Куліш І.М., Королюк Г.О.

SCIENCE PRIZES AND AWARDS

Навчальний посібник для магістрантів
природничо-математичних спеціальностей

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Навчальний посібник сформований у відповідності до програми з іноземної мови для студентів-магістрантів природничо-математичних спеціальностей.

Навчальний матеріал, який доповнює матеріал навчального посібника Куліш І.М. «Англійська мова для магістрантів немовних спеціальностей» текстами та статтями щодо наукових премій та їх переможців, розташовано за тематичним принципом (за розділами). Робота за темою в межах одного розділу організовується на базі текстів та статей про наукові нагороди, їх історію та переможців, системи лексичних вправ репродуктивного та творчого характеру, мовленнєвих завдань комунікативного спрямування. Посібник містить статті для самостійного читання, обговорення у групі та анотування.

ПЕРЕДМОВА

Навчальний посібник призначається для магістрантів природничо-математичних спеціальностей. Мета посібника – удосконалювати у студентів навички читання та розуміння літератури наукової та професійної тематики на основі активізації знань загальновживаної лексики та розширити знання магістрантів про видатних науковців-переможців найпрестижніших наукових премій та їх наукові досягнення через біографічний огляд.

Навчальний матеріал посібника розподілено на три тематичних розділи, текстовий матеріал яких згруповано за темами, які охоплюють Нобелівську премію, історію її створення, процес номінації, її переможців та цікаві наукові факти щодо кожної галузі, в якій надається Нобелівська премія; премія Тюрінга, її переможців та видатні досягнення в галузі інформатики, а також інформацію про видатного англійського математика Алана Тюрінга; премія Чарльза Старка Дрейпера, історія її створення та значні інженерні досягнення, які мали суттєвий вплив на суспільство, а також інформацію про видатного американського вченого та інженера Чарльза Старка Дрейпера та його лабораторію в Массачусетському технологічному інституті.

Кожний розділ включає серію вправ на базі лексичного матеріалу кожної теми, призначених для формування лексичних навичок та тренування вживання мовних явищ на різних етапах удосконалення володіння англійською мовою, а також мовленнєві завдання умовно-комунікативного та комунікативного спрямування.

Посібник містить також статті, які можуть бути використані в організації самостійного читання, а також в обговореннях у групі та анотування. Тематика статей охоплює названі наукові премії та видатні досягнення світу в галузі науки і техніки.

UNIT I

THE NOBEL PRIZE AND ITS WINNERS

Task 1

1. Read and translate the article:

THE NOBEL PRIZE

The **Nobel Prize** is a Sweden-based international monetary prize. The award was established by the 1895 will and estate of Swedish chemist and inventor Alfred Nobel. It was first awarded in Physics, Chemistry, Physiology or Medicine, Literature, and Peace in 1901. An associated prize, The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, was instituted by Sweden's central bank in 1968 and first awarded in 1969. The Nobel Prizes in the specific disciplines (physics, chemistry, physiology or medicine, and literature) and the Prize in Economics, which is commonly identified with them, are widely regarded as the most prestigious award one can receive in these fields.

Alfred Nobel's will from November 25, 1895

Five Nobel Prizes were instituted by the final will of Alfred Nobel, a Swedish chemist and industrialist, who was the inventor of the high explosive dynamite. Though Nobel wrote several wills during his lifetime, the last was written a little over a year before he died, and signed at the Swedish-Norwegian Club in Paris on 27 November 1895. Nobel bequeathed 94% of his total assets, 31 million Swedish kronor, to establish and endow the five Nobel Prizes (as of 2008 that equates to 186 million US dollars).

Nomination and selection

The Prize nomination and selection process is long and rigorous. This is a key reason why the Prizes have grown in importance over the years to become the most important prizes in their field.

The Nobel laureates are selected by their respective *Nobel Committees*. For the Prizes in Physics, Chemistry and Economics, a committee consists of five members elected by *the Royal Swedish Academy of Sciences*; for the Prize in Literature, a committee of four to five members of the *Swedish Academy*; for the Prize in Physiology or Medicine, the committee consists of five members selected by the *Nobel Assembly*, which consists of 50 members elected by Karolinska Institutet; for the Peace Prize, the *Norwegian Nobel Committee* consists of five members elected by the Norwegian Storting (the Norwegian parliament). In its first

stage, several thousand people are asked to nominate candidates. These names are scrutinized and discussed by experts in their specific disciplines until only the winners remain. This slow and thorough process is arguably what gives the prize its importance. Despite this, there have been questionable awards and questionable omissions over the prize's century-long history.

2. Find the English equivalents to the following words and word-combinations:

Бути присудженим, вважатися престижною премією, високонебезпечний динаміт, заповідати загальну власність, забезпечити, суворий процес, бути розглянутим та обговореним, ретельний процес, сумнівний недогляд.

