# Lecture N 10 Education and science in the USA


The key words and phrases: "Melting Pot", to be enrolled in, high and higher education, liberal arts colleges, curriculum, extra-curricular activities, vocational courses, per capita, transcript.

One of the fundamental parts of the American "Melting Pot or "Americanization" is its education. According to the ideas of the creators of American Constitution the education of their country should reflect the nation's basic values and ideals. Equality of opportunities for developing the nation's greatest potential became the most important aspect of American system of education. As many historians believe a great deal of economic, scientific, and cultural progress America has made in its relatively short history is due to its commitment to the ideals of equal opportunities and opportunity of educating as many Americans as possible, to the best of their abilities.

In the whole American society there has always been the belief, that the more schooling a person has, the more material success he or she will achieve in the future. Millions of immigrants coming to America tied their hopes for a better life to a good education for themselves and, most importantly, for their children. They view the education as a way of "rising in the world", as a fundamental part of so-called "the American Dream".

Already in the 17$^{th}$ century the colonists of Northern and Western states showed a great concern for education and required all towns with more than 50 families to provide a schoolmaster at public expense. Before the revolution nine colleges had been opened in North America to train men for service in the church and civil problems. In 1636 more than a hundred years before American independence several Cambridge graduates founded in the Massachusetts Bay Colony the first college Harvard. American colleges in those days duplicated the English ones.

Special emphasis in them was laid on classical education and only those who knew Latin and Greek were considered educated.

The American Revolution brought a lot of new tasks. The independence of the states raised new questions about what American education should be. The first state universities were founded, though their serious work came a century later, after the Civil War. Rapid development of industry, agriculture and transportation after the Civil War brought about the technological needs and stimulated the creation of agricultural and engineering colleges.

Gradually they became the dominant and most influential structure of higher education, a position they still hold. Many of the oldest and best-known liberal arts colleges, such as Yale, Columbia and Harvard, became universities during this period. Oberlin College in Ohio was the first to admit women on an equal basis with men in 1837. In 1861 the private school known as the Massachusetts Institute of Technology (MIT) was founded. In 1862, Congress passed a law, which provided states with federal lands for construction and use for higher education. After that many "land-grant colleges" were established. By 1900, in the USA there were already **a thousand** institutions of higher education. Among them there were law and medical "schools" and hundreds of small colleges, which dealt with everything from the training of teachers to the pulling of teeth.

**The United States have never had a national system of education** although there is a Federal Department of Education, which in some ways corresponds to the Russian ministry of Education. Its function is merely to gather information and to help finance certain educational programs. Education, Americans say, is "a national concern, a state responsibility, and a local function".

Since the Constitution does not state that education is a responsibility of the federal government, all education matters are left to the individual states. In turn, however, state constitutions give the actual administrative control of the schools to the local communities. United Nations figures (1980) show that in the amount spent on education per capita, the U. S. is in ninth place in the world (behind Qatar, Sweden, Norway, the Netherlands, Luxembourg, Denmark, Switzerland, and

Canada). An average of 50 percent of the funds for elementary and secondary education come from state sources, 43 percent from local funds, and only about 6 percent from the federal government.

**Elementary and Secondary Education.**

There are some 16, 000 school districts within the 50 states. School boards made up of individual citizens elected from each community oversee the schools in each district. They set school policy and actually decide what is to be taught.

The major result of this situation is that there is **an enormous amount of variety** and flexibility in elementary, secondary, and higher (university) education throughout the country.

Because of the great variety of schools and so many differences among them, no institution can be singled out as typical one. There exist public and private schools. There are also many schools, supported by the church since religion cannot be taught in state-supported schools because of separation of church and state.

Because of the inequalities inherent in society as a whole, the goal of equal opportunity in education remains an ideal rather than a reality. As the tuition fees are rather high in private schools they are attended primarily by upper-class children. The reason why parents send their children to these schools is that they often believe they will receive a better education in them and they will associate with other children of their own background.

Today there are around 6 million pupils in private schools and 43 million pupils and students in public schools at the elementary and secondary levels throughout the country. In other words 88 percent of American children attend public schools and only 12 percent go to private schools.

The divisions or stages a child passes in his school educational ladder are **elementary, junior high school** or **middle school**, and **high school.** American children begin to attend school at the age of five or six. There are also pre-school classes or kindergartens. Before this kids may attend nursery school or a day care center.

