**SECTION 1. HISTORY, TRADITIONS AND PROBLEMS OF POST GRADUATE EDUCATION**

**1 Read text 1.**

**TEXT 1. POST GRADUATE EDUCATION**

Postgraduate education (or graduate education in North America) involves learning and studying for degrees, professional or academic certificates, or other qualifications for which a first or Bachelor’s degree is generally required. The organization and structure of postgraduate education varies in different countries, as well as in different institutions within countries.

In some programs in the traditional German and Dutch systems, there is no legal distinction between “undergraduate” and “postgraduate”. In such programs, all education aims towards the Master’s degree, whether introductory (Bachelor’s level) or advanced (Master’s level). The aim of the Bologna process is to abolish this system.

There are two main types of qualifications studied for at the postgraduate level: academic and vocational degrees. The term *degree* in this context means the moving from one stage or level to another (from French *degre*, from Latin *de-+gradus*), and first appeared in the 13th century.

Although systems of higher education date back to ancient Greece, China, the Indian subcontinent and Africa, the concept of *postgraduate* education depends upon the system of awarding degrees at different levels of study, and can be traced to the workings of European medieval universities. University studies took six years for a Bachelor degree and up to twelve additional years for a master’s degree or doctorate. The first six years taught the faculty of the arts, which was the study of the seven liberal arts: arithmetic, geometry, astronomy, music theory, grammar, logic, and rhetoric. The main emphasis was on logic. Once a Bachelor of Arts degree had been obtained, the student could choose one of the three faculties – law, medicine, or theology – in which to pursue master’s or doctor’s degrees. Theology was the most prestigious area of study, and considered to be the most difficult.

The degrees of master (magister) and doctor were for some time equivalent, the former being more in favour at Paris and the universities modeled after it, and the latter at Bologna and its derivative universities. At Oxford and Cambridge the title of Master was used for the Faculty of Arts, and the title of Doctor being used for the Faculties of Law, Medicine, and Theology. Because theology was thought to be the highest of the subjects, the doctorate came to be thought of as higher than the master’s.

In most countries. The hierarchy of postgraduate degrees is as follows:

**Master’s degrees (Postgraduate)**

These are sometimes placed in a further hierarchy, starting with degrees such as the Master of Arts and Master of Science, then Master of Philosophy, and finally Master of Letters. In the UK Master’s degrees may be taught or by research. Both last one year and are worth 90 ECTS (European Credit Transfer and Accumulation System) European credits but research is much more extensive. The Master of Philosophy degree lasts 2 years. Professional degrees can last to three and a half years to satisfy professional requirements.

**Doctorates (Postgraduate)**

These are often divided into academic and professional doctorates. An academic doctorate can be awarded as a Doctor of Philosophy (PhD or DPhil), or as a Doctor of Science (DSc). The scientific doctor degree can also be awarded in specific fields. A doctorate is the terminal degree in most fields. In the United States, there is little distinction between a PhD/DPhil and DSc. In the UK, PhD degrees are often equivalent to 270 ECTS European credits.

In the UK and countries whose education systems were founded on the British model, such as the US, the master’s degree was for a long time the only postgraduate degree normally awarded, while in most European countries apart from the UK, the master’s degree almost disappeared. In the second half of the 19th century, however, US universities began to follow the European model by awarding doctorates, and this practice spread to the UK. Conversely, most European universities now offer master’s degrees paralleling or replacing their regular systems.

**2 Decide if the statements below are TRUE or FALSE.**

1The system of postgraduate education is standardized worldwide.

2 The word “degree” means making step-by-step progress.

3 Postgraduate education dates back to the Middle Ages.

4 Bachelor’s degree is a starting point for postgraduate education.

5 Theology was the most complicated field of study and that is why it was not popular.

6 The European universities were modeled after the two oldest universities placed in France and Italy.

7 Master’s degrees were typically received at the universities modeled after Bologna University.

8 At the medieval universities special attention was given to rhetoric.

9 In Great Britain titles for both Master and Doctor meant no difference.

10 At present students who study in Great Britain need 270 ECTS for their Master’s degrees.

11 Awarding Master’s degree is typical for the majority of European countries.

12 The idea of the Bologna process was to introduce new rules and standards in European education system.

**3 Complete the sentences below.**

1 Postgraduate education requires . . . . . . . . .

2 . . . . . . . . . . . . originated in the 13th century.

3 . . . . .. . . . . . . .could be found in the workings of European medieval universities.

4 The list of the liberal arts included . . . . . . . . . . .

5 Theology was considered . . . . . . . . . . . .

6 An academic doctorate can be awarded as . . . . . . . . . . .

or as . . . . . . . . . . . .

7 In Great Britain . . . . . . . . . . . . to 270 ECTS European credits.

**4Match the words from the text with their definitions.**

Written or printed statement, made

by smb. in authority, used as a proof

or evidence of smth. aim

Keeping things different. certificate

To give or grant. distinction

Idea, general notion. rhetoric

Purpose, object. to award

Have a place after in space, time or order. concept

Stress on a word/words to show

importance. to follow

The second of two already mentioned. emphasis

Related to the Middle Ages. the latter

Using words impressively in speech or

writing. medieval

**5 Read the verbs below and try to remember in what context they come up in the text.**

to obtain to abolish

to involve to aim

to satisfy to award

**6 Use the words and phrases in the sentences of your own.**

to date back concept

apart from as well as

to follow the former, . . .the latter

finally for a master’s degree

**7 Review the use of prepositions.**

1 The US universities began to follow the European model . ... . .. .

awarding doctorates.

2 The concept of postgraduate education depends . . . . the system of awarding degrees . . . . different levels of study.

3 The structure of postgraduate education varies . . . .different countries.

4 These degrees were equivalent . . . . . some time.

5 Postgraduate doctorates are divided . . . . academic and professional.

6 The main emphasis was . . . logic.

7 All education aims . . . . . the Master’s degree.

8 There is no legal distinction . . . . . a PhD and DSc.

9 The word “degree” means moving . . . one level . . . another.

10 A doctorate is the terminal degree . . . . most fields.

**8 Translate into English.**

1У статті розглянуто виникнення та розвиток відомої концепції.

2 Ви можете використовувати ідеї та думки інших авторів, однак не забувайте вказувати посилання на їх роботи.

3 Він обговорив з керівником як загальний план дослідження, так і етапи його виконання.

4 Крім Великої Британії ці стандарти й норми застосовуються в усіх європейських країнах.

5 Теорія має соціальне та фізичне обґрунтування, перше можна знайти у працях грецьких філософів, а останнє є предметом обговорення серед сучасних експертів.

6 Список учасників проекту є наступний: . . . . .

**9 Share your ideas and views on the following topics.**

1 Two types of degrees obtained at the postgraduate level.

2 The problem of unification of European educational standards.

3 The term ‘degree’. Its origin and development.

4 The role of European medieval university in the development of modern postgraduate training.

5 The system of ECTS European credits. Meaning and role.

6 PhDs and DScs.

7 Postgraduates degrees in the UK and US.

8 Postgraduate degrees system in modern Europe.

## TEXT 2. POSTGRADUATE EDUCATION IN UKRAINE

In Ukraine Postgraduate education is regarded as specialized [education](http://en.wikipedia.org/wiki/Education" \o "Education) and [professional training](http://en.wikipedia.org/wiki/Professional_development" \o "Professional development) on the basis of the previously obtained educational-proficiency level and experience of the practical work. It is defined as [retraining](http://en.wikipedia.org/wiki/Retraining" \o "Retraining), specialization within a [profession](http://en.wikipedia.org/wiki/Profession" \o "Profession); expansion of the professional profile; probation within a profession, i.e. post-qualifying education or [continuous professional development](http://en.wikipedia.org/wiki/Continuous_professional_development" \o "Continuous professional development). The system of Postgraduate training serves as a ground for [lifelong learning](http://en.wikipedia.org/wiki/Lifelong_learning" \o "Lifelong learning).

At doctoral level Ukraine has a two-degree system. The first qualification is the [***Candidate of Sciences***](http://en.wikipedia.org/wiki/Candidate_of_Sciences) (scientific degree of [*Kandidat Nauk*](http://en.wikipedia.org/wiki/Kandidat_Nauk)) which normally requires at least three years of study after the award of the [Specialist](http://en.wikipedia.org/wiki/Specialist_degree) or the Master [diploma](http://en.wikipedia.org/wiki/Diploma) and is achieved by submitting and defending a [thesis](http://en.wikipedia.org/wiki/Thesis) ([dissertation](http://en.wikipedia.org/wiki/Dissertation)), as well as following [post-graduate studies](http://en.wikipedia.org/wiki/Post-graduate_studies) (*[aspirantura](http://en.wikipedia.org/wiki/Aspirantura" \o "Aspirantura)*) in the specialist field. The second qualification is the ***[Doctor of Sciences](http://en.wikipedia.org/wiki/Doctor_of_Sciences" \o "Doctor of Sciences)*** (scientific degree of *[Doktor Nauk](http://en.wikipedia.org/wiki/Doktor_Nauk" \o "Doktor Nauk)*), the highest degree in Ukraine which is achieved by [dissertation](http://en.wikipedia.org/wiki/Dissertation" \o "Dissertation) that must make an original contribution to a given field of learning, and after a period of further studies (*doktorantura*) following the award of [Kandidat Nauk](http://en.wikipedia.org/wiki/Kandidat_Nauk" \o "Kandidat Nauk) degree.

Doctoral study programmes (post-graduate course, [aspirantura](http://en.wikipedia.org/wiki/Aspirantura" \o "Aspirantura) – for [Kandidat Nauk](http://en.wikipedia.org/wiki/Kandidat_Nauk" \o "Kandidat Nauk) degree and doctoral course, doktorantura – for [Doktor Nauk](http://en.wikipedia.org/wiki/Doktor_Nauk" \o "Doktor Nauk) degree) can be opened in higher education institutions of the third and fourth levels of accreditation or in [research institutes](http://en.wikipedia.org/wiki/Research_institute" \o "Research institute) and their branches.

The two [doctoral degrees](http://en.wikipedia.org/wiki/Doctoral_degree" \o "Doctoral degree) can be earned in two ways: as a result of studies in [aspirantura](http://en.wikipedia.org/wiki/Aspirantura" \o "Aspirantura) and doktorantura or independently. The public defense of the [dissertation](http://en.wikipedia.org/wiki/Dissertation" \o "Dissertation) is held in the form of a public [presentation](http://en.wikipedia.org/wiki/Presentation" \o "Presentation) and [scientific debates](http://en.wikipedia.org/wiki/Scientific_debate" \o "Scientific debate).

The postgraduate education system in Ukraine, as many note, needs reformation, since it largely remains highly bureaucratised and outdated. Pretty much following the tradition established in the Soviet times, the Ukrainian postgraduate education system iscurrently  struggling with accommodating its existing traditions with the western-type approaches towards the academia.

## TEXT 3.

## INTERNATIONAL STUDY, EXCHANGE AND RANKINGS

According to 2013 figures of the [Minister of Education](http://en.wikipedia.org/wiki/Ministry_of_Education_%28Ukraine%29" \o "Ministry of Education (Ukraine)) there are 61,000 foreign students in Ukraine.

According to foreign educational experts there are too many small universities in Ukraine, the majority of which are ineffectively governed and mired in [corruption](http://en.wikipedia.org/wiki/Corruption_in_Ukraine" \l "Corruption_in_higher_education" \o "Corruption in Ukraine). They are not able to withstand existing global challenges. The same experts point out that the quality of doctoral education is bad, particularly in management training, economics, law and languages. All of them also signaled that the greatest problem in the Ukrainian education system is corruption.

None of the Ukrainian higher educational institutions was included in the 2011–2012 [Times Higher Education World University Rankings](http://en.wikipedia.org/wiki/Times_Higher_Education_World_University_Rankings). Ukraine was again not included in the Times Higher Education World University Rankings in 2013. No Ukrainian university has ever been ranked in the [Academic Ranking of World Universities](http://en.wikipedia.org/wiki/Academic_Ranking_of_World_Universities). Nor in the [Performance Ranking of Scientific Papers for World Universities](http://en.wikipedia.org/wiki/Performance_Ranking_of_Scientific_Papers_for_World_Universities). However, the [QS World University Rankings](http://en.wikipedia.org/wiki/QS_World_University_Rankings" \o "QS World University Rankings) 2013/14 listed four Ukrainian higher educational institutions including [Taras Shevchenko National University of Kyiv](http://en.wikipedia.org/wiki/Taras_Shevchenko_National_University_of_Kyiv" \o "Taras Shevchenko National University of Kyiv) (ranked 441-450), [Kyiv Polytechnic Institute](http://en.wikipedia.org/wiki/Kyiv_Polytechnic_Institute" \o "Kyiv Polytechnic Institute) (601-650), [Donetsk National University](http://en.wikipedia.org/wiki/Donetsk_National_University" \o "Donetsk National University) and [Kharkiv Polytechnic Institute](http://en.wikipedia.org/wiki/Kharkiv_Polytechnic_Institute" \o "Kharkiv Polytechnic Institute) (both 701+). In the [Webometrics Ranking of World Universities](http://en.wikipedia.org/wiki/Webometrics_Ranking_of_World_Universities" \o "Webometrics Ranking of World Universities) Taras Shevchenko National University of Kyiv (838th) is the highest ranked university, Kyiv Polytechnic Institute and [Kharkiv National University](http://en.wikipedia.org/wiki/Kharkiv_National_University" \o "Kharkiv National University) are (also) ranked in the top 2000, and 303 are ranked lower than that (the lowest is Kherson State Maritime Academy at place 20,942).

**TEXT 4. TIME IS RUNNING OUT FOR HIGHER EDUCATION REFORMS IN UKRAINE**

Despite the political instability, reform of Ukrainian higher education is still among governmental priorities.Work on amendments to the draft law on higher education had been performed and on July 1, 2014, the law on higher education in Ukraine was finally adopted.