3. Answer the following questions:
1. What disciplines is the Nobel Prize awarded in?
2. What did Nobel bequeath 94% of his total assets to?
3. Why is the Prize nomination and selection process long and rigorous?
4. Whom are the Nobel laureates selected by?
5. What is the first stage of selecting candidates?

4. Tell your friends what you know about the Nobel Prize.

Task 2

1. Read and translate the article:

ALFRED NOBEL
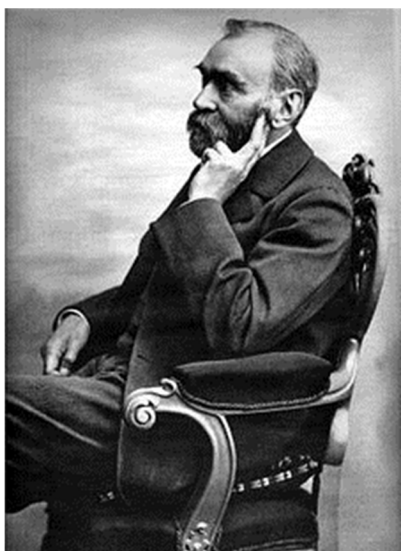
Alfred Bernhard Nobel (Stockholm, Sweden, 21 October 1833 – Sanremo, Italy, 10 December 1896) was a Swedish chemist, engineer, innovator, armaments manufacturer and the inventor of dynamite. He owned Bofors, a major armaments manufacturer, which he had redirected from its previous role as an iron and steel mill. In his last will, he used his enormous fortune to institute the *Nobel Prizes*. The synthetic element nobelium was named after him.

The **Nobel family** is a prominent Swedish family closely related to the history both of Sweden and of Russia in the 19th and 20th centuries. Members of the Nobel family are known not only for their interest in art but also for their inventive ability. *Immanuel Nobel* pioneered the development of underwater mines, designed some of the first steam engines to power Russian ships, installed the first central heating systems in Russian homes and was the first to develop modern plywood (cut with a rotary lathe). One of his sons, *Ludvig Nobel,* was the founder of *The Machine-Building Factory Ludvig Nobel*, a great armaments concern and the inventor of the Nobel wheel. *Ludvig* was also the

founder of Branobel, the foremost Russian oil industry of its time, and launched the world's first diesel-driven tugs and tankers, besides building the first European pipeline. *Alfred Nobel* was the inventor of dynamite and the founder of the Nobel Prizes, to the creation of which he left the bulk of his estate.

The *Nobel Family Society*, which is not to be confused with the *Nobel Foundation*, is a private society of which only the descendants of Immanuel Nobel, the younger, are eligible as members. The Nobel family is also represented in the Nobel Prizes Award Ceremony, held in Stockholm every year.

2. Find the English equivalents to the following words and word-combinations:

Величезний статок, заснувати Нобелевську премію, здатність до винаходів, підводні міни, парова машина, обертальний токарний станок, фанера, озброєння, колесо, буксирне судно, трубопровід, винахідник динаміту, більша частина власності, нащадок; члени, які мають право обиратися.

3. Answer the following questions:
1. What is the greatest achievement of Alfred Nobel?
2. What are the members of Nobel family known for?
3. What are the main achievements of Immanuel Nobel?
4. What did Ludvig Nobel found?
5. What is the Nobel Family Society?

4. Tell your friends what you know about Alfred Nobel and his family.

Task 3

1. Read and translate the article:

Lack of a Nobel Prize in Mathematics

There is no Nobel Prize in Mathematics, which has led to considerable speculation about why Alfred Nobel omitted it. Some recipients of the Nobel Prize in other fields also have notable achievements in or have made outstanding contributions to mathematics; for example, Bertrand Russell was awarded the Nobel Prize in Literature (1950) and Max Born and Walther Bothe shared the Nobel Prize in Physics (1954). Some others with advanced credentials in mathematics and/or who are known primarily as mathematicians have been awarded the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel: Kenneth Arrow (1972), Leonid Kantorovich (1975), John Forbes Nash

(1994), Clive W. J. Granger (2003), Robert J. Aumann (who shared the 2005 Prize with Thomas C. Schelling), and Roger Myerson and Eric Maskin (2007).