Schooling is divided into twelve academic levels or grades. There are more or less definite demands at each level. Pupils take classes in major subjects such as English, Math, History and Science. They must also take classes in physical education and a foreign language. Then they can usually choose elective subjects like art or music. At the end of a term students get a grade of A, B, C, D, or F (fail) for each subject. Grades are based on test scores, class participation, and class and homework assignments. As they finish each subject students get a credit. When they have enough of these, they can go further.

The apostle of American school education is philosopher and educator John Dewey. He believed that the main aim is to teach kids skills, which they will use in the future. He also greatly stressed that activity and experimentation should come first but factual or theoretical information to students is secondary. So, in American schools much attention is given to creative activities.

American schools try to adapt to the needs of society. Schools are initiating programs previously viewed as a part of home education. These include subjects such as driver's education, sewing and cooking classes called home economics, health and sex education, where issues like drug and alcohol abuse and smoking may be treated.

In addition to bilingual and bicultural education programs, many schools have special programs for those with learning and reading difficulties. Many schools also support summer classes, where students can make up for failed courses or even take extra courses. They also attempt to integrate students with varying abilities and backgrounds into an educational system shared by all. Nationwide talent searches for minority group children with special abilities and academic promise began on a large scale in the 1960s.

Like schools in Britain and other English-speaking countries, students are encouraged to be creative not only during class time but also in extra-curricular hours. There is usually a very broad range of extracurricular activities available. Most schools, for instance, publish their own student newspapers, and some have their own radio and t.v. stations. Almost all have school orchestras, bands, and

choirs, which give public performances. There is theater and drama groups, chess and debating clubs, and, of course, sports. Students can learn flying, diving, and mountain - climbing. They can act as volunteers in hospitals and homes for the aged and do other public-service work.

Often the school-children themselves organize and support school activities and raise money through "car washes", baby-sitting, bake sales, or by mowing lawns. Parents and local businesses also help the groups to have a chance to go to state championships, or camping trips. Such activities not only give pupils a chance to be together outside of normal classes, they also help develop a feeling of "school spirit" among the students and in the community.

Whichever varieties of school curricula exist all of them have standard examinations at every level of education.

There are **two widely used and nationally administered tests** for high school students who wish to attend a college or university. One is the **SAT (Scholastic Aptitude Test),** which attempts to measure results in verbal and mathematical fields through multiple-choice questions marked by computer. The other is the **ACT (American College Testing program),** which attempts to measure skills in English, mathematics, and the social and natural sciences. Both tests are given at specific dates and locations throughout the U.S.A. Each year, the SAT is taken by over two million high school students. One million of these students are in their last year of high school. Another million are in their next-to-last year. The ACT, is taken every year by millions h of high school leavers in the western part of the U.S. With so many different types of high schools and programs, and with so many differences in subjects and standards, these tests provide common, nationwide measuring of knowledge.

## Higher Education.

According to American statistics over 41 percent of high school leavers apply to colleges and universities. Every year, about **12 million** Americans are enrolled in the over **3,000** colleges and universities of every type: private, public, church-related, small and large, in cities, counties, and states. Close to 80 percent of the

college students attend public or state institutions while a little over 20 percent are enrolled in privately supported universities and colleges. Every state in the US maintains at least one institution of university rank. Programs in them are often adapted to serve local needs. State universities provide opportunities of higher education usually at a cost considerably below the cost of education in private institutions and the educational fees are lower in them. Each state has the right to found new public or private institutions of higher education within its borders.

## The Types of Higher Educational Institutions:

In the USA there is no clear definition of the term "institution of higher education". The institutions, which provide higher education, do not constitute any coordinate system and are not controlled by any centralized national authority In principle, any educational institution offering further training after leaving high school, the so-called "post-secondary educational institution" may be referred to as Higher Educational Institution. The only criterion to determine the nature of any U.S. institution may be a qualitative level of it.

Of the nation's **1,900 institutions of higher learning** roughly one-third are state or city institutions. About 1,200 are privately controlled or controlled by religious groups. The others are vocational or junior colleges.

**Junior Colleges** (The world "college" refers either to an independent institution offering undergraduate education or to a part of a university). These institutions of higher education or so-called "cow" colleges offer only **two-year programs**. The first program of the "cow" colleges leads to a vocational, professional work (shop work, office work, nurses, mechanics, police, etc.), the other one gives a chance to transfer to a four-year college at the end of two years.

**Colleges of Liberal Arts** generally offer **four year education** beyond the secondary school level. Their programs are aimed at providing a broad educational base in history, science, philosophy, languages and culture. Students choose specialization or concentration in one particular field during **the third and fourth years of the program**.