The law gives rights to Ukrainian universities to resolve many issues around the structure and content of their educational and scientific programmes. It creates a non-governmental agency for quality assurance in higher education, which will authorize the opening of new programmes for all degrees. In fact, the agency will enforce minimal requirements for the learning process according to ministry-approved standards.

According to the law, quality should be a major factor because universities will be required to implement internal monitoring of the quality of the education they offer and regularly publish their results.

Ukrainian universities will be authorized for the final recognition of foreign diplomas and degrees.

For the first time, foreign professors will become equal in the rights they have with their Ukrainian colleagues, which will facilitate their involvement in the educational process. Universities will be able to establish full and guest courses with foreign professors.   
 The law guarantees financial autonomy. It legalises endowments for universities, reduces the number of customs and taxes on their activities and allows universities to manage their own money rather than the state treasury. Financial autonomy does not mean lack of control over spending. This function was simply passed from the ministry to non-governmental bodies and members of the university community.

The law requires the administration to publish online approved budgets for a university and its projects, information on property, data concerning the distribution of wages and other documents. Moreover, only the highest collective body of the university may allow the transfer of university property to another party.

It is also important that the law puts an end to the supremacy of rectors in Ukrainian universities.Firstly, according to the draft law, rectors are elected by all employees and students in general, secret and direct elections. The votes of faculty will weigh 75%, students 15%, and other staff - 10%. Secondly, the procedure of withdrawal from the post of rector has been simplified, meaning rectors will have to take into account the opinion of the university community. Thirdly, the term of a rector’s contract at all universities will be five years and one person can be a rector for a maximum of two terms. The law guarantees opportunities for constant public control of university authorities.

Another significant change that the law will introduce is the reduction of the tutorial workload both for teachers and students.  
The law reduces that load by a third. This change will allow many university teachers to extend the time they spendon researchactivities. The workload will be also reduced for students because the number of hours in one ECTS credit will be 30 instead of 36 hours. In turn, workload reduction for students creates the conditions for fighting plagiarism. The fight against plagiarism will be a way of internally monitoring education quality and should be implemented in all universities. In addition, the draft law demands the online publication of all dissertations.

Last but not least – for the first time there is the possibility of legal guarantees for individuals with disabilities. Ukrainian universities are still not available for these people.  
education inaccessible to people with disabilities for a long time.   
The law imposes on universities a duty to provide everything needed for a normal learning process for people with disabilities.  
 All these and many other changes are supposed to transform Ukrainian universities radically. This reform is fundamental.

**1 Read text 5.**

**TEXT 5. THE UNIVERSITY OF BOLOGNA**

The University of Bologna is recognized as the oldest university in continuous operation, considering that it was the first to use the term *universitas* for the corporation of students and masters which came to define the institution.

The date of its founding is uncertain. The university received a charter from Frederick I Barbarossa in 1158, but in the 19th century, a committee of historians traced the founding of the University back to 1088, which would make it the oldest continuously-operating university in the world.

The University arose around mutual aid societies of foreign students called “nations”(as they were grouped by nationality) for protection against city laws which imposed collective punishment on foreigners for the crimes and debts of their countrymen. These students then hired scholars from the city to teach them. With time the various “nations|” decided to form a larger association, or *universitas* – thus, the university. The university grew to have a strong position of collective bargaining with the city, since by then it derived significant revenue through visiting foreign students, who would depart if they were not well treated. The foreign students in Bologna received greater rights, and collective punishment was ended. There was also collective bargaining with the scholars who served as professors at the university. By the initiation or threat of a student strike, the students could enforce their demands as to the content of courses and the pay professors would receive. University professors werehired, fired and had their pay determined by an elected council of two representatives from every student “nation” which governed the institution, with the most important decisions requiring a majority vote from all the students to ratify. The professors could also be fined if they failed to finish classes on time, or complete course material by the end of the semester. A student committee, the “Denouncers of Professors” kept tabs on them and reported any misbehavior. Professors themselves were not powerless, however, and formed a College of Teachers, and secured the rights to set examination fees and degree requirements. Eventually, the city ended this arrangement, paying professors from tax revenues, and making it a chartered public university.

The university is historically notable for its teaching canon and civil law; indeed, it was set up in large part with the aim of studying *Digest*, a central text in Roman law, which had been rediscovered in Italy in 1070, and the university was central in the development of medieval Roman law. Until modern times, the only degree granted at that university was the doctorate.

Nowadays the University offers 101 different first-level degrees (three years of courses), followed by 108 second-level degrees (two years). After second-level degrees are obtained, one may proceed to 2nd level Master, specialization schools, or doctorates of research (PhD).Higher education processes are being harmonized across the European Community.

**2 Decide if the statements below are TRUE or FALSE.**

1 The University of Bologna is unique in its way.

2 The University of Bologna was founded in 1158.

3 The first university students were foreigners.

4 The students grouped for legal protection.

5 The students fought for their rights successfully.

6 The Bologna students could influence the system of education.

7 The teachers were out of control at Bologna university.

8 The university studies were focused on languages.

9 The university continued the traditions of studying Roman law.

10 Today the university is best known in the context of setting up new educational standards.

**3 Complete the sentences below.**

1 The term*universitas* was first used for . . . . . . . .

2 The university . . . . . . . . . . . . . . . . . . in 1158.

3 . . . . . .. . . . . . . . . . . . . . . . by nationality.

4 The students hired scholars to . . . . . . . . . . . .

5 With time the university had a strong position of . . . . . . . . .

6 There was . . . . . . . . . . . . . . . . . . . . . . . as professors.

7 Two representatives from every student nation . . . . . . . . . .

8 ,. . . . . . . . . . . . . . . reported any misbehavior of professors.

9 A central text in Roman law is . . . . . . . . . . . . .

10 Until modern times, . . . . . . . . . . . . . . . . . was the doctorate.

**4 Match the words below with their definitions.**

The highest university degree

Penalty for wrongdoing

Person of one’s own country

Money paid by citizens to the government for public purposes

Protecting or being protected

To act or behave towards smb.

Income, especially the total annual income

To obtain the use of services in return for fixed payment

Person with much knowledge of particular subject

To agree to buy, sell or exchange smth. after discussion

(Protection, to hire, to bargain, to treat, revenue, scholar, doctorate, punishment, countrymen, tax)

**5 Use the words and phrases in the sentences of your own.**

To be recognized as

To serve as professors

To have a strong position of

To treat well

To govern the institution

To set degree requirements

To be central in smth.

To be not powerless

To finish classes on time

To enforce demands

To complete course material

To report misbehavior

To be notable for

To obtain degrees

To harmonize European Community higher education

**6 Review the use of prepositions.**

1The founding of the university was traced back . . . . . 1088.

2 The university appeared . . . . . . mutual aid societies of foreign students.

3 The city laws imposed collective punishment . . . . foreigners .. . .

The crimes and debts of their countrymen.

4 The city got good revenue . . . . . .visiting foreign students, who would depart if they were not well treated.

5 The professors’ pay was determined . . . . an elected council.

6 There were two representatives . . . . every student nation.

7 The city paid professors . . . . tax revenues.

8 *Digest* was a central text . . . . Roman law.

**7 Translate into English.**

1 Ця технологія визнана як найбільш ефективна.

2 Теорія цього вченого не дужа популярна серед його співвітчизників.

3 Іноземні студенти мають такі ж самі права, як і українські.

4 Найбільш важливі рішення щодо діяльності університету приймаються ректором та його помічниками.

5 Деяким студентам не вдалося підготувати та здати роботи вчасно.

6 Студентська рада не обирає студентського ректора.

7 Цього викладача спершу було найнято, а потім звільнено за наказом ректора університету.

8 На початку навчального року студентів інформують про вимоги, необхідні для отримання позитивної оцінки.

9 Наший університет пропонує два рівні навчання: бакалаврат та магістратура.

10 Європейська спільнота впливає на формування норм та стандартів сучасної вищої освіти.

**8 Share your ideas and views on the following topics.**

1 The foundation of Bologna university.

2 The appearance of *universitas.*

3 The foreign students in Bologna and their rights.

4 The rediscovery of Roman law. Studying *Digest.*

5 The role of Bologna university in the formation of a modern European educational system.

**1 Read text 6.**

**TEXT 6. THE BOLOGNA PROCESS**

The Bologna process is a series of ministerial meetings and agreements between European countries designed to ensure comparability in the standards and quality of higher education qualifications. Through the Bologna Accords, the process created the

European Higher Education Area, in particular under the Lisbon Recognition Convention. It is named after the place it was proposed, the University of Bologna, with the signing of the Bologna declaration by Education Ministers from 29 European countries in 1999, forming a part of European integration.

Prior to the signingof the Bologna declaration, the *Magna Charta Universitatum* had been issued at a meeting of university rectors celebrating the 900th anniversary of the University of Bologna – and thus of European universities – in 1988. One year before the Bologna declaration, education ministers from France, Germany, Italy and the UK signed the Sorbonne declaration in Paris 1998, committingthemselvesto harmonizing the architecture of the European Higher Education System.

In 1999 after adoption of the Bologna Declaration the common European education space was created. General principles of getting higher education, the possibility of student migration and the irrelevance of the language barrier became the main advantages of the Declaration. A new concept is the student mobility. This is facilitated by a system for obtaining academic degrees, and a system of unified credits that evaluate the amount of student’s work. Moving to another college, the unified credits (ECTS) of the previous institution are accepted. That is, contrary to the usual form that we consider not only credit or mark on a particular course are accepted, but the number of attended hours and the amount of work on the subject.

The Bologna process currently has 47 participating countries. The European Commission is an important contributor to the Bologna Process.

**2 Complete the sentences.**

1 The Bologna process was designed to . . . . . . . . . . . . . . . .

2 The Bologna Declaration was signed . . . . . . . . . . . . . . . .

3 The Bologna process was named after . . . . . . . . . . …. ..

4 . . . . . . . . . . . . . . . . . . . . . the common European education space was created.

5 We consider that not only marks on the course are accepted, but . . . . . . . . . . . . . . . . . . . . . .

6 . . . . . . . . . . . . . . . . . an important contributor to the Bologna process.

**3 Translate into English.**

Забезпечити співставлення стандартів та якості вищої освіти

Створення європейського освітнього простору

Прийняття Болонської Декларації

Мовний бар’єр

На противагу звичайній формі оцінювання

Міністри освіти з країн Європи підписали декларацію

**4 Say what you remember/know about**

European Higher Educational Area

Magna Charta Universitatum

Adoption of the Bologna Declaration

**1 You are going to read the text about the role of postgraduate supervisors. Below are some phrases from this text. Try to complete them properly.**

1 Your supervisor is expected to be your . . . . .

A fellow student B fellow researcher C fellow passenger

2 Supervisors give research students feedback on their . . . .

A prospects B process C progress

3 Any research student must keep an accurate . . . . . of his/her supervisor’s feedback.

A record B remark C reform

4 Take seriously any … . . that your supervisor makes.

A satisfaction B suggestion C salutation

5 Make time to . . . . . on your supervisor’s advice.

A respect B reflect C repeat

6 You have to prepare the final draft of your thesis for . . . . .

A subordination B subdivision C submission

7 Supervisory meeting are important for both . . . . .

A kinds B sides C slides

8 Your supervisor will help you to develop your working . . . . .

A plane B plan C plain

9 Your supervisor and you should discuss frequency and format of your supervisory . . . . .

A greetings B sittings C meetings

10 Your supervisor will help you to develop your personal . . . . .

A bills B skills C pills

**2 Now read text 7 and check your choices.**

**TEXT 7. ROLE OF POSTGRADUATE SUPERVISORS**

Every research student has a supervisory team among the members of the University’s academic staff but there should be one member who is designed as your first supervisor. This is the member who carries primary responsibility for your supervision and most of your interactions will be with this person. This person attends formal supervisory meeting with you and reads and comments on the final draft version of your thesis before it is submitted for examination.

Your researcher will act as your mentor, trainer, supporter, critic and fellow researcher. The most important thing is to recognize that supervisors are not to tell students what to do every step on the way. A research degree is an independent research project and a research student is responsible for its success. You will be expected to show that you can plan and manage your work, develop and communicate your ideas, and deliver on time a thesis of an appropriate standard. Supervisors provide advice on the ideas that research students develop, give them feedback on their progress, help them develop their competences as researchers.

Your supervisor will provide advice and guidance to help you:

develop appropriate research practice and refine your plans and ideas;

find and use relevant literature;

understand relevant rules and regulations.

But of course, it is your responsibility to follow that advice. It can be very easy to hear positive comments and overlook the negative ones. Make time to reflect on the advice and take seriously any suggestions they make.

Your supervisor will also provide feedback on your work and progress through:

formal supervisory meetings;

comments on draft written work and findings/results;

reviewing your thesis before submission for examination.

It is important that you keep an accurate record of the feedback that your supervisor provides especially when you come to prepare the final draft of your thesis for submission. When submitting your draft written work or findings/results for comment make sure that this is well organized and presented. Allow your supervisor sufficient time to provide you with feedback.

Your supervisor will help you to develop yourself and your skills by:

working with you to develop an appropriate training plan;

providing coaching or training in research skills relevant to your work;

helping you understand the importance of a broad based training programme including skills necessary for your career development and enhancing your employability.

Your supervisor has a particular interest that you develop skills you will need to complete your research degree, but it is important that you look to develop communication skills, personal leadership, and team working.

Having regular formal supervisory meetings is usually beneficial for both sides. At the start of your research you and your supervisor should discuss frequency and format of your formal supervisory meetings, responsibility for scheduling them. Formal supervisory meetings are an opportunity for you to discuss your progress, describe your findings, and alert your supervisor to any problems. These meetings are an important part of your working relationship with your whole supervisory team. It is important that you spend some time thinking about what you can do to make these meetings as constructive as possible.

