

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

МЕТОДИЧНІ ВКАЗІВКИ

до виконання контрольних завдань для виміру якості навчання з курсу
«Загальна екологія» для студентів навчально-наукового інституту економі-
ки, менеджменту і міжнародного бізнесу

METHODICAL INSTRUCTIONS

for doing control tasks to determine the quality of studying on discipline
«Ecology» for students of Institute of Education and Science in Economics,
Management and International Business

Затверджено
редакційно-видавничою
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Методичні вказівки до виконання контрольних завдання для виміру якості навчання з курсу «Загальна екологія» для студентів навчально-наукового інституту економіки, менеджменту і міжнародного бізнесу / Уклад. Тихомирова Т. С., Філенко О. М., Стаднік В. Ю. – Харків : НТУ «ХПІ», 2018. – 24с.

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INTRODUCTION

Existence in the world is made up of living and non living things. The two groups have to coexist in order to share the resources that are available within the environmental ecosystem. To understand about this mutual co relationship we need to study and understand ecology. We are all part of the ecosystem.

Ecology is defined as the scientific study of interactions of organisms (both biotic and abiotic) with one another within the physical and chemical environment. Ecology involves use of scientific methodology via lab experiments to understand how the different organisms grow, populate, how they interact with other organisms either as parasites, predators, how the organisms die out as well as how they evolve or adapt to changing climatic and environmental situations. The study of ecology is all about connections. By carefully using the principles of ecology, we can learn to predict, extinguish, counteract and prevent potentially adverse effect we might have on the globe around us.

Questions for self-control are given in this methodical instruction as tests. Also correct answers are present. Topics for reports, presentation are represented as well as example of PowerPoint presentation.

1. TESTS-QUESTION FOR MODULE #1

«Base of ecology»

Variant 1

1. What does science ecology study?

- a) all living organisms all over the world;
- b) how to protect nature from human;
- c) systems of living organisms and the interactions among organisms and between the organisms and their environment;
- d) how to protect yourself from pollutions.

2. What does ecophysiology and behavioral ecology studies?

- a) the interactions between species within an ecological community;
- b) adaptations of the individual to its environment;
- c) there is no such brunch of ecology;
- d) processes and relationship across multiple ecosystems or very large geographic areas.

3. What is biosphere?

- a) The biosphere is the part of the earth, including air, land, surface rocks, and water, within which life occurs, and which biotic processes in turn alter or transform;
- b) The biosphere is the part of the earth, including all live organisms;
- c) The biosphere is the part of the earth where the humane activity is present;
- d) The biosphere is all earth without humane.

4. Can a stump be an ecosystem?

- a) yes;
- b) no.

5. Ecological abiotic factors are:

- a) water, sun energy, trees;
- b) air, water, animals, human activity;
- c) nitrogen and phosphorus content in soil, water balance, wind;
- d) water, air, soil, temperature, light, natural disasters.

6. Interspecific relations are:

- a) those which are established between individuals of the same species, forming a population;

- b) interaction between population of carnivore and predator;
- c) interactions between different species;
- d) those which are established between animals and their food.

7. Greenhouse gases are

- a) sulfur oxide, methane, ozone;
- b) carbon dioxide, methane, nitrous oxide;
- c) CO, CO₂, HF, Cl₂;
- d) C₂H₆, CO, NO.

8. Indirect sources of water pollution is:

- a) contaminants that enter the water supply from soils/groundwater systems and from the atmosphere via rainwater;
- b) pollution from cultivating of agricultural plants;
- c) outfalls from factories, refineries, waste treatment plants etc.. that emit fluids of varying quality into urban water supplies;
- d) there is no such type of sources of water pollution.

9. Why does the tropical rainforest so important for people from all over the world?

- a) because it is the greatest resources for wood industry;
- b) because it is the home for many animals;
- c) because there are a lot of unknown plants in rainforests;
- d) because it is the world's greatest resource – the most powerful and bio-actively diverse natural phenomenon on the Earth.