**Specialized Institutions** are usually institutions of technology, teacher training colleges, art schools, and other specialized institutions. They emphasize intensive concentration in a specialty as contrasted with the board range of liberal arts colleges. The course of study typically emphasizes **technical, scientific, or engineering aspects of knowledge** in the field.

**A University.** An American university consists of a number of schools and colleges (such as College of Arts and Sciences or a College of Engineering, etc.). There are two levels: the undergraduate school and the graduate school grouped together in one educational system. Some of the universities are private; others are run by the state.

Despite the development of a network of state universities, private universities continue to play a very significant role in the formation of scientific and educational potential of the United States.
In the US there is a group of private leading universities dramatically different in its characteristics from all other universities of the country. They are: University of California-Berkeley, Mitt, Stanford, Wisconsin, Michigan, Illinois, Harvard, Cornell, Washington university. University of California - Los Angeles, Columbia, Yale, Chicago, Pennsylvania, Princeton University and California Institute of technology. These universities are the undisputed leaders in education and science of the USA and determine the qualitative contribution of higher education in the development of scientific-technical and economic potential of the country.

## Acceptance into university

**Acceptance into university is based on a written application, submission of a transcript showing all courses and results in previously-attended educational institutions, evidence that the student satisfactorily completed all requirements at the previously-attended institution, and sometimes an oral interview or written resume at the school which the student desires to attend.** Different schools of higher learning may have different standards of acceptance: some may require excellent grades on the S.A.T., while others may have less strict

requirements. In higher education and especially in very prestigious universities the U.S.A has a selective system of admission.

At the undergraduate level universities may have several divisions - colleges of liberal arts, a school of business or engineering or applied science, etc. A student usually enrolls in one undergraduate division, but he may take courses in more than one of these.

Students are classified as **freshmen, sophomores, juniors and seniors**. A freshmen is a first year student, a sophomore, a second year student, a junior, a third year student, and a senior, a fourth year student.

Most undergraduate students must take classes in English, Math, History, and science. They choose **a major** (specialize) in a subject such as business, education, or art in **their third year of college** or after they have completed half of their course work. In order to receive any degree from the University students must **complete a survey course in American History or American Government.**

To graduate from a university requires a student to complete requirements of the university, to achieve the minimum allowable **grade** in the required courses, and to collect the required number of so-called **credits**. There is wide variation in the requirements depending on the university. In general, universities and colleges require students to fulfill a set of general requirements applicable to all students at the school (specialization), as well as fulfilling the specific requirements for their **major field** of study. For example, at Haverford College they require **32 credits** for graduation, 1 credit being awarded for each course taken and passed per semester. So, 4 credits per semester and 2 semesters per year equal 8 credits per year. Four years of college education multiplied by 8 credits per year equals 32 credits, or the amount needed to graduate. However, the Linguistics Department requires 10 credits of linguistics courses. As a result, it is necessary to fulfill both requirements before being allowed to graduate, i.e. pass 32 credits of courses.

In addition, most universities require a minimum grade-point average before a student is allowed to graduate.

There are four principal types of academic degrees, each representing a different level of academic achievement:

**The bachelor's (baccalaureate) degree** is the oldest academic degree used in various forms by almost every institution. A full-time undergraduate degree in universities usually takes **four years**. Many students study part-time and work, so it may take them much longer time to finish. Some students first take an associate's degree at "cow" or liberal colleges, where the tuition fees are lower and study two more years at university to complete their bachelor's degree. Some graduate students receive grants, which cover the cost of their education; a person on such a fellowship is called **a university fellow or a grantee**.

All students who have graduated and received the bachelor's degree are classified as **graduate students**. Their transcript of grades is submitted with all applications to graduate schools.

The most common **master's degree** program represents **a minimum of 1 year of work** beyond the baccalaureate. In certain areas this has been extended to 2 years of required graduate study (e.g. in business administration) or even 3 years (e.g. in fine arts). It may also involve one or all of the following additional requirements: a thesis, a general examination, and mastery of a foreign language. The master's degree candidate follows a rather specific course of study, usually in a single field and arranged in cooperation with his adviser.

Master of Arts in Teaching (MAT) is one of the more rapidly growing; it is designed to prepare liberal arts graduate for secondary school teaching. Normally neither a language examination nor a thesis is required for MAT, but course in practical teaching is usually incorporated.

The master's degree program is not, however, considered to be a research degree, but rather preparation for **the PhD**. Doctoral programs usually consist of **at least 3 years of study** beyond the baccalaureate.

There are 2 quite distinct types of doctoral programs: **the professional degree** and **the research degree**. The first type represents advanced training for the practice of

a given profession, such as the Doctor of Medicine, the Doctor of Dental Science, and similar degrees. These degrees do not imply original research.