Several prizes in mathematics have some similarities to the Nobel Prize. The Fields Medal is often described as the "Nobel Prize of mathematics", but it differs in being awarded only once every four years to people not older than forty years old. Other prestigious prizes in mathematics are the *Crafoord Prize*, awarded by the Royal Swedish Academy of Sciences since 1982; the *Abel Prize* which has also been called the "Nobel Prize of mathematics" and has been awarded by the Norwegian government annually, beginning in 2003; the *Wolf Prize* awarded once a year by the Wolf Foundation; the *Shaw Prize* in mathematical sciences awarded since 2004; and the *Gauss Prize*, granted jointly by the International Mathematical Union and the German Mathematical Society for "outstanding mathematical contributions that have found significant applications outside of mathematics," and introduced at the International Congress of Mathematicians in 2006. The Clay Mathematics Institute has devised seven "Millennium Problems," whose solution results in a significant cash award: since it has a clear, predetermined objective for its award and since it can be awarded whenever a problem is solved, this prize also differs from the Nobel Prizes.

There is also no Nobel Prize in computer science, which, as a discipline, historically grew out of mathematics. The *Turing Award* of the Association for Computing Machinery is often called the "Nobel prize of computing."

2. Find the English equivalents to the following words and word-combinations:

Одержувач премії, мати видатні досягнення, зробити вагомий внесок, мати деякі подібні риси, щорічно, визначне застосування, передбачена мета.

3. Answer the following questions:
1. What were some famous mathematicians awarded?
2. Are there any prizes in Mathematics?
3. How do they differ from the Nobel Prize?
4. Is there any prize in computer science?

4. Tell your friends what you know about Prizes in Mathematics.

Task 4
1. Read and translate the article:

Multiple Laureates

Since the establishment of the Nobel Prize, four people have received two Nobel Prizes:
Maria Skłodowska-Curie: in Physics 1903, for the discovery of radioactivity; and in Chemistry 1911, for the

isolation of pure radium Linus Pauling: in Chemistry 1954, for his research into the nature of the chemical bond and its application to the elucidation of the structure of complex substances; and Peace 1962, for nuclear test-ban treaty activism; he is the only person to have won two unshared Nobel Prizes.

- John Bardeen: in Physics 1956, for the invention of the transistor; and Physics 1972, for the theory of superconductivity.
- Frederick Sanger: in Chemistry 1958, for structure of the insulin molecule; and in Chemistry 1980, for virus nucleotide sequencing.

As a group, the International Committee of the Red Cross (ICRC) has received the Nobel Peace Prize three times: in 1917, 1944, and 1963. The first two prizes were specifically in recognition of the group's work during the world wars, and the third was awarded at the year of its 100-Year Anniversary.

The United Nations High Commissioner for Refugees (UNHCR) has won the Peace Prize twice: in 1954 and 1981.

Family laureates

A number of families have included multiple laureates.

- The Curie family claim the most Nobel Prizes, with five:
  - Maria Skłodowska-Curie, Physics 1903 and Chemistry 1911
  - Her husband Pierre Curie, Physics 1903
  - Their daughter Irene Joliot-Curie, Chemistry 1935
  - Their son-in-law Frederic Joliot-Curie, Chemistry 1935
  - In addition, Henry Labouisse, the husband of the Curies' second daughter Eve, was the director of UNICEF when it won the Nobel Peace Prize in 1965.
- Gunnar Myrdal (Economics, 1974) and wife Alva Myrdal (Peace, 1982)
- J. J. Thomson, awarded the Nobel prize for Physics in 1906, was the father of George Paget Thomson who was awarded the Nobel prize for Physics in 1937.
- William Henry Bragg shared the Nobel prize in Physics in 1915 with his son, William Lawrence Bragg.
- Niels Bohr won the Nobel prize in Physics in 1922, and his son Aage Bohr won the Nobel prize in Physics in 1975.
- Manne Siegbahn, who won the Nobel prize in Physics in 1924, was the father of Kai Siegbahn who shared the Nobel prize in Physics in 1981.
- Hans von Euler-Chelpin shared the Nobel prize in Chemistry in 1929 with Arthur Harden. His son, Ulf von Euler, was awarded the Nobel prize in Physiology or Medicine in 1970.
- C.V. Raman who won the Nobel prize in Physics in 1930, was the uncle of Subrahmanyan Chandrasekhar who won the Nobel prize in Physics in 1983.
- Arthur Kornberg shared with Severo Ochoa the 1959 Nobel prize in Physiology or Medicine for their discovery of the mechanisms in the biological synthesis of ribonucleic acid and deoxyribonucleic acid. Kornberg's son Roger won the 2006 Nobel prize in Chemistry for his studies of the molecular basis of eukaryotic transcription.

- Jan Tinbergen, who won the Nobel Prize for Economics in 1969, was the brother of Nikolaas Tinbergen who shared the 1973 Nobel Prize in Physiology or Medicine with Konrad Lorenz and Karl von Frisch.

2. Translate the following words and word-combinations:

Since the establishment of the Prize, the discovery of radioactivity; the isolation of pure radium, the elucidation of the structure of complex substances, the theory of superconductivity, structure of the insulin molecule, for virus nucleotide sequencing, to share the prize, the mechanisms in the biological synthesis.