**2 Answer the questions.**

1 Are teachers from your department responsible for your research?

2 What roles does your supervisor have to play?

3 Must your supervisor control every step of your research very carefully?

4 What portion of responsibility is placed on a research student?

5 In what way do you and your supervisor share responsibility?

6 What does your supervisor’s guidance include?

7 What kinds of activities can your supervisor provide for feedback?

8 What requirements must your thesis draft meet?

9 What personal skills are you expected to develop when doing your research?

10 What is the basic form of your cooperation with your supervisor?

**3 Sort out the list below into three categories:**

**1 Things a research student must do.**

**2 Things a supervisor must do.**

**3 Things you both must do.**

To attend meetings

To carry responsibility for research

To submit a thesis

To act as a fellow researcher

To provide advice and guidance

To give feedback

To develop researcher’s competences

To find and use relevant literature

To take suggestions and critics seriously

To follow advice

To keep an accurate record of the feedback

To allow time for feedback provision

To develop a training plan

To train relevant skills

To schedule meetings

To complete research program

To develop personal leadership

To make meetings constructive

**4 Derive nouns from the adjectives and verbs below.**

Accurate - to train –

Beneficial - to manage –

Frequent - to find –

Supervisory - to interact –

Relevant - to attend –

Responsible - to submit –

Constructive - to guide -

Necessary - to provide

**5 Speak on the following topics.**

Your supervisor’s and your own responsibilities.

The roles that your supervisor may play.

Important things a research student must remember and do.

Supervisory meetings and their importance.

**SECTION 2. EDUCATION AND SCIENCE IN THE MODERN WORLD**

**1 Make sure that you understand the following words and word combinations.**

Intensive intergovernmental contacts, education issues, international cooperation initiates, European dimensions in education, competitiveness, transportability of degrees and qualifications, decade, sustainable development, global education market, EU Education Council, qualified personnel, strategic alliances, intercultural competence, spatio-temporal boundaries.

**2 Read the text.**

**TEXT 1. INTERNATIONAL COOPERATION IN EDUCATION**

Never before have there been so many different opportunities for international cooperation in education. This development is the result of intensive intergovernmental contacts, which have led to multilateral cooperation initiatives. UNESCO and the Council of Europe serve as forums for international discussion of education issues and both give valuable support to international cooperation initiatives and projects relating to education. At present EU cooperation focuses on the European dimensions in education, student and teacher mobility and cooperation between educational institutions.

In higher education the main EU forum is the **Bologna Process**, in which the aim is to improve the competitiveness and attraction of European higher education vis-à-vis other continents. The EU is promoting the transportability of degrees and qualifications for study or work purposes.

Тhe United Nations have declared the years 2005 to 2014 the world decade on "Education for Sustainable Development." With the newly planned European support programme for education, training, youth, and sports, up to 5 million people will be able to complete part of their education abroad - that's almost twice as many as in the past. This is the future EU support programme for the period of 2014-2020 envisaged by the position of the EU Education Council.

With the rise of globalization, institutions of higher education need to become more international in order to operate effectively in the global education market. This also calls for more student and scientist exchanges. As a result, international exchange has become an even more important requirement for modern universities, top-quality research and innovation.

The internationalization of industry and the working world is increasingly calling for qualified personnel with foreign language skills, intercultural competence, and knowledge of other economic regions and business practices. It is never too early to start acquiring these skills.

Massification and marketization of higher education have led to severe competition, and globalization has also led to more strategic alliances among multiple partners across national borders. Coupled with the advancement of information technology, universities are now operating across spatio-temporal boundaries.

Sumy State University is a signatory of Magna Charta Universitatum and a full member of International Association of Universities, European Association of Universities, Eurasian Association of Universities, World Health Organization, Association of Economic Universities of South and Eastern Europe and the Black Sea Region and other international organizations.

Sumy State University international cooperation area involves more than 100 partners abroad from Austria, Belgium, Canada, China, Check Republic, Germany, Great Britain, Japan, Latvia, Lithuania, Poland, Romania, the Russian Federation, Sweden, the USA and other countries of the world.

Sumy State University is a reliable partner in international grant programs and projects of EU (Tempus, Erasmus Mundus, Youth in Action), United Nations Development Program, World Bank, bilateral scientific and research projects, grants of private foundations. Within the last 5 years the amount of research works submitted for international grant projects has increased by about 20 times.

Sumy State University actively develops academic mobility programmes, including long-term and short-term study abroad programmes, internships and placement programmes; professional development and research programmes for postgraduate students, research and teaching staff, using technologies of credit transfer and recognition of academic results.

**3 Answer the questions.**

1 What did modern cooperation in education result from?

2 What European organizations plan and support the development of educational cooperation at the highest level?

3 What are current focuses of the EU cooperation in education?

4 What is the main purpose of the Bologna process?

5 What do you know about the program “Education for Sustainable Development”?

6 What are the international needs and challenges of modern education?

7 What makes cooperation among modern universities so specific?

8 What international membership has SSU got by now?

9 What countries are considered to be the international partners of SSU?

10 What international programs is SSU involved into?

**4 Complete the sentences.**

1 Intensive intergovernmental contacts have led to . . .

2 The aim of the Bologna process is . . .

3 The years 2005-2014 were declared . . .

4 . . . need to become more international.

5 . . . is increasingly calling for qualified personnel with foreign language skills.

6 Sumy State University cooperation involves . . . international partners.

**5 Use proper prepositions.**

1 Intensive intergovernmental contacts have led … multilateral cooperation initiatives.

2 UNESCO and the Council of Europe serve … forums … international discussion of education issues and both give valuable support … international cooperation initiatives and projects relating … education.

3 The internationalization … industry and the working world is increasingly calling … qualified personnel … foreign language skills, intercultural competence, and knowledge of other economic regions and business practices.

4 Coupled … the advancement of information technology, universities are now operating … spatio-temporal boundaries.

**6 Translate into English.**

1 Головним майданчиком обговорення освітніх проблем у Європі є ЮНЕСКО та Рада Європи.

2 Співрацю у галузі європейської освіти сфокусовано на мобільності як викладачів, так і студентів.

3 З метою ефективного функціонування на глобальному освітньому ринку вища освіта має стати більш міжнародною.

4 Ніколи не пізно набувати нові навички.

5 Сучасні університети співпрацюють без часових або просторових кордонів.

**7 Share your thoughts and ideas on the following points.**

1 European dimensions in education today.

2 The role of UNESCO and the Council of Europe in promoting European standards of education.

3 The Bologna process. Aims and objectives.

4 The growing needs for international education.

5 The international activities of SSU.

**1 Read text 2A.**

**TEXT 2A. INTERNATIONAL COOPERATION IN SCIENCE**

**AND RESEARCH:** **CERN**

The **European Organization for Nuclear Research**, known as **CERN i**s a [European](http://en.wikipedia.org/wiki/Europe" \o "Europe) research organization. Established in 1954, the organization is based in the northwest suburbs of [Geneva](http://en.wikipedia.org/wiki/Geneva" \o "Geneva) on the Franco–Swiss border and has 21 European [member states](http://en.wikipedia.org/wiki/CERN" \l "Member_States). [Israel](http://en.wikipedia.org/wiki/Israel" \o "Israel) is the first (and currently only) non-European country granted full membership. The convention establishing CERN was ratified on 29 September 1954 by 12 countries in Western Europe.

The term CERN is also used to refer to the laboratory, which in 2013 counted 2513 staff members, and hosted some 12,313 fellows, associates, apprentices as well as visiting scientists and engineers representing 608 universities and research facilities and 113 nationalities.Soon after the laboratory's establishment, its work went beyond the study of the [atomic nucleus](http://en.wikipedia.org/wiki/Atomic_nucleus" \o "Atomic nucleus) into [higher-energy physics](http://en.wikipedia.org/wiki/High-energy_physics" \o "High-energy physics), which is concerned mainly with the study of interactions between [particles](http://en.wikipedia.org/wiki/Subatomic_particle" \o "Subatomic particle). Therefore the laboratory operated by CERN is commonly referred to as the European laboratory for particle physics. CERN's main function is to provide the [particle accelerators](http://en.wikipedia.org/wiki/Particle_accelerator" \o "Particle accelerator) and other infrastructure needed for high-energy physics research – as a result, numerous experiments have been constructed at CERN following international collaborations. It is also the birthplace of the [World Wide Web](http://en.wikipedia.org/wiki/World_Wide_Web" \o "World Wide Web).

The [World Wide Web](http://en.wikipedia.org/wiki/World_Wide_Web" \o "World Wide Web) began as a CERN project called [ENQUIRE](http://en.wikipedia.org/wiki/ENQUIRE" \o "ENQUIRE), initiated by [Tim Berners-Lee](http://en.wikipedia.org/wiki/Tim_Berners-Lee" \o "Tim Berners-Lee) in 1989 and [Robert Cailliau](http://en.wikipedia.org/wiki/Robert_Cailliau" \o "Robert Cailliau) in 1990. Based on the concept of [hypertext](http://en.wikipedia.org/wiki/Hypertext" \o "Hypertext), the project was aimed at facilitating sharing information among researchers. The first website went on-line in 1991. On 30 April 1993, CERN announced that the World Wide Web would be free to anyone.

As of 2014, CERN receives contributions from states with a total population of about 517 million people.

Ukraine and CERN signed a cooperation agreement in 1993, and a joint declaration in 2011, setting priorities in scientific-technical cooperation. The Associate Membership of Ukraine opened a new era of cooperation, strengthened the long-term partnership between CERN and the Ukrainian scientific community. Associate Membership allows Ukraine to participate in the governance of CERN, through attending the meetings of the CERN Council. Moreover, it allows Ukrainian scientists to become members of the CERN staff, and to participate in CERN’s training and career-development programmes. Finally, it allows Ukrainian industry to bid for CERN contracts, thus opening up opportunities for industrial collaboration in areas of advanced technology.

**2 Answer the questions.**

1 How long has the CERN project lasted?

2 Why do we call it an example of the international cooperation project?

3 What is the main function of CERN?

4 How is World Wide Web related to CERN?

5 What is known about investments into the project?

6 Can we see Ukraine among CERN’ members?

7 What opportunities has the Associate Membership opened for the Ukrainian scientific community?

8 What can you add to the information presented in the text?

9 What do you know about Large Hadron Collider?

**3 Read text 2B.**

**TEXT 2B.** [**LARGE HADRON COLLIDER**](http://en.wikipedia.org/wiki/Large_Hadron_Collider)

Most of the activities at CERN are currently directed towards operating the new [Large Hadron Collider](http://en.wikipedia.org/wiki/Large_Hadron_Collider) (LHC), and the experiments for it. The LHC represents a large-scale, worldwide scientific cooperation project.

[](http://en.wikipedia.org/wiki/File:Construction_of_LHC_at_CERN.jpg) The detector for [LHC](http://en.wikipedia.org/wiki/Large_Hadron_Collider" \o "Large Hadron Collider) at CERN

The LHC tunnel is located 100 metres underground, in the region between the [Geneva International Airport](http://en.wikipedia.org/wiki/Geneva_International_Airport" \o "Geneva International Airport) and the nearby [Jura mountains](http://en.wikipedia.org/wiki/Jura_mountains" \o "Jura mountains). It uses the 27 km circumference circular tunnel.

The initial particle beams were injected into the LHC in August 2008. The first attempt to circulate a beam through the entire LHC was at 8:28 GMT on 10 September 2008, but the system failed because of a faulty magnet connection, and it was stopped for repairs on 19 September 2008.

The LHC resumed operation on Friday 20 November 2009 by successfully circulating two beams, each with an energy of 3.5 trillion electron volts. The challenge that the engineers then faced was to try to line up the two beams so that they smashed into each other.

At 12:00 BST on Tuesday 30 March 2010 the LHC successfully smashed two proton particle beams travelling with 3.5 TeV (trillion electron volts) of energy, resulting in a 7 TeV [event](http://en.wikipedia.org/wiki/Event_%28particle_physics%29" \o "Event (particle physics)). However, this was just the start of the road toward the expected discovery of the [Higgs boson](http://en.wikipedia.org/wiki/Higgs_boson" \o "Higgs boson).

In July 2012, CERN scientists announced the discovery of a new sub-atomic particle that could be the much sought after Higgs boson believed to be essential for formation of the Universe.In March 2013, CERN announced that the measurements performed on the newly found particle allowed to conclude that this is a Higgs boson.

Most of the roads on the CERN campus are named after famous physicists, e.g.- Richard Feynman, Niels Bohr, Albert Einstein.

**4 Decide if the statements below are True or False.**

1 The first attempt to set up LHC was successful.

2 In September 2008, LHC was stopped and repaired.

3 Two circulating beams ran in parallel at high speed.

4 The LHC experiment made scientists announce a new sub-atomic

particle.

5 Newly discovered particle can throw the light on our Universe formation.

6 There is the Star Alley on the CERN campus.

7 Visitors to CERN can go through history when working along the CERN roads.

**5 Answer the questions.**

1 What is known about the location of the LHC?

2 What is the idea of the experiment with circulating beams?

3 What is a Higgs boson?

**1 Read text 3.**

**TEXT 3 THE INFLUENCE OF MODERN TECHNOLOGY ON**

**SOCIETY: GOOD OR BAD?**

Nowadays we are witnessing a shift in the role technology is playing in our society. In the modern-day world technology is no longer a tool for survival but it turned to a means of communication and entertainment. Mass communication technology has made it easier than ever to connect with people. At the same time this raises the concern of whether technology has a good or bad influence on our society, is the use of technology destroying face-to-face interaction and communication between people?

Whenever you’re in a coffee shop, standing at a bus stop or taking the tube you can easily see how people are connected to each other using different sorts of electronic devices. The primary concern regarding this new communication behavior is whether it made face-to-face interaction and communication between people nonexistent. This is true in many aspects as this may lead to living in a virtual world that only includes interacting with people with texting and social networks. This leads to the ability for people to be lonely, as having too many virtual friendships causes the inability to establish meaningful relationships. The young generations in our society are participating in a massive, unintentional social experiment the results of which are not entirely predictable.

The lack of communication affects also relationships inside families. It is quite common in today’s society for a family to eat dinner completely separate from each other – almost purposely avoiding face-to-face communications. On the other hand there might be an explanation for this phenomenon: husbands, wives, boyfriends and girlfriends no longer go entire days without speaking to each other on the phone, emailing each other, facebooking each other or texting each other. So when they get home they just are not excited to sit and talk to one another.