**The research doctorate (PhD)** is the highest earned degree in the American graduate school. Candidates usually follow a program of studies concentrated in one of the major fields of knowledge. They are normally required to demonstrate reading proficiency in at least two foreign languages. After a student has satisfactorily completed his course work and met his foreign language requirements, he must take a comprehensive examination to demonstrate a general knowledge of his field. It may be oral or written or both, and is evaluated by a special committee. The final period of predoctoral study is given to the preparation of the dissertation (this may require several years to finish). The prospective doctor of philosophy should defend the conclusions of his dissertation. Consequently, it is frequently the custom to make public announcements of the date and place of the final examination and to permit the attendance of any scholars who may wish to participate.

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| 18 years old to 21 years to | 1P$^{st}$ year-freshman<br>2P$^{nd}$ year-sophomore<br>3d year-junior<br>4P$^{th}$ year-senior | College or University Undergraduate Education (bachelor's degree) |
| 2 years | Master's program | Graduate or Professional Education |
| 3 to 6 years | Professional schoo (law, medicine) | |
| 3 to 5 year | Doctoral program (after M.A. program) | |

Some colleges and universities also award **honorary degrees** as a form of deserved recognition for distinguished public service or for outstanding creative work.

The concept of continuing (or lifelong) education is of great importance to Americans. Every year, over ten percent of all adult Americans further their education through participation in part-time instruction. Some estimate that as many as 45 million adult Americans are currently taking courses in universities, colleges, professional associations, government organizations or even churches and synagogues.

**1. Answer the questions.**

I. What were the aims of early institutions of higher learning?
2. Did American colleges duplicate their British counterparts in all respects?
3. List the changes that took place in the American system of higher education in the 19th century?
4. What does the word "school" mean as applied to an American university?
5. When were women first admitted to American universities?
6. Is public education in the USA centralized? Is there a unified system of education in the USA?
7. At what age do children begin to attend school in the USA? What is an elementary school in the USA?
8. What is a high school in the USA?
9. What is the theoretical basis of the great amount of time allotted to extra-curricular activities?
10. What kind of personality do they try to develop in American school-students?
11. Is there a national system of higher education?
12. How can an American school-leaver enter a higher educational institution?
13. What are the entrance standards and admission policies at American universities and Colleges?
14. What are the levels of the American higher learning?
15. What are "majoring" and "minoring" in American higher education?
16. What are the American degrees?

**2. Translate the Russian words and phrases into English**:

Основной принцип; образование; общее образование; децентрализация образования; детский сад; начальная школа; средняя школа; класс, оценка, система образования, программа обучения, учебный год, домашнее задание, каникулы, учащийся, основные предметы, бесплатное обучение, частная школа, плата за обучение, внеклассная деятельность, окончить школу, училище, требования при поступлении в университет, общественные науки, точные науки, предметы гуманитарного цикла, ректор университета, декан,

заведующий кафедрой, отсев учащихся, разделение учащихся по способностям, студент первого года обучения, второго, третьего; студент-отличник, окончить университет, учиться в магистратуре, аспирантуре.

## American Science

Read and translate the following key words and word combinations:

Scientific establishments , to lag behind , challenges of World War I , Scientific undertakings, to follow the suit, under the auspices [ ‘o:spisəs], to regain momentum , to pave the way ,to be second to none.

In the American colonies approach to science was practical. The trade was associated with sailing so scientific interest focused on astronomy, mathematics, topography, meteorology and stimulated usefulness for navigation and agriculture. Almost all scientific activities in New England were concentrated in Boston, which from the beginning became the intellectual capital of New England. Another cultural center was in Philadelphia, which had more political, cultural and intellectual ties with Europe.

After the revolution and independence new favorable conditions for organization science were gradually created. In the late 18th and the early 19th centuries new ideas and technology demanded new approaches and teamwork. In 1848 **the American Association for the Advancement of Science** was founded.

In 1863 **the National Academy of Sciences (NAS**) was organized. The creation of the Academy originated from the immediate practical problems of the time of the Civil War. It also reflected the fact that at that time the US was beginning to emerge as a technological country. The Academy created departments related to

scientific and technological problems (the Geological Survey, the National Bureau of Standards, the US Weather Bureau, the Patent Office, etc.). The need for scientific instruction led to the organization of scientific schools and centers of learning and research (at Yale and Harvard Universities).In 1861 the Massachusetts Institute of Technology was founded.
The challenges of World War I had a far-reaching effect on the development of science in the USA. During the war and after it American universities produced the great number of well-trained scientists and engineers. With the introduction of graduate schools into American education scientific research began to play a major role in many universities. American industry began to have a scientific foundation; several of the larger industries established research laboratories of international level. The Federal Government also developed a number of scientific agencies.