3. Answer the following questions:
1. How many recipients were awarded the Nobel Prizes twice?
2. Who are they?
3. Tell about one of them.
4. How many families have included multiple laureates?
5. What is the most outstanding science family?

4. Tell your friends what you know about multiple and family laureates.

Task 5
1. Read and translate the article:

Marie Skłodowska Curie

Marie Skłodowska Curie (November 7, 1867 – July 4, 1934) was a physicist and chemist of Polish upbringing and, subsequently, French citizenship. She was a pioneer in the field of radioactivity, the first person honored with two Nobel Prizes, receiving one in physics and later, one in chemistry. She was the first woman to serve as professor at the University of Paris.

Maria Skłodowska was born in Warsaw and lived there until she was twenty-four years old. In 1891 she followed her elder sister Bronisława to study in Paris, where she obtained her higher degrees and conducted her subsequent scientific work. She founded the Curie Institutes in Paris and Warsaw. Her husband Pierre Curie was a Nobel co-laureate of hers, being awarded a Nobel Prize in physics at the same time. Her daughter Irene Joliot-Curie and son-in-law Frederic Joliot-Curie also received Nobel prizes.

Her achievements include the creation of a theory of *radioactivity* (a term she coined), techniques for isolating radioactive isotopes, and the discovery of two new elements, polonium and radium. Under her personal direction, the world's first

studies were conducted into the treatment of neoplasms (cancers), using radioactive isotopes.

While an actively loyal French citizen, she never lost her sense of Polish identity. She named the first new chemical element that she discovered (1898) polonium for her native country, and in 1932 she founded a Radium Institute (now the Maria Skłodowska–Curie Institute of Oncology) in her home town Warsaw, headed by her physician-sister Bronisława.

2. Translate the following words and word-combinations:

Polish upbringing, French citizenship, a pioneer in the field of radioactivity, to obtain higher degrees, to conduct subsequent scientific work, a theory of radioactivity, isolating radioactive isotopes.

3. Answer the following questions:
1. What did Maria Skłodowska-Curie receive her Nobel Prizes for?
2. Where did she obtain her higher degrees?
3. What did her achievements include?
4. What was her connection with her native land?
5. What was her family famous for?

4. Tell your friends what you know about Maria Skłodowska-Curie and her family.

Task 6

1. Read and translate the article:

Linus Carl Pauling
Part I
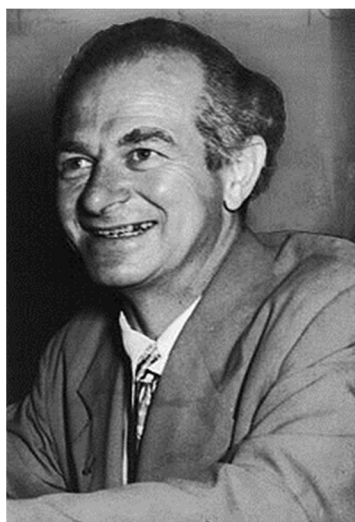
Linus Carl Pauling (February 28, 1901 – August 19, 1994) was an American chemist, peace activist, author, and educator. He was one of the most influential chemists in history and ranks among the most important scientists in any field of the 20th century. Pauling was among the first scientists to work in the fields of quantum chemistry, molecular biology, and orthomolecular medicine. He is one of only 4 individuals to have won multiple Nobel Prizes. He is one of only two people to have been awarded a Nobel Prize in two different fields (the Chemistry and Peace prizes), the other being Marie Curie (the Chemistry and Physics prizes), and the only person to have been awarded each of his prizes without sharing it with another recipient.

Pauling was born in Portland, Oregon, spent part of his childhood in the small town of Condon, Oregon, then returned and attended high school in Portland. He dropped out of high school one class short of graduation in order to attend Oregon Agricultural College (now Oregon State University), from which he graduated in 1922 with a degree in chemical engineering. Pauling then went to the California Institute of Technology (Caltech), where he received his Ph. D in physical chemistry and mathematical physics in 1925. Two years later, he accepted a position at Caltech as an assistant professor in theoretical chemistry. In 1932, Pauling published a landmark paper, detailing his theory of orbital hybridization and analyzed the tetravalency of carbon. That year, he also established the concept of electronegativity and developed a scale that would help predict the nature of chemical bonding. Pauling continued this work, but also began publishing papers on the structure of the atomic nucleus. In 1954, Pauling was awarded the Nobel Prize in Chemistry. As a biochemist, Pauling conducted research with X-ray crystallography and modeling in crystal and protein structures. This type of approach was used by Rosalind Franklin, James Watson and Francis Crick in the U.K to discover the double helix structure of the DNA molecule.