The paradox of the mass communication technology is that we are growing more distant from each other when we choose to make smartphones, computers, television, and the like our primary means of communicating with each other. It is true that the long-term social effects of modern communication are still to be seen but it doesn’t seem, at least for now, like they are more helpful than destructive to society. It is clear today that scientists cannot control many risky and dangerous processes. Any mistake can lead to disaster.

The achievements of sciences are impressive. Medical science has extended the human life span by about 4 times what it was before 1700s. Astronomy has been the foreground of every great discovery in fundamental physics since the dawn of civilization. Physics perpetuates the works which give the understanding of the world and universe as a whole. Chemistry is responsible for every industrial material you can name. Biology has vastly improved all understanding of the way life was created, it thrives thus fueling all medical and life research. Engineering has brought everything from bridges, buildings, roads, planes to computers, satellites, space stations and nanotechnology from the grasp of the ever inquisitive scientist and into the home of the common person. Technology develops fast but the global issues that still cover the entire planet are the following:

1 Environmental consequences of the scientific and technological

progress which really cause alarm.

Non-renewable natural resources (oil, gas, coal, metal ore, etc) are approaching exhaustion. Renewable resources (oxygen, forests, flora and fauna) do not have time to recover.

Irreversible use of air, water and soil also takes place.

Energy consumption has reached a critical level striking the energy balance of our planet. Concentration of carbon dioxide and heating of the atmosphere result from the greenhouse effect.

2 The war and peace problem is especially urgent. Even a local nuclear war can damage the atmosphere.

3 The gap between the developed, developing and underdeveloped countries is deepening.

4 We are facing the spiritual degradation and devaluation of moral values. Welfare, high standards of living and selfishness of people in the developed countries are opposed to poverty, hatred and envy coming from people in the underdeveloped countries.

**2 Decide if the statements below are TRUE or FALSE.**

1 Technology has gained a new basic function.

2 Communication through social networks puts people into the real world.

3 Schoolchildren and students are the participants of the well planned experiment.

4 Family members stay face-to-face less time.

5 The experts are sure that modern communication gadgets are more helpful than destructive.

6 Modern people live much longer than those in the 17th century.

7 Living standards are increasing globally.

8 Countries and nations are opposed to each other today and this trend tends to be stable.

**3 Match the halves of the sentences.**

1 Modern information technologies

2 People with virtual friendships

3 When using smartphones and computers

4 Thanks to medical science

5 Any local nuclear war

6 Poor countries

7 Moral values

are unable to have real relationships.

make human communication easier.

may destroy the whole world.

people become distant from each other.

are getting even poorer.

are losing their importance.

our life span has grown a lot.

**4 Complete the sentences.**

1 It is still unclear whether technology has . . . . . . . . . . . on our society.

2 People start living in the virtual world when they interact . . . .

3 Today many family members avoid . . . . . . . . . . . . . . . . . . . . . .

4 We . . . . . . . . . . . . . . . . . . . . . . . . .from each other.

5 Global environmental situation . . . . . . . . . . . . . . . .

6 . . . . . . . . . . . . . . . . . . . . is as urgent as never before.

7 The world is facing . . . . . . . . . . . . . . . . . . moral values.

8 The greenhouse effect causes . . . . . . . . . . . . . . . . . . . .

**5 Make statements related to the text using the nouns below.**

communication

interaction

generation

television

exhaustion

consumption

concentration

**6 Use the following adjectives in the sentences of your own.**

predictable

renewable

irreversible

**7** **Say what you know about**

the greenhouse effect,

face-to-face communication today,

virtual world where some people live,

progress in medicine,

global spiritual degradation.

**1Read text 4.**

**TEXT 4. IS TECHNOLOGY MAKING US STUPID?**

We have become so dependent on technology that we are losing our ability to solve problems and remember the most basic information. If we need an answer to a question, we look it up on the internet. If we need a phone number, we look it up on our cell phones. People often use a calculator to multiply single-digit numbers. When you rely on technology to think for you, you do not think for yourself. The first thing to suffer is our memory. We don’t try even to remember birthdays because they are stored on our electronic organizers. We don’t try to remember appointments because they are noted in our calendars. We stop relying on our memory because we know we don’t need to remember anything anymore.

Technology has harmed our communication skills, and, in particular, our language skills. We use electronic translators and depend on word processor to correct spelling and grammar mistakes. In general, most of e-mails and texts are badly written. We are either losing language skills because we have never learned them, or because technology makes learning obsolete.

We turn our attention to our ringing cell phone while being focused on something, such as reading a book or having a conversation. We live in a state of being constantly interrupted by technology, and this prevents us from being able to focus on one thing at a time.

We have stopped challenging ourselves. When something has no quick and easy solution, we tend to move on to something else.

Technology does not stimulate but kills creativity. It prevents us from original thinking for ourselves. Instead we look something up on the internet as it is easier. We need to be taught and develop an ability to moderate and balance the use of technological tools. We need this to develop and stimulate our brains to solve complex problems that computers cannot solve. Technology helps us to get information and results. It is like an automobile that helps us to go faster, but we must still exercise our muscles to get around. We must learn to balance technology and our own natural abilities, to use our brains as well as our machines.

All technology can be used either well or badly. Cognitive-extension technologies may change the nature of our intelligence, but there is no reason to think that they reduce it. They can alienate us from the world around, but only if we let them.

Cognitive-extension technologies are not new. The written language is one of the oldest forms to record our thoughts and memories in external form. It resulted in a gradual loss of outstanding memory that people used to have in pre-literate cultures. Did we become more stupid after developing the written language?

True creativity is only possible after you have mastered a certain body of knowledge. And for this you need a “library” of knowledge, which is what the internet is gradually becoming.

It is sad to see people using their cell phones in restaurants as they have so little to say to the person they are with. It seems more like technology giving us an excuse to be rude.

When we are writing a research paper on our computer, we often have many windows open because we simultaneously compare, contrast and filter information from a large number of sources. Thus we do not reduce the demands on our attention. Actually we concentrate harder.

The assumption that intelligence is exclusively what your brain does, and that everything else is a sort of a base or support for this, is naïve. Ever since we started developing cognitive-extension technologies like written language, intelligence has always, at least partly, been a matter of what you can do with the world around you. Thinking is not something we do exclusively in our head; it is also something we do in the world.

Our brains may be the center of huge information networks stretching out into the world through the technologies we build, but there is no reason to suppose that our brains will not always be at this center.

**2 Decide if the statements below are TRUE or FALSE.**

1 Modern people don’t often think for themselves.

2 Electronic gadgets help develop our memory.

3 Modern people are losing their grammar and spelling skills.

4 Technology makes us be focused on it any moment.

5 We are becoming lazier in thinking.

6 People must exercise their brains as well as they do with their muscles.

7 It depends on the person how to use technology effectively.

8 The development of the written language made people more stupid.

9 Computer can help us develop mental skills.

10Applied with gadgets people badly need new rules of communication**.**

**3 Complete the sentences.**

1 . . . to multiply single-digit numbers.

2 Today all birthdays are stored . . .

3 Technology . . . our language skills.

4 We live in a state of . . .

5 . . . kills creativity.

6 We must learn to balance . . .

7 All technology can be used either . . .

8 True creativity is possible after you have mastered . . .

9 It is said to see . . .

10 . . . we compare, contrast and filter information from a large number of sources.

**4 Match the halves of the phrases below due to the text.**

1 We must exercise our muscles

2 We need to be taught

3 We use a word processor

4 Students use a lot of sources

5 People use calculators

A to do research.

B to develop and stimulate our brains.

C to get around.

D to correct spelling and grammar mistakes.

E to multiply numbers.

**5 Match the adjectives below with their opposites.**

External simple

Gradual small

Written internal

Huge spoken

Stupid fast

Complex clever

Constant joyful

Sad rare

**6 Fill in the blanks with the appropriate prepositions.**

1 Lots of information is stored today . . . our electronic organizers.

2 We don’t need to remember anything and stop relying . . . our memory.

3 Even being focused . . . something we turn our attention . . . our ringing cell telephone.

4 We are constantly interrupted . . . technology.

5 Technology prevents us . . . being able to focus on one thing at a time.

6 Huge information networks stretch . . . . . . the world . . . the technologies we build.

**7 Translate into English. Remember to use the following words and word combinations from the text: instead, there is no reason, in general, actually, at least partly, in particular.**

1 Насправді він не торкається цього питання у своєму дослідженні.

2 Немає ніякого сенсу обговорювати це двічі.

3 Взагалі ми погоджуємося з вашими аргументами.

4 Компанія повинна змінити свою кадрову політику хоча б частково.

5 Вони допомагали нам у виконанні проекту, зокрема у проведенні дослідів.

6 Сьогодні в нас не буде лекції. Замість неї ми матимемо практичне заняття.

**8 Share your ideas on the following topics:**

Pros and contras of the internet;

The way cell phones have changed our communication;

The way modern technology influences our intelligence;

How to balance technology and human abilities.

**1 Read text 5.**

**TEXT 5. LIBRARY VS THE INTERNET**

## We live in the information age, where access to many wonderful Internet resources is just a few quick clicks away. For this reason, you might be thinking, "Cool. I don't have to go to the library. I can do all my research online.” Not so fast. The Internet is not a substitute for the library. It is a tool best used in addition to traditional research sources. Why use both? Because each has resources, benefits, and limitations that the other do not. Examine the pros and cons of both the library and the Internet below.

**Pros of libraries**

Uses universal cataloging systems that classify and organize all resources.

Houses professional books, newspapers, magazines, and other resources that have been edited and reviewed prior to their publication.

Provides free access to journals, magazines, newspapers, encyclopedias, and other print reference works.

Often has archived materials—newspapers and magazines—that date back many years.

Offers a free Internet connection and other electronic resources, such as reference CD-ROMs.

Has knowledgeable reference librarians to help you locate resources.

**Pros of Internet**

Online resources can be accessed 24 hours a day, 7 days a week.

[Web sites](http://www.classzone.com/books/research_guide/page_build.cfm?content=library) can be constantly updated to provide breaking news and timely information.

Provides opportunities for two-way communication through [e-mail](http://www.classzone.com/books/research_guide/page_build.cfm?content=library), [LISTSERVS](http://www.classzone.com/books/research_guide/page_build.cfm?content=library), and [newsgoups](http://www.classzone.com/books/research_guide/page_build.cfm?content=library).

Provides access to many newspapers, magazines, journals, and encyclopedias.

Some sites feature rare books, documents, and special collections that traditionally have only been available in libraries.

Offers a complete multimedia experience, with text, video, interactive features, audio, hyperlinks, and graphics all in one place.

**Cons of libraries**

Resources can be checked out by other patrons and, therefore, may not always be available.

A library's publications cannot provide up-to-the-minute news and information the way Web sites can.

Closes after hours.

**Cons of Internet**

Has no system that catalogs and organizes all resources.

Anyone with an Internet connection can publish a Web site.

Reliability of information is not guaranteed.

Archived materials might only date back several years.

Some electronic resources are only available through a subscription.

Internet access is often not free.

Does not have knowledgeable librarians who can help you find resources.

The findings indicate the ways in which library service is fundamentally changing. Reductions in physical visits to the library are associated with investments in e-materials such as e-books, which may be an indication that services are moving online, allowing people to perform library transactions such as checking availability of materials, checking them out and returning them online. And, an overall reduction in computer use could correspond with investments in wireless facilities, which libraries have made so that customers can use their own devices. These changes signal the need for new data elements for the survey to allow a closer examination of electronic delivery of library collections and services.

**2 Answer the questions.**

1 Do you use library resources for your research? What kind(s) of them in particular? How long have you been using them?

2 Are you satisfied with the level of services that libraries can provide you with?

3 Do you agree with the arguments presented in the text? If yes/no, explain.

4 What things mentioned in the text are of minor importance or are not available in Ukraine?

5 Can you add your own views on advantages and disadvantages of libraries and the Internet?

**2 Think and say as many library/internet words as you remember.**

**3 Share your ideas on the following topics.**

1 Your personal experience of using both resources of information. (Speak about problems and difficulties you faced. Give some practical hints and recommendations to your classmates.)

2 Predictions on the future of both resources.

3 Sites popular among young people of your age.

4 Sites which may be helpful for young researchers.

5 Sites you visited yesterday and today.

6 Sites which can be used to practice and improve English language knowledge and skills.

**1 Read text 6.**

**TEXT 6. ENGLISH AND SCIENTIFIC RESEARCH: SOME REFLECTIONS**

It is generally accepted that knowledge is for the brain as food for the body, and that a person with knowledge of different languages has greater visions and wider horizons. Without the knowledge of other languages a researcher would have to rely on books and information written only in his native language, which would certainly narrow his thinking.

Michael Faraday once said that any researcher has to follow three major steps: work, analyze and publish. All the three parts are equally important. However, the importance of the language appears in the third part- publishing. In order to publish a research paper in top journals you should have in depth knowledge of English in addition to research content. It does not matter what you invent, you can not publish it till you present it in a format suitable for journals. Although research is fun, writing and publishing papers is a big tension particularly for those who are not well trained in English. Most of us think in our native language, then translate in English. If you present your research in an informal or improper way, no journal will publish it. In simple words, we waste lots of time on writing papers in order to publish. Due to the present system we are spending a lot of time on writing rather than on research.

At present the real output of any scientific research is measured by its impact, hence the level of international journals is determined by their impact factor. How many people cited our papers is more important than how many papers we wrote. To make our papers accessible to a large number of readers, we have to publish our results in a language understood by a large population. Thus one has to publish his/her findings in English.

Most of the world’s leading scientific journals are published in English. Researchers from non-English speaking countries have to spend a significant portion of their time in getting their reports and research papers translated/written them in English. This obviously steals their precious time from laboratory work. For example, in Japan English is becoming the language of basic science resulting in the gradual disappearance of publications in Japanese. RIKEN, one of Japan’s most comprehensive groups of research facilities, has claimed that its scientists published about 2000 original reports in English in 2005, but only 174 in Japanese. One report shows that editing companies in Japan charge researchers $500 to $800 per manuscript. Language training can cost $2000 for a ten-week course. These costs are huge and slow down scientific activities in laboratory.