Like education, the US scientific establishments have always been serious responses to society's practical needs. Since America was rich in natural resources but relatively poor in personnel for education and research, the Federal Government did a lot to master resources for the guidance of the nation's scientific community. A few scientists from other countries were invited. Among them the inventor of the telephone Alexander Graham Bell from Scotland, a developer of alternating-current electrical systems Charles Steinmetz from Germany, the creator of television camera Vladimir Zworykin,. the serb Nikola Tesla who invented brushless electrical motor based on rotating magnetic fields.

During World War II a lot of leading European scientists, many of them of Jewish descent, fled to America from the regimes of their countries. One of the first to do so was **Albert Einstein**. After him a good percentage of Germany's theoretical physics community left for the US as well This circumstance gave American science in general and the American academy in particular a mighty boost.

In the mid-1950s the US government gave huge investments to the science sector, which attraced scientists from all over the world to work there. The research facilities in the US were second to none, and scientists were drawn to the US for this reason alone. That led to the situation that since 1950, Americans have won approximately half of the Nobel Prizes in the sciences. (so far over 781). It is also worth mentioning that among the American Nobel Prize winners there are not a few Russian former compatriots (over 60), who moved to the USA during different periods of time and under different circumstances. Undoubtedly, they have left a considerable "Russian" trace both in American and the world science. Alexander Seversky (1894-1974) was a designer of military aircraft. Among his ideas were the autopilot system disprove in the air. Stepan Timoshenko (1878-1972)-scientist-metallurgist, the largest specialist in the world of resistance materials. Nobel laureate economist Leontief, the inventor of television Zworykin, aircraft designer Igor Sikorsky, the great ophthalmologist Elena Fedorovich, Nina Fedorova - geneticist, academician of the National Academy of Sciences, physicist George Gamow and many others.

Being one of the few industrial countries not crashed by war, the US began to occupy a position of unchallenged leadership in the post-war period. Although the USA does not exercise a centralized science and technology policy, it is impossible to say that there is absolutely no central monitoring of science and technology there. The Federal government spends huge amounts of money on science. It is the main source of funding for fundamental research and the biggest customer of military programs.

Modern network of scientific organizations in the United States includes federal financed research centers, state laboratories, private industrial firms and non-profit organization. The US government maintains its own laboratories (such as the **Oak Bridge National Laboratory, the National Research Laboratory**

**or the Brookhaven National Laboratory**). The governmental and military contracts also encourage the growth of science-oriented industries (e.g. Bell Laboratories).

**Scientific organizations formally classified as "independent research institutes "but nicknamed as "Think Tanks" or "Brain Factories**" were organized. The main aims of **TT** or **BF,** attached to the Federal government and its Agencies by annual contracts, are long-range analysis and ideas necessary for policy-making, problem solving and decision-making. The largest of the "Think tanks" is **the RAND Corporation** (Research and Development). RAND employs a lot of prominent scholars: mathematicians, chemists, physicists, social scientists, computer experts and others. The most important researches carried out by RAND are connected with military tasks

Thanks to large-scale federal sponsorship the nature of academic research has gone a very substantial change.

**The American Academy of sciences** occupies at present a whole quadrangle at Constitution Avenue in Washington D.C. It has a great number of programs that include the participation in international scientific undertakings, the development of relationships with other academies, cooperation in worldwide scientific project. Although it does not maintain direct research programs of its own, as, for example, the Russian Academy of Sciences, the Academy plays its leading role in various advisory governmental committees and determining scientific policy matters in general. The Academy also established a number of its Councils and Foundations.

**The National Research Council. NRC** was intended to strengthen and enlarge the role of the Academy in public affairs by adding to its staff a much larger body of American scientists and engineers and acting as the center for intersociety scientific activities.

**The National Science Foundation (NSF) is** responsible for the progress of science across astronomical, space, earth and ocean sciences; programs concerned with biological and social sciences; investigations in engineering; encouraging the training of engineers at undergraduate and graduate levels through grants. NSF sponsors work in mathematical sciences, computer research and chemistry; manages and funds the US activities in Antarctica. NSF also administers programs for exchange with other countries of students, scholars and teachers.