2. Translate the following words and word-combinations into Ukrainian:

An influential chemist, quantum chemistry, molecular biology, orthomolecular medicine, to share with another recipient, to attend high school, to graduate with a degree in chemical engineering, to receive Ph. D in physical chemistry, to accept a position as an assistant professor, theory of orbital hybridization, tetravalency of carbon, the concept of electronegativity, to predict the nature of chemical bonding, to conduct research with X-ray crystallography, modeling in crystal and protein structures, to discover the double helix structure.

3. Read and translate the article:

Linus Carl Pauling
Part II

During the Second World War, Pauling worked on military research and development. However, when the war ended he became particularly concerned about the further development and possible use of atomic weapons and with the destruction inflicted on the world by war in general. Ava Helen Pauling, Linus's wife, was a pacifist and in time he came to share her views. Pauling soon began to express his concerns with the effects of nuclear fallout and in 1962, was awarded the Nobel Peace Prize for his campaign against above ground nuclear testing. His beliefs were not without controversy at the time and he was criticized by some for his actions.

In 1959 Pauling together with Emile Zuckerkandl developed their theory of the molecular clock, which enables one to judge the separation in time between two species by looking at the number of differences in their hemoglobin proteins. They estimated in this way that chimpanzees and humans diverged about 11 million years ago, the current timetable is 7 million years ago. They also developed a theory to explain the apparent constant rate of molecular change in the crucial proteins, which still retained their functions.

Pauling was also successful as an author and educator. His first book, *The Nature of the Chemical Bond* (1939), is considered influential even to this day, as is his introductory textbook, *General Chemistry* (1947). Later in life, he became an advocate for greatly increased consumption of vitamin C and other nutrients. He generalized his ideas to define orthomolecular medicine, which is still regarded as unorthodox by conventional medicine. He popularized his concepts, analyses, research and insights in several successful but controversial books, such as *How to Live Longer and Feel Better* in 1986.

4. Translate the following words and word-combinations into English:

Використання атомної зброї, поділяти погляди, висловлювати хвилювання, наслідки радіоактивних опадів, наземні ядерні випробовування, зберігати функцію, споживання вітаміну С та поживних речовин, наукове дослідження та інтуїція.

5. Answer the following questions:
1. What field was Pauling among the first scientists to work in?
2. What landmark paper did Pauling publish?
3. What research did Pauling conduct as a biochemist?
4. What concern did he express as to the military research?
5. What enables the theory of the molecular clock?
6. What another theory did Pauling together with Emile Zuckerkandl develop?
7. What his book is considered influential even to this day?

6. Tell your friends what you know about Linus Carl Pauling and his research.

Task 7

1. Read and translate the article:

John Bardeen

John Bardeen, Ph.D. (May 23, 1908 – January 30, 1991) was an American physicist and electrical engineer, who won the Nobel Prize in Physics twice: first in 1956 with William Shockley and Walter Brattain for the invention of the transistor; and again in 1972 with Leon Neil Cooper and John Robert Schrieffer for a fundamental theory of conventional superconductivity known as the BCS theory.

The transistor revolutionized the electronics industry, allowing the Information Age to occur, and made possible

the development of almost every modern electronical device, from telephones to computers to missiles. Bardeen's developments in superconductivity, which won him his second Nobel, are used in Magnetic Resonance Imaging (MRI).

In 1990, John Bardeen appeared on *LIFE Magazine* 's list of "100 Most Influential Americans of the Century."

In 1956, John Bardeen shared the Nobel Prize in Physics with William Shockley of Semiconductor Laboratory of Beckman Instruments and Walter Brattain of Bell Telephone Laboratories "*for their researches on semiconductors and their discovery of the transistor effect*".

In 1957, John Bardeen, in collaboration with Leon Cooper and his doctoral student John Robert Schrieffer, proposed the standard theory of superconductivity known as the BCS theory (named for their initials).

BCS theory explains conventional superconductivity, the ability of certain metals at low temperatures to conduct electricity without electrical resistance. BCS theory views superconductivity as a macroscopic quantum mechanical effect. It proposes that electrons with opposite spin can become paired, forming Cooper pairs. Independently and at the same time, superconductivity phenomenon was explained by Nikolay Bogoliubov by means of the so-called Bogoliubov transformations.

In 1972, John Bardeen shared the Nobel Prize in Physics with Leon Neil Cooper of Brown University and John Robert Schrieffer of the University of Pennsylvania *for their jointly developed theory of superconductivity, usually called the BCS-theory*.

This was Bardeen's second Nobel Prize in Physics. He became the first person to win two Nobel Prizes in the same field. He also became the third person out of only four to win two Nobel Prizes.

Bardeen gave much of his Nobel Prize money to fund the Fritz London Memorial Lectures at Duke University.

2. Translate the following words and word-combinations into Ukrainian:

Fundamental theory, conventional superconductivity, modern electronical device, Magnetic Resonance Imaging, the discovery of the transistor effect, to conduct electricity without electrical resistance, macroscopic quantum mechanical effect.