The researcher whose training is in English could devote more time for their experiments than exercising for language. In many countries students learn basic sciences in the English language environment built at schools and universities. At the international conferences and seminars we can observe the difficulty faced by scientists from the countries which are quite developed in science and technology but are no-native English users. In spite of their good research results, they are sometimes nervous during presentations due to the difficulty in expressing their ideas clearly in English. On the other hand, researchers who studied their courses in English are more confident in presentations even if the merit of their research is not of high standard.

Another case where proficiency in English plays a vital role is in the preparation of research grants proposals. Even a promising project proposal may be rejected because of the lack of logical reasoning. A researcher can consult with professional editors to prepare a proposal. But the fact is that they may not know the technical ideas of the project, and sometimes this joint work may lead to negative results.

Considering the growing need of disseminating research results to a wider population, many Asian and European countries, which used to teach science courses in their native languages, are gradually adopting English as the language of science.

Today people of different areas of expertise have to work together. For the survival in this competitive and rapidly advancing world, everyone has to be able to grasp the new challenges and opportunities. Whoever gets the latest information at the earliest will come ahead and those who miss will certainly lag behind. In which language this communication is being made in a broad scale? Of course, English.

**2 Decide if the statements below are TRUE or FALSE.**

1 Any researcher must rely primarily on the information he can find in his native language.

2 English is especially important for presenting the results of research.

3 The journal editors are happy to publish innovative information whatever its format might be.

4 By impact factor we mean the total number of publications that a researcher has produced.

5 Knowledge of English saves the researchers’ time significantly.

6 Teaching professional English to school and university students is becoming more popular today.

7 All scientists and researchers feel comfortable at the international conferences.

8 Poor English may low down the value of the research.

9 The researcher’s cooperation with professional translators automatically guarantees high standard of scientific English in translation.

10 Scientists and researchers are hunting the information today.

**3 Complete the sentences below.**

1 . . . . . . . . . . . can narrow researcher’s thinking.

2 . . . . . . . . . . . appears to be especially important in publishing.

3 No journal will publish you paper if you . . . . . . . . . . . . . . . . . . .

4 We must present the results . . . . . . . . . . . . . . . by a large population.

5 In Japan . . . . . . . . . . .. . . . . . . . . . . . the language of basic science.

6 English speaking researchers spend . . . . . . . . . . . . . . . . . . . .than exercising for language.

7 . . . . . . . . . . . . . . . . . . . . . may lead to negative results.

8 . . . . . . . . . . . . . . . . . . . . . are gradually adopting English as the language of science.

**4 Read, translate and use in the proper context the words and phrases below.**

Scientific activities

Impact factor

Grant proposals

Joint work

In a broad scale

Project proposals

Top journals

To teach science course in English

To be of high standard

To be well trained in English

To express ideas clearly in English

To narrow one’s thinking

To present in a suitable format

To grasp new challenges and opportunities

To be equally important

To be accessible to a large number of readers

**5 Chose the connectors from the list below to complete the sentences.**

Although, considering, because of, in order to, thus, hence, even if, in spite of, another case, on the other hand, however, due to.

1 . . . . . . . . . . the growing need of presenting research results to a wider population, many countries are adopting English as the language of science.

2. . . . . . . . . . . ., English speaking researchers are more confident in presentations . . . . . . . . . . . . . the merit of their research is not of high standard.

3 We have to publish our results in a language understood by a large population. . . . . . . . one has to publish his findings in English.

4 Work, analysis and publishing are equally important . . . . . . . . . . . , the importance of the language appears in publishing.

5 You should have a good command of English . . . . . . . . . .publish a research paper in top journals.

6 We are spending a lot of time on writing rather than on research . . . the present system.

7. . . . . . . . . . research is fun, publishing papers may be a big tension.

8 A project proposal may be rejected . . . . . . . the lack of logical reasoning.

9 . . . . . . . . . . where proficiency in English plays a vital role is in the preparation of grant proposals.

10 . . . . . . . . . . . their good research results, they are sometimes nervous during presentations.

11 The real output of any research is measured by its impact, . . . . . .the level of international journals is determined by their impact factor.

**6 Match the adjectives from the text on the left with their antonyms on the right.**

gradual foreign

narrow unimportant

basic uncomfortable

huge fast

comprehensive small

native broad

accessible simple

significant hidden

suitable unclear

**7 Fill in proper prepositions.**

1 A researcher must not rely only . . . . . the information written . . . . his native language.

2 The level of a journal is determined . . . . its impact factor.

3 We want make our paper accessible . . . . a large number of readers.

4 Most . . . us think in our native language.

5 Whoever gets the latest information . . . . the earliest will come . . . . …

6 . . . . the other hand, these researchers are more confident in presentations.

7 Many countries are adopting English . . . . the language of science.

**8 Translate into English.**

1 Якщо вчений покладається лише на вітчизняні джерела, він звужує межі власного дослідження.

2 Ваші досягнення нічого не варті доки вони не представлені у фаховому виданні високого рівня.

3 Коли ми спершу пишемо статтю рідною мовою, потім перекладаємо її на англійську, ми марнуємо дорогоцінний час.

4 Навчати студентів та аспірантів їх спеціальності англійською мовою – ефективна та продуктивна ідея.

5 Презентанти з високим рівнем володіння англійською мовою почуваються досить комфортно на міжнародних конференціях.

6 Досліднику, який спілкується з аудиторією без перекладача, значно легше поділитися своїми думками та результатами.

7 Люди зі знанням англійської мови не обов’язково добре знаються на усіх деталях вашої галузі та дослідження.

8 У сьогоднішньому конкурентному науковому світі перевагу має той, хто першим отримає інформацію та зуміє скористатися єю.

**9 Speak briefly on the points below.**

1 Research and native language.

2 Publishing and languages.

3 Effective time management in research writing.

4 International journals and impact factor.

5 Training scientists in English.

6 Presentations and English.

7 Preparation of research grant proposals.

**SECTION 3. SCIENCE :HISTORY AND OUTSTANDING PEOPLE**

**1 Read text 1.**

**TEXT 1. FROM HISTORY OF SCIENCE**

[Science](http://en.wikipedia.org/wiki/Science) is [empirical](http://en.wikipedia.org/wiki/Empirical_knowledge), [theoretical](http://en.wikipedia.org/wiki/Theory), and [practical](http://en.wikipedia.org/wiki/Procedural_knowledge) knowledge about the [natural world](http://en.wikipedia.org/wiki/Nature), produced by scientists who do the observation, [explanation](http://en.wikipedia.org/wiki/Scientific_explanation), and prediction of real world [phenomena](http://en.wikipedia.org/wiki/Phenomenon). The English word *scientist* was first coined in the 19th century. Previously, people investigating nature called themselves [natural philosophers](http://en.wikipedia.org/wiki/Natural_philosophers" \o "Natural philosophers).

In prehistoric times, advice and knowledge was passed from generation to generation in an [oral tradition](http://en.wikipedia.org/wiki/Oral_tradition" \o "Oral tradition). The development of writing enabled knowledge to be stored and communicated across generations with much greater fidelity. Many ancient civilizations collected astronomical information in a systematic manner through simple observation. Basic facts about human physiology were known in some places, and [alchemy](http://en.wikipedia.org/wiki/Alchemy" \o "Alchemy) was practiced in several civilizations.

From their beginnings in [Sumer](http://en.wikipedia.org/wiki/Sumer) (now [Iraq](http://en.wikipedia.org/wiki/Iraq)) around 3500 BC, the [Mesopotamian](http://en.wikipedia.org/wiki/Mesopotamia) people began to record some [observations](http://en.wikipedia.org/wiki/Observation) with [numerical data](http://en.wikipedia.org/wiki/Numerical_data). Astronomical periods identified by Mesopotamian scientists are still widely used in Western calendars such as the [solar year](http://en.wikipedia.org/wiki/Solar_year) and the [lunar month](http://en.wikipedia.org/wiki/Lunar_month). [Ancient Egypt](http://en.wikipedia.org/wiki/Ancient_Egypt) made significant advances in astronomy, mathematics and medicine. They developed [geometry](http://en.wikipedia.org/wiki/Geometry) to preserve farmland, which was flooded annually by the [Nile river](http://en.wikipedia.org/wiki/Nile_river).

The earliest Greek philosophers provided answers to the question: "How did the ordered [cosmos](http://en.wikipedia.org/wiki/Cosmos) in which we live come to be?" [Pythagoras](http://en.wikipedia.org/wiki/Pythagoras) of [Samos](http://en.wikipedia.org/wiki/Samos) founded the [Pythagorean school](http://en.wikipedia.org/wiki/Pythagoreanism), which investigated mathematics and was the first to postulate that the Earth is spherical in shape. [Leucippus](http://en.wikipedia.org/wiki/Leucippus) (5th century BC) introduced [atomism](http://en.wikipedia.org/wiki/Atomism" \o "Atomism), the theory that all matter is made of indivisible particles, especially in [anatomy](http://en.wikipedia.org/wiki/Anatomy" \o "Anatomy), [zoology](http://en.wikipedia.org/wiki/Zoology" \o "Zoology), [botany](http://en.wikipedia.org/wiki/Botany" \o "Botany), [mineralogy](http://en.wikipedia.org/wiki/Mineralogy" \o "Mineralogy), [geography](http://en.wikipedia.org/wiki/Geography" \o "Geography), [mathematics](http://en.wikipedia.org/wiki/Mathematics" \o "Mathematics) and [astronomy](http://en.wikipedia.org/wiki/Astronomy" \o "Astronomy).

In [Hellenistic Egypt](http://en.wikipedia.org/wiki/Ptolemaic_Kingdom" \o "Ptolemaic Kingdom), the mathematician [Euclid](http://en.wikipedia.org/wiki/Euclid" \o "Euclid) introduced the concepts of definition, axiom, theorem and proof still in use today in his *[Elements](http://en.wikipedia.org/wiki/Euclid%27s_elements" \o "Euclid's elements)*. [Archimedes](http://en.wikipedia.org/wiki/Archimedes" \o "Archimedes), one of the greatest mathematicians of all time, is also known in [physics](http://en.wikipedia.org/wiki/Physics" \o "Physics) for laying the foundations of [hydrostatics](http://en.wikipedia.org/wiki/Fluid_statics" \o "Fluid statics), [statics](http://en.wikipedia.org/wiki/Statics" \o "Statics), and the explanation of the principle of the [lever](http://en.wikipedia.org/wiki/Lever" \o "Lever).

The earliest traces of mathematical knowledge in the Indian subcontinent appear with the [Indus Valley Civilization](http://en.wikipedia.org/wiki/Indus_Valley_Civilization" \o "Indus Valley Civilization) (c. 4th millennium BC ~ c. 3rd millennium BC). The first textual mention of astronomical concepts comes from the [Vedas](http://en.wikipedia.org/wiki/Veda" \o "Veda), religious literature of India. Some of the earliest linguistic activities can be found in [Iron Age India](http://en.wikipedia.org/wiki/Iron_Age_India" \o "Iron Age India) (1st millennium BC) with the analysis of [Sanskrit](http://en.wikipedia.org/wiki/Sanskrit" \o "Sanskrit) for the purpose of the correct recitation and interpretation of [Vedic](http://en.wikipedia.org/wiki/Vedas" \o "Vedas) texts. [Ayurveda](http://en.wikipedia.org/wiki/Ayurveda" \o "Ayurveda) is a system of traditional medicine that originated in ancient India before 2500 BC, and is now practiced as a form of [alternative medicine](http://en.wikipedia.org/wiki/Alternative_medicine" \o "Alternative medicine) in other parts of the world.

With the [spread of Islam](http://en.wikipedia.org/wiki/Spread_of_Islam) in the 7th and 8th centuries, a period of [Muslim](http://en.wikipedia.org/wiki/Muslim) scholarship, known as the [Islamic Golden Age](http://en.wikipedia.org/wiki/Islamic_Golden_Age), lasted until the 13th century. The use of a single language, [Arabic](http://en.wikipedia.org/wiki/Arabic_language), allowed communication without need of a translator. Access to [Greek](http://en.wikipedia.org/wiki/Greek_language) texts from the [Byzantine Empire](http://en.wikipedia.org/wiki/Byzantine_Empire), along with [Indian](http://en.wikipedia.org/wiki/History_of_India) sources of learning, provided Muslim scholars a knowledge base to build upon. Muslim scientists placed greater emphasis on [experiment](http://en.wikipedia.org/wiki/Experiment) than had the [Greeks](http://en.wikipedia.org/wiki/Greeks). This led to an early [scientific method](http://en.wikipedia.org/wiki/Scientific_method" \o "Scientific method) being developed in the Muslim world, where significant progress in methodology was made in optics. In [mathematics](http://en.wikipedia.org/wiki/Islamic_mathematics" \o "Islamic mathematics), the [Persian](http://en.wikipedia.org/wiki/Persian_people" \o "Persian people) mathematician [Muhammad ibn Musa al-Khwarizmi](http://en.wikipedia.org/wiki/Muhammad_ibn_Musa_al-Khwarizmi" \o "Muhammad ibn Musa al-Khwarizmi) gave his name to the concept of the [algorithm](http://en.wikipedia.org/wiki/Algorithm" \o "Algorithm), while the term [algebra](http://en.wikipedia.org/wiki/Algebra" \o "Algebra) is derived from *al-jabr*, the beginning of the title of one of his publications. What is now known as [Arabic numerals](http://en.wikipedia.org/wiki/Arabic_numerals" \o "Arabic numerals) originally came from India, but Muslim mathematicians did make several refinements to the number system. Ibn Sina ([Avicenna](http://en.wikipedia.org/wiki/Avicenna" \o "Avicenna)) is regarded as the most influential philosopher of Islam. He pioneered the science of experimental medicine and was the first physician to conduct clinical trials.