**The American Physical Society (APS)** pursues the mission "to advance and diffuse the knowledge of physics", to be active in public and governmental affairs, and in the international physics community. There is a long list of the names of prominent American physicists awarded with different national and international prizes: **Gorge Pullin** working on gravitational waves, **Kris Larsen**, studying astronomy and black holes, **David Landau**, the Director of the Center for Simulational Physics at the University of Georgia, **Timothy Gay** with his group investigating polarized electron molecules (e.g. DNA) and many others.

**The National Academy of Engineering** was established in 1964 as an organization of distinguished engineers, sharing with the National Academy its responsibility for advising the Federal government.

A great part of Research **and Development** is done **at the US universities,** sponsored mainly through contract systems.
The organization of research in universities is carried out in two forms: on the basis of grants and contracts. Universities conduct research not only in their laboratories, but also in laboratories belonging to different government departments. The largest Federal research centers are managed under contracts of University administration. An example is the Laboratory Lincoln at the Massachusetts Institute of technology.
Thanks to the cooperation of University research with industry there is the rapid growth of scientific and industrial complexes. Among such complexes

the most important are: the Cambridge-Boston, San Francisco, Los Angeles, Princeton and Houston. **Big science research** is mainly funded not only by the Federal government agencies and private business enterprises, but also by some international organizations, e.g. UNESCO. A considerable part of the money comes from the Pentagon, which remains the biggest supporter of new technologies and developments.

One of the most spectacular-and controversial- accomplishments of US federal technology became the harnessing of nuclear energy. The development of the atomic bomb and its use against Japan in 1945 initiated the Atomic Age, a time of anxiety over weapons of mass destruction. Fortunately, besides military aims, the sophisticated advantages of atomic energy led also to its peaceful uses in economy and medicine.

Almost in tandem with the Atomic Age there has been running t**he Space Age.** American scientist Robert Goddard was one of the first to experiment with rocket propulsion systems even before the Second World War. During the late 1940s, the US Department of Defense pursued upper atmospheric research as a means of assuring American leadership in this field. A major step forward came when President D. Eisenhower approved a plan to orbit a scientific satellite to gather scientific data about the Earth.

In October 1957 the world's first artificial satellite **SPUTNIC 1 was launched in the Soviet Union**. The space race began and in 1958 the Congress and the President created the Federal Independent Agency **National Aeronautics and Space Administration (NASA)** as **"**An Act to provide for research into problems of flight within and outside the Earth's atmosphere and for other purposes**".** NASA was headed by Famous German rocket specialist **Werner von Braun** and absorbed into itself the earlier National Advisory Committee for Aeronautics and lots of other organizations. It keeps three major research laboratories and some smaller test facilities (with the annual budget of 100 million dollars and 8000 employees).

Eventually NASA created other Centers and a number of affiliates including the Space Center in Huston, where the forming and training of the space crews is carried out.

When in1961 Russian cosmonaut **Yuri Gagarin** returned to the earth he pronounced a well-known challenge: “Now let the other countries try to catch us”. Several weeks later President Kennedy appealed to Congress: “I believe this nation should commit itself to achieving the goal of landing a man on the moon and returning him safely to earth”.

After that NASA began to conduct space missions. On May 5th, 1961 **Alan B. Shepard Jr.** became the first American to fly into space, and on February 20th, 1962 **John H. Glenn** became the first US astronaut to orbit the Earth. One of the highlights of the program occurred on June 3, 1965, when **Edward H. White** became the first US astronaut to conduct a spacewalk.

The main achievement of NASA during its early years involved the human exploration of the Moon. In 1968, after 11 years of major challenges and tragedies – notably 1967 fire in an Apollo capsule, having taken the lives of three astronauts, the Apollo project was launced under the auspices of the NASA. Apollo 7 carried three men around the earth, and then Apollo 8 carried three others around the moon. Apollo 9 and 10 tested the workability of the lunar module. On July 16, 1969, astronauts **Neil Armstrong and Edwin Aldrin** landed on the moon in Apollo 11, leaving behind a plaque that read: “Here Men from Planet Earth First Set Foot upon the Moon. We Came in Peace for All Mankind”. “That’s one small step for man, one giant leap for mankind”, said Neil Armstrong on returning to the earth.

Since then, there have been other American flights to the moon. Displays at the **National Air and Space Museum in Washington**, D.C. show the developments in space travel. From the scientific point of view, Apollo 15 and Apollo 16

expeditions were especially important, as they were aimed at learning more about the origin of the moon and the universe. During the moon expedition astronauts **Scott and Irwin** were able to leave the lunar Module to drive around over more than 27 kilometers of lunar ground and bring back a chunk of truly ancient lunar crust. After Apollo 17 the exploration of space shifted from the Apollo lunar program to Skylab, the manned orbital space station.