3. Translate the following words and word-combinations into English:

Американський фізик, здобувати Нобелевську премію, винахід транзистора, найвпливовіший американець, розділити Нобелівську премію, пояснити явище, спільно розроблена теорія.

4. Answer the following questions:
1. What field did John Bardeen win the Nobel Prize in?
2. What did transistor make possible?
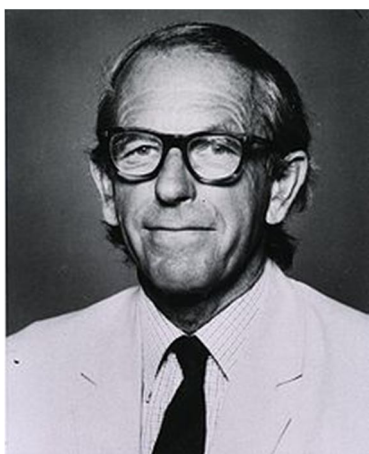3. What did John Bardeen share the first Nobel Prize for?

4. What did John Bardeen win the second Nobel Prize for?
5. What did Bardeen give much of his Nobel Prize money for?

5. Tell your friends what you know about John Bardeen and his achievements.

Task 8

1. Read and translate the article:

Frederick Sanger

Frederick Sanger, (born 13 August 1918) is an English biochemist and twice a Nobel laureate in chemistry. He is the fourth (and only living) person to have been awarded two Nobel Prizes.

Sanger completed his Bachelor of Arts in natural sciences from St John's College, Cambridge in 1939. Raised as a Quaker, he learned to abhor violence, and during the Second World War he was a conscientious objector, being allowed to continue his research for a Ph.D.

He originally intended to study medicine, but became interested in biochemistry; some of the leading biochemists in the world were at Cambridge at the time. He completed his Ph.D. in 1943 under A. Neuberger, on lysine metabolism and a more practical problem concerning the nitrogen of potatoes.

Sanger's first triumph was to determine the complete amino acid sequence of the two polypeptide chains of insulin in 1955. Prior to this it was widely assumed that proteins were somewhat amorphous. In determining these sequences, Sanger proved that proteins have a defined chemical composition.

Sanger's principal conclusion was that the two polypeptide chains of the protein insulin had precise amino acid sequences and, by extension, that every protein had a unique sequence. It was this achievement that earned him his first Nobel Prize in Chemistry in 1958.

In the 1960s he turned his attention to RNA molecules and again developed methods for separating fragments of these generated with specific nucleases. He then turned to DNA and, by 1975, had developed the "dideoxy" method for sequencing DNA molecules, also known as the *Sanger method*. Two years later Sanger used his technique to successfully sequence the genome of the Phage Φ-X174; the first fully sequenced DNA-based genome. He did this entirely by hand. This has been of key importance in such projects as the Human Genome Project and earned him his second Nobel prize in Chemistry in 1980, which he shared with Walter Gilbert and Paul Berg. He is thus far (2009) the only person to have been awarded two Nobel Prizes in Chemistry.

2. Find the English equivalents to the following words and word-combinations:

Двічі Нобелевський лауреат з хімії, ненавидіти насилля, сумлінний противник, мати намір вивчати медицину, зацікавитися біохімією, послідовність поліпептидних ланцюгів, мати певний хімічний склад, відокремити елементи, послідовність молекул ДНК.

3. Answer the following questions:
1. What was Sanger's first triumph?
2. What did he prove about proteins?
3. What was Sanger's principal conclusion as to protein insulin?
4. What achievement did he earn his first Nobel Prize in Chemistry in 1958 for?
5. What did Sanger develop as to the RNA molecules?
7. What is known as the Sanger method?
8. What did Sanger earn his second Nobel Prize in Chemistry in 1980 for?

4. Tell your friends what you know about Frederick Sanger, his research and achievements.

Task 9

1. What do you know about the Noble Prize and the Nobel Prize winners?

2. Read the article and say what fact surprises you most.

Odd Facts about the Nobel Prize

Nobel Prize winners receive a medal and a cash award.

1. Robert Lucas, winner of the 1995 Nobel Prize in Economics for his work on the theory of "rational expectations," split his $1 million prize with his ex-wife. If there were a Nobel Prize for Foresight or Timing, she should be nominated, based on a clause in their divorce settlement from seven years earlier: "Wife shall receive 50 percent of any Nobel Prize." The clause expired on October 31, 1995. Had Lucas won any year after, he would have kept the whole million.