Variant 2

1. What does science ecology study?

- a) how to protect air, land and water from pollution;
- b) systems of living organisms and the interactions among organisms and between the organisms and their environment;
- c) all population of animals in the world;
- d) global changing of climate.

2. What does community ecology studies?

- a) there is no such brunch of ecology;
- b) adaptations of the individual to its environment;
- c) the interactions between species within an ecological community;

d) processes and relationship across multiple ecosystems or very large geographic areas.

3. What is ecosystem?

a) An ecosystem can be defined as any situation where there is interaction between organisms and their environment;

b) An ecosystem can be defined as any situation where there is interaction between nature and pollutions;

c) An ecosystem can be defined as any situation where there is interaction between humane and nature;

d) An ecosystem can be defined as any situation where there is interaction between industrial enterprises and ecology laws.

4. Can a stone be an ecosystem?

a) no;

b) yes.

5. Intraspecific relations are:

a) those which are established between animals and their food;

b) interactions between different species;

c) those which are established between individuals of the same species, forming a population;

d) interaction between population of carnivore and predator.

6. What categories of organisms are present in ecosystem?

a) trees, animals, birds, mushrooms;

b) plants and animals;

c) bacteria, birds, animals;

d) producers, consumers, decomposers.

7. Greenhouse effect is:

a) the result of air pollution by all human's enterprises;

b) the result of air pollution from cars all over the world;

c) the result of heat absorption by certain gases in the atmosphere and re-radiation downward of a part of that heat;

d) the result of heat absorption of carbon dioxide.

8. Acid rain is caused by

a) sulphur dioxide and nitrous oxides;

b) carbon dioxide, methane, nitrous oxide;

c) C₂H₆, CO, NO;

d) carbon dioxide and ozone.

9. Direct sources of water pollution is:

a) pollution from cultivating of agricultural plants;

b) contaminants that enter the water supply from soils/groundwater systems and from the atmosphere via rainwater;

c) there is no such type of sources of water pollution;

d) outfalls from factories, refineries, waste treatment plants etc.. that emit fluids of varying quality into urban water supplies.

2. ANSWERS FOR TEST #1

| Variant 1 | Variant 2 |
|-----------|-----------|
| 1-c | 1-b |
| 2-b | 2-c |
| 3-a | 3-a |
| 4-a | 4-b |
| 5-d | 5-c |
| 6-c | 6-d |
| 7-b | 7-c |
| 8-a | 8-a |
| 9-d | 9-d |

3. TESTS-QUESTION FOR MODULE #2
«Ecological problems of different technological cycles»

Variant 1

1. Nonrenewable resource of energy are:

- a) gas, oil, sun, uranium;
- b) oil, coal, water;
- c) gas, oil, coal;
- d) sun, water, oil.

2. The natural gas power production process begins with:

- a) with the extraction of natural gas and ends with its combustion in boilers and turbines to generate electricity;
- b) with the extraction of natural gas, continues with its treatment and transport to the power plants, and ends with its combustion in boilers and turbines to generate electricity;
- c) with the extraction of natural gas and continues transport to the power plants;
- d) with the extraction of natural gas, continues with its treatment and transport to the power plants, and ends with its combustion in boilers.

3. At the power plant, the burning of natural gas produces:

- a) nitrogen oxides and carbon dioxide, but in lower quantities than burning coal or oil;
- b) nitrogen oxides, sulfur oxide, carbon dioxide;
- c) nitrogen oxides and carbon dioxide, but in higher quantities than burning coal or oil;
- d) carbon dioxide.

4. The largest quantities of water needed when we produce electricity from:

- a) oil;
- b) coal;
- c) water;
- d) gas.

5. Choose correct assertion:

- a) Burning municipal solid waste produces only mercury compounds and dioxins;

- b) Emissions associated with generating electricity from solar technologies are unknown because this technology is «too young»;
- c) Hydropower's air emissions are negligible because no fuels are burned;
- d) Biomass power plants emit nitrogen oxides.