An intellectual revitalization of Europe started with the birth of [medieval universities](http://en.wikipedia.org/wiki/Medieval_university) in the 12th century. The contact with the Islamic world allowed Europeans access to scientific [Greek](http://en.wikipedia.org/wiki/Greek_language) and [Arabic](http://en.wikipedia.org/wiki/Arabic_language) texts. The first half of the 14th century saw much important scientific work being done, largely within the framework of [scholastic](http://en.wikipedia.org/wiki/Scholasticism) commentaries on Aristotle's scientific writings. In 1348, the [Black Death](http://en.wikipedia.org/wiki/Black_Death) and other disasters sealed a sudden end to the previous period of massive philosophic and scientific development. The rediscovery of ancient texts was improved after the [Fall of Constantinople](http://en.wikipedia.org/wiki/Fall_of_Constantinople) in 1453, when many [Byzantine](http://en.wikipedia.org/wiki/Byzantine_Empire) scholars found refuge in the West. The introduction of printing democratized learning and allowed a faster propagation of new ideas. These developments paved the way for the [Scientific Revolution](http://en.wikipedia.org/wiki/Scientific_Revolution) which is traditionally held by historians to have begun in 1543. The thesis of Copernicus' book was that the Earth moved around the Sun. The period culminated with the publication of the *[Philosophiæ Naturalis Principia Mathematica](http://en.wikipedia.org/wiki/Philosophi%C3%A6_Naturalis_Principia_Mathematica" \o "Philosophiæ Naturalis Principia Mathematica)* in 1687 by [Isaac Newton](http://en.wikipedia.org/wiki/Isaac_Newton" \o "Isaac Newton).

Through their correspondence European scientists first learned about the Chinese science and culture. Among the technological accomplishments of China were early [seismological](http://en.wikipedia.org/wiki/Seismometer" \o "Seismometer) detectors, the [water-powered](http://en.wikipedia.org/wiki/Hydraulics" \o "Hydraulics) [celestial globe](http://en.wikipedia.org/wiki/Celestial_globe" \o "Celestial globe) , [matches](http://en.wikipedia.org/wiki/Match" \o "Match), the independent invention of the [decimal system](http://en.wikipedia.org/wiki/Decimal" \o "Decimal), [dry docks](http://en.wikipedia.org/wiki/Dry_dock" \l "Graving" \o "Dry dock), sliding [calipers](http://en.wikipedia.org/wiki/Calipers" \o "Calipers), the double-action [piston pump](http://en.wikipedia.org/wiki/Piston_pump" \o "Piston pump), [cast iron](http://en.wikipedia.org/wiki/Cast_iron" \o "Cast iron), the [blast furnace](http://en.wikipedia.org/wiki/Blast_furnace" \o "Blast furnace), the [iron](http://en.wikipedia.org/wiki/Iron" \o "Iron) [plough](http://en.wikipedia.org/wiki/Plough" \o "Plough), the multi-tube [seed drill](http://en.wikipedia.org/wiki/Seed_drill" \o "Seed drill), the [wheelbarrow](http://en.wikipedia.org/wiki/Wheelbarrow" \o "Wheelbarrow), the [suspension bridge](http://en.wikipedia.org/wiki/Suspension_bridge" \o "Suspension bridge), the [winnowing machine](http://en.wikipedia.org/wiki/Winnowing_machine" \o "Winnowing machine), the [rotary fan](http://en.wikipedia.org/wiki/Mechanical_fan" \o "Mechanical fan), the [parachute](http://en.wikipedia.org/wiki/Parachute" \o "Parachute), [natural gas](http://en.wikipedia.org/wiki/Natural_gas" \o "Natural gas) as fuel, the [raised-relief map](http://en.wikipedia.org/wiki/Raised-relief_map" \o "Raised-relief map), the [propeller](http://en.wikipedia.org/wiki/Propeller" \o "Propeller), the [crossbow](http://en.wikipedia.org/wiki/Crossbow" \o "Crossbow), and a solid fuel [rocket](http://en.wikipedia.org/wiki/Rocket" \o "Rocket), the [multistage rocket](http://en.wikipedia.org/wiki/Multistage_rocket" \o "Multistage rocket), the [horse collar](http://en.wikipedia.org/wiki/Horse_collar" \o "Horse collar), along with contributions in [logic](http://en.wikipedia.org/wiki/Logic" \o "Logic), [astronomy](http://en.wikipedia.org/wiki/Astronomy" \o "Astronomy), [medicine](http://en.wikipedia.org/wiki/Medicine" \o "Medicine), and other fields.

The 17th century "Age of Reason" opened the avenues to the decisive steps towards modern science, which took place during the 18th century "Age of Enlightenment". Directly based on the works of [Newton](http://en.wikipedia.org/wiki/Isaac_Newton" \o "Isaac Newton), [Descartes](http://en.wikipedia.org/wiki/Descartes" \o "Descartes), [Pascal](http://en.wikipedia.org/wiki/Blaise_Pascal" \o "Blaise Pascal) and [Leibniz](http://en.wikipedia.org/wiki/Gottfried_Leibniz" \o "Gottfried Leibniz), the way was now clear to the development of modern [mathematics](http://en.wikipedia.org/wiki/Mathematics" \o "Mathematics), [physics](http://en.wikipedia.org/wiki/Physics" \o "Physics) and [technology](http://en.wikipedia.org/wiki/Technology" \o "Technology) by the generation of [Benjamin Franklin](http://en.wikipedia.org/wiki/Benjamin_Franklin" \o "Benjamin Franklin), [Leonhard Euler](http://en.wikipedia.org/wiki/Leonhard_Euler" \o "Leonhard Euler), [Mikhail Lomonosov](http://en.wikipedia.org/wiki/Mikhail_Lomonosov" \o "Mikhail Lomonosov) and [Jean le Rond d'Alembert](http://en.wikipedia.org/wiki/Jean_le_Rond_d%27Alembert" \o "Jean le Rond d'Alembert) . The impact of this process was not limited to science and technology, but affected [philosophy](http://en.wikipedia.org/wiki/History_of_philosophy" \o "History of philosophy), [religion](http://en.wikipedia.org/wiki/History_of_religion" \o "History of religion), and society and politics in general.

The Romantic Movement of the early 19th century reshaped science by opening things unexpected in the classical Enlightenment. Major breakthroughs came in biology, especially in [Darwin's theory of evolution](http://en.wikipedia.org/wiki/Darwinism), physics (electromagnetism), mathematics (non-Euclidean geometry, group theory) and chemistry (organic chemistry). The decline of Romanticism was followed by [Positivism](http://en.wikipedia.org/wiki/Positivism), which began to take the ideals of the intellectuals after 1840 and lasted until about 1880.

**2 Decide if the statements below are TRUE or FALSE.**

1 Historically the word “natural philosopher” was replaced by the word “scientist”.

2 Alchemy was practiced for 100 years.

3 The development of writing made it possible to store and share information.

4 We have to thank Mesopotamian scientists for introduction of the solar year and the lunar month.

5 The students of the school Pythagorean studied astronomy and biology.

6 The concept of atomism is based on indivisibility.

7 The first traces of the alternative medicine can be found in Egypt.

8 The spread of Islam led to the spread of the scientific knowledge.

9 The Greeks built their knowledge on the Indian and Muslim sources of learning.

10 Muslim mathematicians put some innovations into the Indian system of numeration.

11 Avicenna is known for introduction of clinical testing.

12 Europe saw the scientific rebirth in the 10th century.

13 Epidemic diseases could not stop the development of philosophy and science in the Middle Ages.

14 The invention of printing gave a big push to the scientific knowledge spread.

15 The historians consider the Scientific revolution to begin in the 15th century.

16 The European scientists borrowed much from the Chinese inventors.

17 The Age of Enlightenment was followed by the Age of Reason.

18 Romanticism made the way for Positivism.

**2 Check your memorizing skills. Refer the enlisted scientific concepts to their geography and time.**

Scientific concept Country/region Time period

Lunar month

Atomism

Alternative medicine

Algebra

Theory of evolution

**3 Say where these things appeared first.**

Axiom, decimal system, parachute, clinical trials, the Vedas, suspension bridge.

**4 Say where these scientists and scholars belong to.**

Pythagoras, Darwin, Aristotle, Avicenna, Pascal, Leibniz, Copernicus, Lomonosov, Euler, Euclid.

**5 Pick up from the text the information related to the development of medicine, mechanics, astronomy, mathematics, algebra, geometry, biology, physics, philosophy.**

**6 Define the meaning of the words from the text.**

**to observe**

**A B C**

watch carefully plan carefully write carefully

**fidelity**

**A B C**

transparency accuracy currency

**emphasis**

**A B C**

press mess stress

**physician**

**A B C**

doctor rector physicist

**celestial**

**A B C**

related to sky related to time related to past

**impact**

**A B C**

defect effect respect

**refinement**

**A B C**

development achievement improvement

**7 Translate the following phrases into English.**

Явища реального світу, було вжито вперше, доісторичні часи, більш детально, почали фіксувати спостереження, щорічно затоплювати, має форму сфери, сформувати основи, поширення ісламу, Візантійська імперія, започаткувати науку, знайти захист, рішучі кроки, прорив.

**8 Share your understanding of**

Natural philosophy

Concept of indivisibility

Vedic texts

Arabic numerical system

Age of Enlightenment

The Black Death

**1 Read text 2.**

**TEXT 2. NIKOLA TESLA**

Nikola Tesla, a Serbian American inventor, electrical engineer, mechanical engineer, and the designer of the modern alternating current electricity supply system, was born in 1856 to Serbian parents in the village in the Austrian Empire (modern-day Croatia). His father was a Serbian Orthodox priest. His mother had a talent for making home craft tools, mechanical appliances, and the ability to memorize Serbian epic poems. Tesla was the fourth of five children.

In 1870, Tesla started to attend school at Higher Real Gymnasium, were he was profoundly influenced by a math teacher. He finished a four-year term in three years. At school Tesla was able to perform integral calculus in his head, which prompted his teachers to believe that he was cheating.

In 1875, Tesla enrolled at Austrian Polytechnic in Graz on a Military Frontier scholarship. During the first year he earned the highest grades possible and passed nearly twice as many exams as required. At the end of his second year, after the conflict with a professor, Tesla lost his scholarship and became addicted to gambling. He gambled away his tuition money.

In January 1880, Tesla left for Prague where he was to study. Unfortunately, he arrived too late to enroll at Charles-Ferdinand University; he never studied Greek, a required subject; and he was illiterate in Czech, another required subject. He attended lectures, although, as an auditor, he did not receive grades for the courses.

In 1881 Tesla moved to Budapest to work at a telegraph company. During his employment, Tesla made improvements to the Central Station equipment and perfected a telephone amplifier.

In 1882, Tesla began working for the Continental Edison Company in France, designing and making improvements to electrical equipment. In 1884 he relocated to New York City where he was hired by Thomas Edison to work for his company. In 1885 he claimed that he could redesign Edison’s inefficient motor and generators, improving both in service and economy. Tesla fulfilled the task but instead of getting the money that Edison had promised him, Tesla was offered a raise over his week salary. Tesla refused the offer and immediately resigned.

In late 1886 Tesla met Alfred S. Brown, a Western Union superintendent, and New York attorney Charles F. Peck. Together in 1887 they formed the Tesla Electric Company. They also set a laboratory where Tesla worked on improving and developing new types of electric motors, generators and other devices. One of the things Tesla developed there was an induction motor that ran on alternating current, a powers system format that was starting to be built in Europe and the US because its advantages in long distance high voltage transmissions.

In 1888, Tesla’s friend and publicist, arranged for him to demonstrate his alternating current system at the American Institute of Electrical Engineers. George Westinghouse from the Westinghouse Electric & Manufacturing Company decided that Tesla’s patent on rotating magnetic field based induction motor was better among the two presented. Tesla’s alternating current work put him firmly on the “AC” side of the so-called “War of Currents”, an electrical standards battle between Thomas Edison and George Westinghouse. In 1897, because of financial difficulties the Westinghouse Electric broke its licensing agreement with Tesla.

In July 1891, at the age of 35, Tesla became a naturalized citizen of the United States, and established his laboratories in New York. From 1892 to 1894 he serves as vice president of the American Institute of Electric Engineers.

In 1896, after hearing of Wilhelm Rontgen’s discovery of X-ray imaging, Tesla proceeded to do his own experiments in X-ray imaging, developing a high energy single terminal vacuum tube of his own design that had no target electrode and that worked from the output of the Tesla Coil. He considered that his instruments would enable one to generate Roentgen rays of much greater power than with ordinary apparatus.

In 1898, Tesla demonstrated a radio-controlled boat which he called “teleautomation” to the public during an electrical exhibition at Madison Square Garden. He tried to sell his idea to the US army, but they showed little interest. In 1900 Tesla was granted patents for a “system of transmitting electrical energy” and “an electrical transmitter”.

When G.Marconi made his famous first-ever transatlantic radio transmission in 1901, Tesla quipped that it was done with 17 Tesla patents. This was the beginning of years of patent battles over radio with Tesla’s patents being upheld in 1903, followed by a reverse decision in favor of Marconi in 1904. In 1943, a Supreme Court of the United States decision restored the prior patents of Tesla.

In May 1899, Tesla moved to Colorado Springs, where he would have room for his high-voltage and high-frequency experiments. He investigated atmospheric electricity, observing lightning signals via his detectors. He produced artificial lightning with discharges of millions of volts. Tesla left Colorado Springs in 1900 because he began planning the Wardenclyffe Tower facility. The tower was erected to its full 187 feet (57m) in 1902.

On his 50th birthday in 1906, Tesla demonstrated his 200 horsepower (150 kilowatts) 16,000 rpm bladeless turbine. Tesla invented a steam-powered mechanical oscillator.

In 1928, Tesla received his last patent for a biplane capable of taking off vertically (VTOL aircraft)

In 1935, in his annual birthday celebration interview, Tesla announced a method of transmitting mechanical energy with minimal loss over any terrestrial distance, a related new means of communication, and a method of accurately determining the location of underground mineral deposits.