2. Physicist Lise Meitner, whose work helped lead to the discovery of nuclear fission, was reportedly nominated for the Nobel Prize 13 times without ever winning (though nominations are kept secret, so we don't know for sure). This makes her the Dynasty of the Nobel Prize scene – that show was nominated for 24 Emmy Awards but never won. Other analogies we'd accept: The Color Purple (11 Oscar

nominations in 1985, no wins), the Buffalo Bills or Minnesota Vikings (4 Super Bowl losses each without a victory) and William Jennings Bryan (three-time Democratic nominee for President, losing twice to McKinley and once to Taft.)

3. People who refused the prize:
• **Le Duc Tho** was awarded the 1973 Nobel Peace Prize with Henry Kissinger for their roles in brokering a Vietnam cease fire at the Paris Peace Accords. Citing the absence of actual peace in Vietnam, Tho declined to accept.
• **Jean Paul Sartre** waved off the 1964 Nobel Prize in Literature. His explanation: "It is not the same thing if I sign Jean-Paul Sartre or if I sign Jean-Paul Sartre, Nobel Prize winner. A writer must refuse to allow himself to be transformed into an institution, even if it takes place in the most honorable form."
• Afraid of Soviet retribution if he traveled to Stockholm to claim his prize, **Boris Pasternak** declined to accept the 1958 Prize in Literature, which he'd earned for Doctor Zhivago. The Academy refused his refusal. "This refusal, of course, in no way alters the validity of the award. There remains only for the Academy, however, to announce with regret that the presentation of the Prize cannot take place." Yevgeny Pasternak accepted the prize on behalf of his deceased father in 1989.
• Swedish poet **Erik Axel Karlfeldt** won for Literature in 1918. He did not accept because he was Secretary of the Swedish Academy, which awards the prize. He was given the award posthumously in 1931. This was allowed because the nomination was made before Karlfeldt died -- no candidate may be proposed after death.

4. In 2007, 90-year-old **professor Leonid Hurwicz** became the oldest person to ever win (one-third of the Prize in Economics); at 87, writer **Doris Lessing** became the oldest woman (Literature).

Task 10

1. Read and translate the article:

The Nobel Prize in Physics

"The said interest shall be divided into five equal parts, which shall be apportioned as follows: /- - -/ one part to the person who shall have made the most important discovery or invention within the field of physics ..."

(Excerpt from the will of Alfred Nobel)

Physics was the prize area which Alfred Nobel mentioned first in his will. At that time, in the end of the nineteenth century, many people viewed physics as the foremost of the sciences, and perhaps Nobel saw it this way as well. His own research was also closely tied to physics.

In 1901 the very first Nobel Prize in Physics was awarded to Wilhelm Rontgen for his discovery of X-rays. In more recent years, the Physics Prize has been awarded for both pioneering discoveries and groundbreaking inventions.
The Nobel Prize in Physics is awarded by the Royal Swedish Academy of Sciences.

1. Find the English equivalents in the article:

Розділити, рівні частини, згадати першим, розглядати фізику, передова наука, власне наукове дослідження, бути тісно пов'язаним з фізикою, відкриття рентгенівських променів, прогресивні відкриття.

2. Read the facts on the Nobel Prize in Physics and answer the following questions:

1. How many Nobel Prizes have been awarded since 1901?
2. How many Prizes were unshared?
3. May a prize amount be divided between more than 3 persons?
4. Who was awarded with the Nobel Prize in Physics twice?
5. Who was the youngest Nobel Laureate in Physics?
6. Who was the oldest Nobel Laureate in Physics?
7. Are there any women awarded with the Nobel Prize in Physics?
8. How many multiple Nobel Laureates are there in Physics?
9. Are there any Family Laureates in Physics?
10. Whom were the laurel wreaths awarded in ancient Greece to?

Facts about the Nobel Prize in Physics
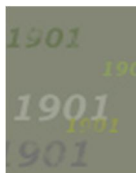
Number of Nobel Prizes in Physics
104 Nobel Prizes in Physics have been awarded since 1901. It was not awarded on six occasions: in 1916, 1931, 1934, 1940, 1941, and 1942.

Why were the Nobel Prizes not awarded in those years? In the statutes of the Nobel Foundation it says: "If none of the works under consideration is found to be of the importance indicated in the first paragraph, the prize money shall be reserved until the following year. If, even then, the prize cannot be awarded, the amount shall be added to the Foundation's restricted funds." During World War I and II, fewer Nobel Prizes were awarded.

Number of shared and unshared Nobel Prizes in Physics
47 Physics Prizes have been given to one Laureate only.
29 Physics Prizes have been shared by two Laureates.
28 Physics Prizes have been shared between three Laureates.
Why is that? In the statutes of the Nobel Foundation it says: "A prize amount may be equally divided between two works, each of which is considered to merit a prize. If a work that is being rewarded has been produced by two or three persons, the prize shall be awarded to them jointly. In no case may a prize amount be divided between more than three persons."