6. Landfill gas:

- a) is created when microorganisms cause organic waste, such as food wastes and paper, to decompose in landfills;
- b) is created when we extract oil from land;
- c) is created when we try to decompose our food wastes;
- d) there is no such type of gas.

7. Health acute effects of toxic materials is:

- a) not occur until some point after the exposure;
- b) that occur immediately after a single exposure;
- c) that produce an adverse effect on one or more organ systems in the body after repeated exposure;
- d) that produce an adverse effect on one or more organ systems in the body after a single exposure.

8. Organic farming is a method of crop and livestock production that:

- a) forbidden to use pesticides;
- b) allows to produce agriculture products only for farms' families needs;
- c) forbidden to use genetically modified organisms;
- d) forbidden to use pesticides, fertilizers, genetically modified organisms, antibiotics and growth hormones.

9. Choose correct assertion:

- a) organic products required less energy and less land than conventional ones;
- b) per unit of product, organic produce generates low nitrogen leaching;
- c) organic milk, cereals, and pork generated higher greenhouse gas emissions per product than conventional ones;
- d) organic products better for the environment.

10. Speaking about ecological problems of megacities we use term «radiative forcing». It means:

- a) possibility of using nuclear energy;
- b) net change in the energy balance of the Earth system due to some imposed perturbation;

- c) radiative wastes in municipal dumps;
- d) we hadn't use such term.

Variant 2

1. Renewable resource of energy are:

- a) gas, oil, sun, uranium;
- b) oil, coal, water;
- c) gas, oil, coal;
- d) sun, wind, water, solid wastes.

2. Nuclear power plant use:

- a) uranium? that was extracted from the earth through traditional mining techniques or chemical leaching;
- b) enriched fuel from uranium ore (uranium oxide pellets);
- c) plutonium ore;
- d) tritium, cesium, krypton, neptunium.

3. Burning municipal solid wastes produce:

- a) methane;
- b) toxic dust and ash;
- c) nitrogen oxides and sulfur dioxide as well as trace amounts of toxic pollutants, such as mercury compounds and dioxins;
- d) nitrogen oxides and sulfur dioxide.

4. The largest quantities of water needed when we produce electricity from:

- a) sun;
- b) oil;
- c) coal;
- d) wind.

5. Choose correct assertion:

- a) hydropower has no air quality impacts;
- b) photovoltaic systems require the use of any water to create electricity;
- c) biomass power plants emit a lot of sulfur dioxide;
- d) wind technologies produce some substantial amount of solid waste while creating electricity.

6. The idea of solar-thermal technology is:

a) to concentrate the sun's rays with mirrors or other reflective devices to heat what you need;

b) need to use wafers made of silicon or other conductive materials;

c) to gather sun light for lightening;

d) to concentrate the sun's rays with mirrors or other reflective devices to heat a liquid to create steam, which is then used to turn a generator and create electricity.

7. Health acute effects of toxic materials is:

a) not occur until some point after the exposure;

b) that produce an adverse effect on one or more organ systems in the body after repeated exposure;

c) that occur immediately after a single exposure;

d) that produce an adverse effect on one or more organ systems in the body after a single exposure.

8) «Certified organic» is:

a) trade mark;

b) a term given to products produced according to organic standards as certified by one of the certifying bodies;

c) document, that farmers can give for their products;

d) any label at fruits.

9. Choose correct assertion:

a) organic farming promotes not to use crop rotations and cover crops, and encourages balanced host/predator relationships;

b) the principal goal of organic production is to develop enterprises that can give bigger profit than other;

c) artificial fertilizers were first created during the mid-17th century;

d) organic produce can usually qualify for higher prices than non-organic products.

10. Speaking about ecological problems of megacities we use term «radiative forcing». It means:

a) net change in the energy balance of the Earth system due to some imposed perturbation;

b) possibility of using nuclear energy;

c) radiative wastes in municipal dumps;

d) we hadn't use such term.