In 1975, NASA began to cooperate with the Soviet Union to achieve the first international human spaceflight, **the Apollo-Soyuz Test Project (ASTP)**. The two spacecrafts were launched within 7.5 hours, docked three hours after and 3 American astronauts **Thomas P. Stafford, Vance Brand, Donald Slaytor** and 2 Soviet Cosmonauts **Alexei Leonov and Valerii Kubasov** met and shook hands in orbit. After that various US space shuttles docked with **the Soviet Mir nine times**, and 52 American astronauts as well as astronauts from Europe and Japan, visited the station for research and training.

During the 1980s and the 1990s, the USA launched several spaceships to investigate distant planets: Jupiter, Venus and Mercury. The Viking probes landed on Mars and provided valuable information of the planet. Since 1975 there have been a number of space expeditions to Mars, Jupiter and its moon Europa stimulating public interest in aerospace exploration. NASA's **Hubble Space Telescope** launched in 1990 discovered 16 extrasolar planet candidates. Using innovative technologies, the Mars spacecraft landed on Mars on July 4th, 1997 and explored the surface of the planet. The Mars Pathfinder mission was a scientific success, watched by many via the Internet.

By the 1980s NASA had created the nation' space transportation system of the future – the Space **Shuttle** that was a reusable manned spacecraft taking off like a rocket and landing like an airplane. After the number of successful missions of shuttle Columbia, on January 28, 1986, the space shuttle Challenger exploded soon after liftoff due to the leak of one of two Solid Rocket Boosters. All seven

members of the crew including a woman astronaut were killed. On the First of February 2003 American Space Shuttle Columbia again broke up over Texas as it descended for a landing at the Kennedy Space Center in Florida following a 16-day flight. All its seven crewmembers died. After the Challenger disasters the Shuttle program was stopped for over two years.

In spite of the tragedies and loss of the human lives NASA continued space scientific research with the **cooperation** between Russian and U.S. scientists.

The USA and Russia set up quite a number united workgroups for coordination of cooperated actions in such fields as biology, astrophysics, solar physics and interplant researches. From 1995 to 1998 the joint programs **Mir-Shuttle** and **Mir-NASA** were carried on. The USA-Russian Space cooperation was supervised by joint American-Russian workgroups, including the representatives of different governmental bodies, universities and institutions of the USA and Russia.

**The ILS (International Launch Services**) joint venture was formed in 1995 and became another example of cooperation between the two countries One of the notable events in bilateral space work was the establishment of **the Sea Launch International** consortium, of which 40% was owned by **Boeing Commercial Space Co.** and 25 % **by Russian Energiya Rocket Space Corp.** The achieved experience paved the way for the creation of another International project **ISS** with the participation of 11 countries. The permanent work of ISS began in November 2000. In May 2000 the first launch of the U.S. rocket-carrier Atlas 111, equipped with a Russian RD-180 engines was conducted.

**John Mather and George Smoot's** Nobel Prize awards of 2006 marked the inception of cosmology as a precise science and manifested the work of more than 1,000 researchers, engineers and other participants for the experimental measurements that revealed the blackbody form of the microwave background radiation measured by satellite launched by NASA in 1989.

**1. Answer the questions.**

1. What do you know about NAS activity? What are the similar and different features in the work of the US National Academy of sciences and the Russian one?

2. Which non-profit scientific institutions do you know in the USA? What is “Think Tanks”?

3. Which role did the World Wars play in the development of American science?

4. What part did the US universities occupy in the development of research?

5. Which names of American Nobel prize winners do you know? Do you know any Russians among them?

6. What do you know about NASA activities?

7. Tell about the space age in the USA and Russia. Give the examples of space cooperation of our two countries.

2. Render the texts in English:

Современная сеть научных организаций в США включает государственные ведомственные лаборатории, федерально финансируемые исследовательские центры, частные промышленные фирмы и некоммерческие (бесприбыльные) организации. Это обусловлено тем, что федеральное правительство тратит огромные средства на науку. Оно - основной источник финансирования фундаментальных исследований и самый крупный заказчик военных программ.

**Б). Бесприбыльные исследовательские организации.**

Бесприбыльные исследовательские организации не ставят своей целью получение коммерческой прибыли. Это освобождает их от федеральных налогов и делает их относительно независимыми. Бесприбыльными исследовательскими организациями являются исследовательские отделы университетов, федерально финансируемые исследовательские центры, научно-технические общества, музеи, частные благотворительные фонды. Сюда же относятся независимые исследовательские институты, профессиональные общества и Академия наук.