In January 1943, Tesla, 86, died alone in the New Yorker Hotel. 2,000 people attended a state funeral for Tesla. After the funeral Tesla’s body was cremated. His ashes were transported to Belgrade to be displayed in a gold-plated sphere on a marble pedestal in the Nikola Tesla Museum.

Tesla obtained around 300 patents worldwide for his inventions. Some of his patents are not accounted for. A minimum of 278 patents were issued to him in 26 countries. His patents were approved in the US, Britain, Canada and in many countries around the world. Many inventions developed by Tesla were not put into patent protection.

**2 Say what you remember about**

1 Nikola Tesla’s family,

2 Tesla’s schooling and education,

3 Tesla’s work and relations with T. Edison,

4 Tesla Electric Company,

5 War of currents,

6 Patent battles with Marconi,

7 Life and work at Colorado Springs,

8 Tesla’ death,

9 Tesla’s inventions,

10 Tesla’s patents.

**3 What were the following inventions made for?**

1 an induction motor

2 a high energy single terminal tube

3 teleautomation

4 an electrical transmitter

5 Wardenclyffe Tower

6 VTOL aircraft

**4 Match the halves of the sentences.**

1 In 1856 Tesla

2 At school Tesla was influenced

3 In 1884 Tesla

4 In 1900 Tesla was granted patent

5 Wardenclyffe Tower

6 Tesla’s ashes

7 Tesla’s patents

A was erected in 1902.

B by math teacher

C was hired by Thomas Edison.

D were approved in many countries around the world.

E were transported to Belgrade.

F was born to Serbian parents.

G for a system of transmitting electrical energy.

**5 Complete the sentences from the text.**

1 In 1870, Tesla started . . . . .

2 During his first year at Austrian Polytechnic Tesla . . . . .

3 Tesla moved to Budapest to . . . . .

4 Tesla claimed that he could redesign . . . . .

5 Tesla developed an induction motor that ran on . . . . .

6 . . . . . established his laboratories in New York.

7 In 1898, Tesla demonstrated a radio-controlled boat which . . . . .

8 Tesla investigated atmospheric electricity, observing . . . . .

9 Tesla died alone . . . . .

10 Tesla obtained around . . . . .

**6 Use the following phrases in the sentences of your own.**

To have a talent for

To perform integral calculus in head

To make improvements

To grant patents

To determine the location

To approve/issue patents

**7 Use the prepositions properly.**

1 Tesla was the fourth . . . five children.

2 Tesla was profoundly influenced . . . a math teacher.

3 Tesla enrolled . . . Austrian Polytechnic . . . a Military Frontier scholarship.

4 Tesla left . . . Prague where he was to study.

5 . . . an auditor, Tesla did not receive grades for the courses.

6 Tesla began working . . . the Continental Edison Company.

7 . . . the age of 35, Tesla became a naturalized citizen of the United States.

8 Tesla tried to sell his idea . . . the US army.

9 In 1928 Tesla received his last patent for a biplane capable . . . taking . . . vertically.

10 Tesla obtained . . . 300 patents worldwide.

**8 Derive the nouns from the verbs below.**

to apply - to generate –

to induce – to memorize -

to decide – to agree –

to consider – to imagine –

to demonstrate - to transmit –

to protect- to restore –

to announce – to attend -

to influence - to perform –

to addict – to arrive –

to require – to employ –

to improve – to perfect -

to fulfill – to amplify –

**9 Translate into English.**

1 На молодого вченого глибоко вплинули відкриття початку двадцятого століття.

2 Цей двигун має переваги над іншими приладами.

3 Новий літак здатний виконувати вертикальний зліт.

4 Марконі здійснив передавання трансатлантичного радіосигналу у 1901 році.

5 Працюючи на телеграфну компанію, Тесла зробив декілька винаходів, які вдосконалили обладнання компанії.

6 Після заснування власної лабораторії Тесла став віце-президентом інституту інженерів-електриків.

7 Тесла продовжив власні експерименти з застосування рентгенівського випромінювання.

8 Тесла отримав патент за розробку системи передавання електричної енергії.

9 Багато винаходів Тесли не захищені патентами.

10 Тесла повідомив про його метод передавання механічної енергії з мінімальними втратами незалежно від відстані.

**1 Read text 3.**

**TEXT 3. VOLODYMYR VERNADSKY**

Volodymyr Ivanovych Vernadsky was a [Ukrainian](http://en.wikipedia.org/wiki/Ukraine" \o "Ukraine) and [Soviet](http://en.wikipedia.org/wiki/Soviet_Union" \o "Soviet Union) [mineralogist](http://en.wikipedia.org/wiki/Mineralogist" \o "Mineralogist) and [geochemist](http://en.wikipedia.org/wiki/Geochemist" \o "Geochemist) who is considered one of the founders of [geochemistry](http://en.wikipedia.org/wiki/Geochemistry" \o "Geochemistry), [biogeochemistry](http://en.wikipedia.org/wiki/Biogeochemistry" \o "Biogeochemistry), and of [radiogeology](http://en.wikipedia.org/wiki/Radiogeology" \o "Radiogeology).

Vernadsky was born in [Saint Petersburg](http://en.wikipedia.org/wiki/Saint_Petersburg), [Russian Empire](http://en.wikipedia.org/wiki/Russian_Empire), on 12 March  1863. According to family legend, his father was a descendent of [Zaporozhian Cossacks](http://en.wikipedia.org/wiki/Zaporozhian_Cossacks" \o "Zaporozhian Cossacks). He had been a professor of [political economy](http://en.wikipedia.org/wiki/Political_economy" \o "Political economy) in [Kiev](http://en.wikipedia.org/wiki/Kiev" \o "Kiev) before moving to Saint Petersburg. His mother was a noblewoman of Russian ethnicity

Vernadsky graduated from [Saint Petersburg State University](http://en.wikipedia.org/wiki/Saint_Petersburg_State_University" \o "Saint Petersburg State University) in 1885. As the position of [mineralogist](http://en.wikipedia.org/wiki/Mineralogist" \o "Mineralogist) in [Saint Petersburg State University](http://en.wikipedia.org/wiki/Saint_Petersburg_State_University" \o "Saint Petersburg State University) was vacant, and [Vasily Dokuchaev](http://en.wikipedia.org/wiki/Vasily_Dokuchaev" \o "Vasily Dokuchaev), a soil scientist, and Alexey Pavlov, a geologist, had been teaching Mineralogy for a while, Vernadsky chose to enter Mineralogy.

While trying to find a topic for his doctorate, he first went to Naples to study under [crystallographer](http://en.wikipedia.org/wiki/Crystallography" \o "Crystallography) Arcangelo Scacchi, who was [senile](http://en.wikipedia.org/wiki/Dementia" \o "Dementia) by that time. Scacchi's condition led Vernadsky to go to Germany to study under [Paul Groth](http://en.wikipedia.org/wiki/Paul_Groth" \o "Paul Groth). Vernadsky learned to use Groth's modern equipment, who had developed a machine to study the [optical](http://en.wikipedia.org/wiki/Optical" \o "Optical), [thermal](http://en.wikipedia.org/wiki/Thermal" \o "Thermal), [elastic](http://en.wikipedia.org/wiki/Elastic_%28solid_mechanics%29" \o "Elastic (solid mechanics)), [magnetic](http://en.wikipedia.org/wiki/Magnetic" \o "Magnetic) and [electrical](http://en.wikipedia.org/wiki/Electrical" \o "Electrical) properties of [crystals](http://en.wikipedia.org/wiki/Crystal" \o "Crystal). He also gained access to the physics lab of [Leonhard Sohncke](http://en.wikipedia.org/wiki/Leonhard_Sohncke" \o "Leonhard Sohncke) , who was studying crystallisation during that period.

Vernadsky participated in the First General Congress of the [zemstvos](http://en.wikipedia.org/wiki/Zemstvo" \o "Zemstvo), held in Petersburg on the eve of the [1905 revolution](http://en.wikipedia.org/wiki/Revolution_of_1905" \o "Revolution of 1905) to discuss how best to pressure the government to the needs of the Russian society; became a member of the liberal [Constitutional Democratic Party](http://en.wikipedia.org/wiki/Constitutional_Democratic_Party" \o "Constitutional Democratic Party) (KD); and served in parliament, resigning to protest the [Tsar's](http://en.wikipedia.org/wiki/Tsar" \o "Tsar) proroguing of the Duma. He served as professor and later as vice rector of Moscow University, from which he also resigned in 1911 in protest over the government's reactionary policies. After the [February revolution](http://en.wikipedia.org/wiki/February_Revolution" \o "February Revolution) of 1917, he served on several commissions of agriculture and education of the provisional government, including as assistant minister of education.

Vernadsky first popularized the concept of the [noosphere](http://en.wikipedia.org/wiki/Noosphere" \o "Noosphere) and deepened the idea of the [biosphere](http://en.wikipedia.org/wiki/Biosphere" \o "Biosphere) to the meaning largely recognized by today's scientific community. The word 'biosphere' was invented by [Austrian](http://en.wikipedia.org/wiki/Austria" \o "Austria) [geologist](http://en.wikipedia.org/wiki/Geologist" \o "Geologist) [Eduard Suess](http://en.wikipedia.org/wiki/Eduard_Suess" \o "Eduard Suess), whom Vernadsky met in 1911.

In Vernadsky's theory of the Earth's development, the [noosphere](http://en.wikipedia.org/wiki/Noosphere" \o "Noosphere) is the third stage in the earth's development, after the [geosphere](http://en.wikipedia.org/wiki/Geosphere" \o "Geosphere) (inanimate matter) and the [biosphere](http://en.wikipedia.org/wiki/Biosphere" \o "Biosphere) (biological life). Just as the emergence of life fundamentally transformed the geosphere, the emergence of human [cognition](http://en.wikipedia.org/wiki/Cognition" \o "Cognition) will fundamentally transform the biosphere. In this theory, the principles of both life and cognition are essential features of the Earth's [evolution](http://en.wikipedia.org/wiki/Evolution" \o "Evolution), and must have been implicit in the earth all along. This systemic and geological analysis of living systems complements [Charles Darwin](http://en.wikipedia.org/wiki/Charles_Darwin" \o "Charles Darwin)'s theory of [natural selection](http://en.wikipedia.org/wiki/Natural_selection" \o "Natural selection), which looks at each individual species, rather than at its relationship to a subsuming principle.

Vernadsky's visionary pronouncements were not widely accepted in the West. However, he was one of the first scientists to recognize that the oxygen, nitrogen and carbon dioxide in the Earth's atmosphere result from biological processes. During the 1920s he published works arguing that living organisms could reshape the planets as surely as any physical force. Vernadsky was an important pioneer of the scientific bases for the environmental sciences.

Vernadsky was a member of the [Russian and Soviet Academies of Sciences](http://en.wikipedia.org/wiki/Russian_Academy_of_Sciences" \o "Russian Academy of Sciences) since 1912 and was a founder and first president of the [Ukrainian Academy of Sciences](http://en.wikipedia.org/wiki/Ukrainian_Academy_of_Sciences" \o "Ukrainian Academy of Sciences) in [Kiev](http://en.wikipedia.org/wiki/Kiev" \o "Kiev), Ukraine (1918). He was a founder of the [National Library of Ukrainian State](http://en.wikipedia.org/wiki/Vernadsky_National_Library_of_Ukraine" \o "Vernadsky National Library of Ukraine) and worked closely with the [Tavrida University](http://en.wikipedia.org/wiki/Tavrida_University" \o "Tavrida University) in [Crimea](http://en.wikipedia.org/wiki/Crimea" \o "Crimea). In the late 1930s and early 1940s Vernadsky played an early advisory role in the [Soviet atomic bomb project](http://en.wikipedia.org/wiki/Soviet_atomic_bomb_project" \o "Soviet atomic bomb project), as one of the most forceful voices arguing for the exploitation of [nuclear power](http://en.wikipedia.org/wiki/Nuclear_power" \o "Nuclear power), the surveying of Soviet [uranium](http://en.wikipedia.org/wiki/Uranium" \o "Uranium) sources, and having [nuclear fission](http://en.wikipedia.org/wiki/Nuclear_fission" \o "Nuclear fission) research conducted at his Radium Institute. He died, however, before a full project was pursued.

The National Library of Ukraine is named in honor of Vladimir Vernadsky. UNESCO sponsored an international scientific conference, "Globalistics-2013", at Moscow State University on October 23–25, 2013, in honor of Vernadsky's 150th birthday.

**2 Say what you remember about**

1 N.Vernadsky’ parents,

2 Vernadsky’ education,

3 His staying in Italy and Germany,

4 His political activity,

5 Vernadsky’s idea of noosphere,

6 Vernadsky’ contribution to the development of environmental sciences,

7 His participation in the atomic bomb project.

**3 Match the halves of the sentences.**

1 Vernadsky worked in [Leonhard Sohncke](http://en.wikipedia.org/wiki/Leonhard_Sohncke" \o "Leonhard Sohncke) laboratory

2 Vernadsky served as a professоr and vice rector

3 He also served as

4 The concept of biosphere

5 Vernadsky introduced

6 Vernadsky theory complemented

7 Vernadsky laid the scientific foundations

8 Vernadsky was an advisor

the idea of noosphere.

an assistant minister of education.

Ch.Darwin’s theory.

to the atomic bomb project.

at Moscow University.

where crystallization was studied.

for the environmental sciences.

was developed by [Austrian](http://en.wikipedia.org/wiki/Austria) [geologist](http://en.wikipedia.org/wiki/Geologist) [Eduard Suess](http://en.wikipedia.org/wiki/Eduard_Suess).

**4 Complete the sentences from the text.**

1Vernadsky’s father is said to be . . . .

2 Vernadsky went to Naples . . .

3 . . . on several commissions of agriculture and education.

4 The noosphere is . . . .

5 . . . . the Ukrainian Academy of Sciences.