4. ANSWERS FOR TEST #1

| Variant 1 | Variant 2 |
|-----------|-----------|
| 1-c | 1-d |
| 2-b | 2-b |
| 3-a | 3-c |
| 4-b | 4-c |
| 5 -c | 5 -a |
| 6-a | 6-d |
| 7-b | 7-c |
| 8-d | 8 -b |
| 9-c | 9-d |
| 10-b | 10-a |

5. TOPIC OF REPORT OR PRESENTATION ON DISCIPLINE «ECOLOGY»

1. Ecological problems of big cities (megalopolises).
2. The biggest anthropogenic accidents in the world.
3. Theories of life evolution on the Earth.
4. Famous actors, who do much for environment protection.
5. Michael Jackson and his «Earth Song»: how did they influence society.
6. Organic farming: principles and prospect in Ukraine and all over the world.
7. Animals, which are included to the Red List in Ukraine.
8. Plants, which are included to the Red List in Ukraine.
9. How governments of different countries struggle against increasing population.

Topics for presentations

1. Global warming (2 students).
2. The most beautiful waterfall in the world (2 students).
3. Problem with fresh water in Africa (2 students).
4. Environmental certification marks (2 students).

Topics of posters

1. Against natural fur using for our clothes (2 students).
2. Against nuclear weapon (2 students).

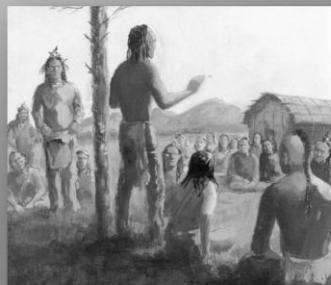
6. EXAMPLE OF POWER POINT PRESENTATION

Niagara Falls



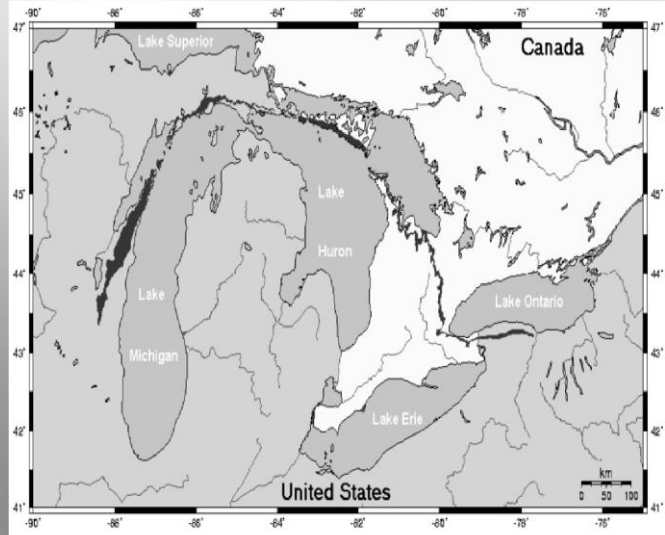
The origin of the name

ONE OF THE EARLIEST NATIVE TRIBES CALLED THEMSELVES THE "ONGUIAAHRA". IN 1641 THE ONGUIAAHRA INDIANS WERE THE PREDOMINANT TRIBE ALONG THE NIAGARA RIVER. THE FRENCH MODIFIED THIS TRIBE NAME TO THE WORD "NEUTRAL" BECAUSE IT WAS EASIER TO TRANSLATE. A FRENCH MAP DATED 1680 REFERS TO A DESTROYED NEUTRAL INDIAN VILLAGE SITUATED CLOSE TO THE NIAGARA RIVER AS "NIAGAGEREGA" NIAGARA ORIGINATES FROM THE NEUTRAL INDIAN NAME "ONGNIAAHRA" MEANING "THUNDER OF WATERS". .