Наибольший объем исследований среди бесприбыльных организаций выполняют независимые исследовательские институты. Они не входят в состав фирм и университетов и различны по своим размерам и структуре. Это, как правило, специализированные исследовательские организации. Старейшими бесприбыльными организациями являются

Меллоновский, Беттелевский и Рокфеллеровский фонды. Особое место в этой группе бесприбыльных федеральных исследовательских центров занимает «РЭНД корпорейшен». Это специализированный научный центр, который дает независимую экспертную оценку качества и способов исполнения различных научно-исследовательских проектов. Эта корпорация проводит предварительные исследования, предшествующие выполнению проекта, но не принимает практического участия в их осуществлении, хотя консультирует исполнителей в ходе выполнения проекта. Ее часто называют «мозговым центром», или «мыслительным резервуаром».



Read and translate the following words and word combination:

To spawn - (создавать, зарождаться, размножаться), an entrepreneur - предприниматель, владелец предприятия ,venture capital –капитал, вложенный в предприятие, synergy - явление в деловой практике, когда общий результат превышает сумму отдельных эффектов, to endow - - капитал, вкладываемый в предприятие, to impede- обеспечивать капиталом, Insulator - диэлектрик, непроводник, flagship - флагман.

Geographically, the Silicon Valley is the northern part of the Santa Clara County, an area stretching from the south end of the San Francisco to San Jose.

The name Silicon Valley was coined in 1971 by Don C. Hoefler, editor of the Microelectronics News, when he used this term in his magazine as the title for a series of articles about semiconductor industry in Santa Clara County. Silicon Valley saw the development of the integrated circuit, the microprocessor, the personal computer and has spawned a lot of high-tech products as pocket calculators, cordless telephones, lasers or digital watches. Looking at our high-tech society in which the PC has become indispensable-both in businesses and at home, the crucial role of Silicon Valley as the birthplace of the microelectronics and then the PC revolution has become even more evident.

Silicon Valley is also seen as a place where many entrepreneurs backed by venture capital have made the American Dream come true as “Overnight

Millionaires". This makes Silicon Valley a philosophy saying that everything which seems impossible is feasible and that improvements in the US society can take place. The mayor of San Jose Thomas Emery called it the "economic and cultural frontier where successful entrepreneurship and venture capitalism, innovative work rules and open management styles provide the background for the most profound inquiry ever into the nature of intelligence" which might, together with "bioengineering and artificially intelligent software", affect our evolution. The revolutionary inventions and developments, which have been made in this «Valley», affect the daily life and it is hard to imagine high-tech society without them.

The story of the "Silicon Valley" starts with **Stanford University,** which has been of fundamental importance in the rise of the electronics industry in Santa Clara County. In 1887, Leland Stanford, a wealthy railroad magnate who owned a large part of the Pacific Railroad, decided to built a university and dedicate it to the memory of his son who died very young. The university was opened in 1891 and became later one of the world's greatest academic institutions.

**Frederick Terman** who is known today as a godfather of the Silicon Valley changed the position of this university fundamentally. After graduation from Stanford University he decided to go east to the Massachusetts Institute of Technology (MIT), but after receiving his doctorate in 1924 he turned to Palo Alto and became the head of the engineering department in 1937.Terman established strong cooperation between Stanford and the surrounding electronics industry to stop the brain drain among the university graduates, as they could not find good jobs in California at that time.Thanks to him many companies endowed the university with gifts, which Terman used to hire qualified professors from all over the USA. Thus, he created a mechanism, which increased the settlement of the electronics industry.

During World War II, after the Japanese attack at Pearl Harbor in 1942, a great deal of the US military forces and of the military production was moved to California. Within a few years, California became a booming industrial state and the military center of the USA. After World War II, t**he Stanford Research Institute (SRI**) was founded to provide the industry with more skilled specialists and increase the number of companies in Santa Clara County. More firms - among them Hewlett-Packard as one of the first residents - settled their departments in this park.

Military funding for high-tech products was responsible for the rapid growth of Silicon Valley. A lot of firms (Such firms as FMC, GTE, Varian Associates, Westinghouse, and finally Lockheed) opened their R&D departments in the Stanford Research Park and started Lockheed Missiles and Space Company (LMSC). The invention of the microprocessor in the early 1970s represented the next step towards the modern way of computing, providing the basis for the subsequent personal computer revolution.

I'll just call the companies Intel Corporation (Integrated Electronics),that designed the first microprocessor, IBM (International Business Machines) that has become the world's leading company in the big mainframe computers since the 1950s., The Apple Company, the Sun workstation, and Microsoft Corporation.