# 5 Say in what context the following phrases are used in the text.

1 vacant position

2 a topic for doctorate

3 to gain access to

4 assistant minister

5 human cognition

6 natural selection

7 environmental sciences

8 exploitation of nuclear power

**6 Use the prepositions properly.**

1 According … family legend, his father was a descendent of [Zaporozhian Cossacks](http://en.wikipedia.org/wiki/Zaporozhian_Cossacks" \o "Zaporozhian Cossacks).

2 He first went … Naples to study … [crystallographer](http://en.wikipedia.org/wiki/Crystallography" \o "Crystallography) Arcangelo Scacchi.

3 He also gained access … the physics lab of [Leonhard Sohncke](http://en.wikipedia.org/wiki/Leonhard_Sohncke" \o "Leonhard Sohncke).

4 He served … professor and later … vice rector of Moscow University.

5 Vernadsky first popularized the concept of the [noosphere](http://en.wikipedia.org/wiki/Noosphere" \o "Noosphere) and deepened the idea of the [biosphere](http://en.wikipedia.org/wiki/Biosphere" \o "Biosphere) … the meaning largely recognized

… today's scientific community.

6 [Charles Darwin](http://en.wikipedia.org/wiki/Charles_Darwin)'s theory of [natural selection](http://en.wikipedia.org/wiki/Natural_selection) which looks … each individual species, rather than at its relationship … a subsuming principle.

7 Vernadsky was a member of the [Russian and Soviet Academies of Sciences](http://en.wikipedia.org/wiki/Russian_Academy_of_Sciences" \o "Russian Academy of Sciences) … 1912.

**7 Translate into English.**

1 Вернадського вважають одним з засновників геохімії.

2 Вернадський отримав доступ до лабораторії, в якій досліджувалися проблеми кристалізації.

3 Після Лютневої революції у 1917 року Вернадський працював заступником міністра освіти.

4 Ноосфера це третій етап розвитку Землі.

5 Аналіз живих систем Вернадського додав до теорії природного відбору Чарльза Дарвіна.

**1 Read text 4.**

**TEXT 4. MYKOLA PYROGOV**

**Mykola Ivanovych Pyrogov** ( 1810 – 1881) was a prominent [Russian](http://en.wikipedia.org/wiki/Russia" \o "Russia) and [Ukrainian](http://en.wikipedia.org/wiki/Ukraine" \o "Ukraine) scientist, medical doctor, [pedagogue](http://en.wikipedia.org/wiki/Pedagogue" \o "Pedagogue), [public figure](http://en.wikipedia.org/wiki/Public_figure" \o "Public figure), and corresponding member of the [Russian Academy of Sciences](http://en.wikipedia.org/wiki/Russian_Academy_of_Sciences" \o "Russian Academy of Sciences) (1847). He was the first surgeon to use anaesthesia in a field operation (1847), invented various kinds of surgical operations, and developed his own technique of using [plaster casts](http://en.wikipedia.org/wiki/Orthopedic_cast" \o "Orthopedic cast) to treat fractured [bones](http://en.wikipedia.org/wiki/Bone" \o "Bone). He is one of the most widely recognized physicians.

Pyrogov was born on 25 November 1810 in Moscow, Russia, to a major in the commissary service. He learned to read in several languages as a child. Pyrogov originally intended to become a civil servant, but the family doctor, [Efrem Mukhin](http://en.wikipedia.org/w/index.php?title=Efrem_Mukhin&action=edit&redlink=1" \o "Efrem Mukhin (page does not exist)), who was a professor of anatomy and physiology at [Moscow State University](http://en.wikipedia.org/wiki/Moscow_State_University" \o "Moscow State University), persuaded the authorities to accept him as a student aged only 14.

Pyrogov decided to specialize as a surgeon when he completed his studies in 1828. He completed further studies at the [German University of Dorpat](http://en.wikipedia.org/wiki/University_of_Tartu" \o "University of Tartu), (now in [Tartu](http://en.wikipedia.org/wiki/Tartu" \o "Tartu)), receiving a doctorate in 1832 on the ligation of the [ventral aorta](http://en.wikipedia.org/wiki/Ventral_aorta" \o "Ventral aorta). There he studied under Professor Moyer, who was trained by Italian anatomist [Antonio Scarpa](http://en.wikipedia.org/wiki/Antonio_Scarpa" \o "Antonio Scarpa), both influencing figures for Pyrogov, and was professor from 1836 to 1840. In May 1833, he travelled to Berlin, meeting surgeons [Karl Ferdinand von Graefe](http://en.wikipedia.org/wiki/Karl_Ferdinand_von_Graefe" \o "Karl Ferdinand von Graefe), [Johann Nepomuk Rust](http://en.wikipedia.org/wiki/Johann_Nepomuk_Rust" \o "Johann Nepomuk Rust) and [Johann Friedrich Dieffenbach](http://en.wikipedia.org/wiki/Johann_Friedrich_Dieffenbach" \o "Johann Friedrich Dieffenbach) at the [University of Berlin](http://en.wikipedia.org/wiki/University_of_Berlin" \o "University of Berlin). Germany's renowned surgeon, Professor [Bernhard von Langenbeck](http://en.wikipedia.org/wiki/Bernhard_von_Langenbeck" \o "Bernhard von Langenbeck), taught Pyrogov how to properly use the [scalpel](http://en.wikipedia.org/wiki/Scalpel" \o "Scalpel), namely like a [violin bow](http://en.wikipedia.org/wiki/Violin_bow" \o "Violin bow). Pyrogov also visited the [University of Göttingen](http://en.wikipedia.org/wiki/University_of_G%C3%B6ttingen).

In October 1840, Pyrogov took up an appointment as professor of surgery at the academy of military medicine in [Saint Petersburg](http://en.wikipedia.org/wiki/Saint_Petersburg), and undertook three years of military service in this period. He first used [ether](http://en.wikipedia.org/wiki/Ether) as an [anaesthetic](http://en.wikipedia.org/wiki/Anaesthetic) in 1847, and investigated [cholera](http://en.wikipedia.org/wiki/Cholera) from 1848. Around this time he compiled his the anatomical atlas, *Topographical anatomy of the human body* (vol. 1–4, 1851–1854).

He worked as an army surgeon in the [Crimean War](http://en.wikipedia.org/wiki/Crimean_War" \o "Crimean War), arriving in [Simferopol](http://en.wikipedia.org/wiki/Simferopol" \o "Simferopol) in December 1854. Due to his works in the Crimea, he is considered to be the father of field surgery. He followed the work by [Louis-Joseph Seutin](http://en.wikipedia.org/wiki/Louis-Joseph_Seutin" \o "Louis-Joseph Seutin) in introducing [plaster casts](http://en.wikipedia.org/wiki/Orthopedic_cast" \o "Orthopedic cast) for setting broken bones, and developed a new [osteoplastic](http://en.wikipedia.org/w/index.php?title=Osteoplastic&action=edit&redlink=1" \o "Osteoplastic (page does not exist)) method for [amputation](http://en.wikipedia.org/wiki/Amputation" \o "Amputation) of the foot, known as the "Pirogov amputation". He was also the first to use anethesis in the field, particularly during the siege of [Sevastopol](http://en.wikipedia.org/wiki/Sevastopol" \o "Sevastopol), and he introduced a system of [triage](http://en.wikipedia.org/wiki/Triage" \o "Triage) into five categories. He encouraged female volunteers as an organized corps of nurses.

He returned to Saint Petersburg after the end of the war in 1856, but withdrew from the academy. He wrote an influential paper on the problems of [pedagogy](http://en.wikipedia.org/wiki/Pedagogy" \o "Pedagogy), arguing for the education of the poor, non-Russians, and women. He also argued against early specialization, and for the development of secondary schools. He returned to the Crimea as a superintendent of schools. He moved to Kiev in 1858 after disagreements with the governor general in [Odessa](http://en.wikipedia.org/wiki/Odessa" \o "Odessa). In 1856, he retired to his estate in Vyshnya in central Ukraine. He treated the local peasants there, established a clinic, and learned the Ukrainian language. Around this time he wrote *The Old Physician's Diary* and "Questions of Life".

In 1862, he took charge of a delegation of Russian students that was sent overseas to train as teachers. He treated [Giuseppe Garibaldi](http://en.wikipedia.org/wiki/Giuseppe_Garibaldi" \o "Giuseppe Garibaldi) for an injury to his foot sustained at [Aspromonte](http://en.wikipedia.org/wiki/Aspromonte" \o "Aspromonte) on 28 August. Pyrogov returned to Russia in 1866. He visited the battlefields and field hospitals of the [Franco–Prussian War](http://en.wikipedia.org/wiki/Franco%E2%80%93Prussian_War" \o "Franco–Prussian War) in 1870, as a representative of the Russian [Red Cross](http://en.wikipedia.org/wiki/Red_Cross" \o "Red Cross), and was again a field surgeon in the [Russo–Turkish War](http://en.wikipedia.org/wiki/Russo%E2%80%93Turkish_War,_1877%E2%80%931878" \o "Russo–Turkish War, 1877–1878) in 1877.

He last appeared in public in May 1881, and died later that year in the village of Vyshnya (now [Vinnytsia](http://en.wikipedia.org/wiki/Vinnytsia), Ukraine).The Pyrogov Museum is located in his birth town at his former estate and clinic. Near this 1947 building is a [mausoleum](http://en.wikipedia.org/wiki/Mausoleum" \o "Mausoleum) which is used as a family chapel and in which his embalmed body is visible in public. [Pyrogov Glacier](http://en.wikipedia.org/wiki/Pirogov_Glacier" \o "Pirogov Glacier) in [Antarctica](http://en.wikipedia.org/wiki/Antarctica" \o "Antarctica), the large [Pyrogov Hospital](http://en.wikipedia.org/wiki/Pirogov_Hospital" \o "Pirogov Hospital) in [Sofia](http://en.wikipedia.org/wiki/Sofia" \o "Sofia), Bulgaria and the [2506 Pyrogov](http://en.wikipedia.org/wiki/2506_Pirogov" \o "2506 Pirogov) [asteroid](http://en.wikipedia.org/wiki/Asteroid" \o "Asteroid), discovered in 1976, are all named in honour of him. [Russian National Research Medical University](http://en.wikipedia.org/wiki/Russian_National_Research_Medical_University" \o "Russian National Research Medical University) and [Odessa State Medical University](http://en.wikipedia.org/wiki/Odessa_State_Medical_University" \o "Odessa State Medical University) were formerly named after him, until the [Russian Revolution](http://en.wikipedia.org/wiki/1917_Russian_Revolution" \o "1917 Russian Revolution); [Vinnytsia Medical University](http://en.wikipedia.org/w/index.php?title=Vinnytsia_Medical_University&action=edit&redlink=1" \o "Vinnytsia Medical University (page does not exist)) was named after M.Pyrogov in 1960.

**2 Say what you remember about**

1 M.Pyrogov’s family and childhood

2 His University studies

3 His making career as a surgeon

4 M.Pyrogov’s military service and participation in the wars

5 His professional achievements and accomplishments

6 His public activities

7 His life in Ukraine

8 His death

**3 Answer the questions.**

1 Why did Pyrogov became a student at the young age?

2 What made him become a surgeon?

3 What was the contribution of Pyrogov to the development of medical science?

4 What innovations did he introduce in the field surgery?

5 What social problems were of special interest for M.Pyrogov?

6 What was special about his death?

**4 Match the halves of the sentences.**

**1** Pyrogov was the first surgeon

2 Pyrogov was taught how

3 He encouraged female volunteers

4 He moved to Kiev in 1858

5 Pyrogov treated [Giuseppe Garibaldi](http://en.wikipedia.org/wiki/Giuseppe_Garibaldi" \o "Giuseppe Garibaldi)

6 Pyrogov’s embalmed body

because of his disagreements with the governor general in [Odessa](http://en.wikipedia.org/wiki/Odessa).

is visible in public.

for an injury to his foot

as an organized corps of nurses.

to properly use the [scalpel](http://en.wikipedia.org/wiki/Scalpel) in Germany.

to use anaesthesia in a field operation

**5 Complete the sentences from the text.**

**1** Pyrogov was the first surgeon . . . . . . . ..in a field operation.

2 Pyrogov originally intended . . . . . . . . . . .

3 . . . . . . . . . . . . . *Topographical anatomy of the human body.*

4 In Ukraine Pyrogov treated . . . . . . , established . . . . . . ., and learned the Ukrainian language.

5 Pyrogov . . . . . . . . . . . . . . in the [Russo–Turkish War](http://en.wikipedia.org/wiki/Russo%E2%80%93Turkish_War,_1877%E2%80%931878) in 1877.

6 Pyrogov visited field hospitals as a representative . . . . . .

7 The Pyrogov Museum is located . . . . . at his former estate and clinic.

**6 Use the prepositions properly.**

1 He learned to read . . . . . . several languages . . . . . . a child.

2 There he studied . . . .. . Professor Moyer, who was trained . . . . Italian anatomist [Antonio Scarpa](http://en.wikipedia.org/wiki/Antonio_Scarpa" \o "Antonio Scarpa), both influencing figures . . . . . Pyrogov, and was professor . . . . . . 1836 . . . . . 1840.

3 He also argued . . . . . early specialization, and . . . . . the development of secondary schools.

4 . . . . . this time he wrote *The Old Physician's Diary* and "Questions of Life".

5 He last appeared . . . . . . . public . . . . . May 1881.

6 The [mausoleum](http://en.wikipedia.org/wiki/Mausoleum" \o "Mausoleum) is used . . . . a family chapel and in which his embalmed body is visible . . . . public.

**7 Translate into English.**

1 Пирогов винайшов декілька видів хірургічних операцій.

2 Друг сімї Пирогових переконав адміністрацію університету зарахувати Миколу Пирогова у віці 14 років.

3 Пирогов переїхав до Києва після його незгоди з генерал-губернатором з Одеси.

4 Пирогов відвідав польові госпіталі під час Франко-Прусської війни.

5 Забальзамоване тіло Пирогова можна побачити у фамільній капличці.

6 Вінницький медичний університет носить ім’я Миколи Пирогова.