Main information

NIAGARA FALLS CONSISTS OF TWO WATERFALLS ON THE NIAGARA RIVER, WHICH MARKS THE BORDER BETWEEN NEW YORK AND ONTARIO, CANADA - THE AMERICAN FALLS, LOCATED ON THE AMERICAN SIDE OF THE BORDER AND HORSESHOE FALLS LOCATED ON THE CANADIAN SIDE. TO THE RIGHT OF THE AMERICAN FALLS IS A SMALLER WATERFALL THAT HAS BEEN SEPARATED FROM THE AMERICAN FALLS BY NATURAL FORCES, WHICH IS USUALLY CALLED BRIDAL VEIL FALLS. IT IS ESTIMATED THAT 12,000 YEARS AGO WHEN THE FALLS WERE FORMED, THE EDGE OF THE FALLS WAS AS MUCH AS SEVEN MILES FURTHER DOWN RIVER THAN IT IS TODAY. UNTIL THE 1950S, WHEN THE FLOW OF WATER BEGAN TO BE CONTROLLED, THE BRINK OF THE FALLS MOVED BACKWARD AN ESTIMATED ONE FEET EVERY YEAR BECAUSE OF EROSION (THIS MEANS THAT IN 50 THOUSAND YEARS



Do the Falls freeze over in the winter?

THE TREMENDOUS VOLUME OF WATER NEVER STOPS FLOWING, HOWEVER, THE FALLING WATER AND MIST CREATE ICE FORMATIONS ALONG THE BANKS OF THE FALLS AND RIVER. THIS CAN RESULT IN MOUNDS OF ICE AS THICK AS FIFTY FEET. IF THE WINTER IS COLD FOR LONG ENOUGH, THE ICE WILL COMPLETELY STRETCH ACROSS THE RIVER AND FORM WHAT IS KNOWN AS THE "ICE BRIDGE". THIS ICE BRIDGE CAN EXTEND FOR SEVERAL MILES DOWN RIVER UNTIL IT REACHES THE AREA KNOWN AS THE LOWER RAPIDS. UNTIL 1912, VISITORS WERE ALLOWED TO ACTUALLY WALK OUT ON THE ICE BRIDGE AND VIEW THE FALLS FROM BELOW.





How is the water used?

The waters of the Niagara River are used by a combined Canada/United States population of more than 1,000,000 people

- drinking water
- recreation (boating, swimming, bird-watching)
- fishing
- industrial cooling water supply
- receiver of municipal and industrial effluents
- hydro-power generation (Sir Adam Beck Station in Ontario & New York State Power Authority)



Why is the water so green?



THE STARTLING GREEN COLOUR OF THE NIAGARA RIVER IS A VISIBLE TRIBUTE TO THE EROSION POWER OF WATER. AN ESTIMATED 60 TONS OF DISSOLVED MINERALS ARE SWEEPED OVER NIAGARA FALLS EVERY MINUTE. THE COLOUR COMES FROM THE DISSOLVED SALTS AND "ROCK FLOUR," VERY FINELY GROUND ROCK, PICKED UP PRIMARILY FROM THE LIMESTONE BED BUT PROBABLY ALSO FROM THE SHALES AND SANDSTONES UNDER THE LIMESTONE CAP AT THE FALLS.



Niagara Falls at night



Peak numbers of visitors occur in the summertime, when Niagara Falls are both a daytime and evening attraction. From the Canadian side, floodlights illuminate both sides of the falls for several hours after dark (until midnight).

From the American side, the American Falls can be viewed from walkways along Prospect Park, which also features an observation tower. Nearby, the Cave of the Winds trail leads hikers down some three hundred steps to a point beneath Bridal Veil Falls



Amazing Views





CONCLUSIONS

The methodical indications are developed for the foreign students, whom studying subject «Ecology» in English.

Also, the methodical indications are aimed for more deep learning of the lecture material with help of the self-control method.

The questions and answers, which are given in this methodical instruction, are at the limits of the lecture material only.

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Навчальне видання

Методичні вказівки

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