Number of Nobel Laureates in Physics
The Nobel Prize in Physics has been awarded to 189 Laureates. As John Bardeen has been awarded twice there are **188** individuals who have been awarded the Nobel Prize in Physics since 1901.

Youngest Physics Laureate
To date, the youngest Nobel Laureate in Physics is Lawrence Bragg, who was 25 years old when he was awarded the Nobel Prize with his father in 1915. Bragg is not only the youngest Physics Laureate, he is also the youngest Nobel Laureate in any Nobel Prize area.

Oldest Physics Laureate
The oldest Nobel Laureate in Physics to date is Raymond Davis Jr., who was 88 years old when he was awarded the Nobel Prize in 2002.

Female Nobel Laureates in Physics
Of the 188 individuals awarded the Nobel Prize in Physics, only two are women. 1903 - Marie Curie (also awarded the 1911 Nobel Prize in Chemistry.) 1963 - Maria Goeppert-Mayer

Multiple Nobel Laureates in Physics
John Bardeen is the only person who has received the Nobel Prize in Physics twice. Marie Curie was awarded the Nobel Prize twice, once in Physics and once in Chemistry.

John Bardeen
Physics 1956
Physics 1972

Marie Curie
Physics 1903
Chemistry 1911

Posthumous Nobel Prizes in Physics

There have been no posthumous Nobel Prizes in Physics. From 1974, the Statutes of the Nobel Foundation stipulate that a Prize cannot be awarded posthumously, unless death has occurred after the announcement of the Nobel Prize. Before 1974, the Nobel Prize has only been awarded posthumously twice: to Dag Hammarskjold (Nobel Peace Prize 1961) and Erik Axel Karlfeldt (Nobel Prize in Literature 1931).

Family Nobel Laureates in Physics
Married   couples:

Marie Curie and Pierre Curie were awarded the Nobel Prize in Physics in 1903. Marie Curie was awarded the Nobel Prize a second time in 1911, this time receiving the Nobel Prize in Chemistry.

(One of Marie and Pierre Curie's daughters, Irene Joliot-Curie , was awarded the Nobel Prize in Chemistry in 1935 together with her husband Frederic Joliot.)

Father & son: (All awarded the Nobel Prize in Physics.)

William Bragg and Lawrence Bragg, 1915

Niels Bohr, 1922 and Aage N. Bohr, 1975

Manne Siegbahn, 1924 and Kai M. Siegbahn, 1981

J. J. Thomson, 1906 and George Paget Thomson, 1937

## Why are the individuals and organisations awarded a Nobel Prize called Nobel Laureates?

The word "Laureate" refers to being signified by the laurel wreath.

In Greek mythology, the god Apollo is represented wearing a laurel wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greece laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

Task 11

1. Read and translate the article:
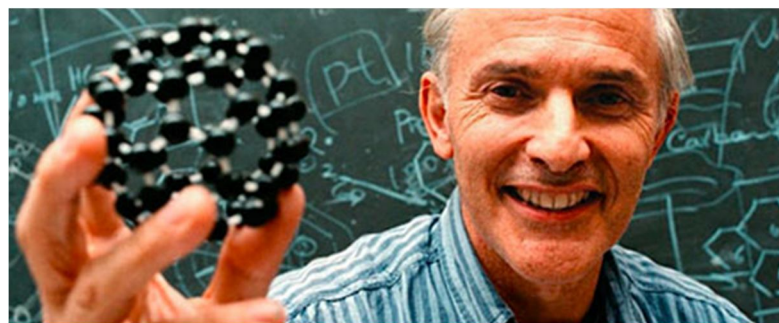
The Nobel Prize in Chemistry

"The said interest shall be divided into five equal parts, which shall be apportioned as follows: /- - -/ one part to the person who shall have made the most important chemical discovery or improvement ..."

(*Excerpt from the will of Alfred Nobel*)

Chemistry was the most important science for Alfred Nobel's own work. The development of his inventions as well as the industrial processes he employed were based upon chemical knowledge. Chemistry was the second prize area that Nobel mentioned in his will.

In 1901 the very first Nobel Prize in Chemistry was awarded to Jacobus H. van Hoff for his work on rates of reaction, chemical equilibrium, and osmotic pressure. In more recent years, the Chemistry Laureates have increased our understanding of chemical processes and their molecular basis, and have also contributed to many of the technological advancements we enjoy today.
The Nobel Prize in Chemistry is awarded by the Royal Swedish Academy of Sciences.

1. Find the English equivalents in the article:

Розробка винаходів, промисловий процес, хімічні знання, згадувати у заповіті, бути присудженим, швидкість реакції, хімічна рівновага, осмотичний тиск, хімічний процес, молекулярна основа, технологічний прогрес.

2. Read the facts on the Nobel Prize in Chemistry and answer the following questions:
1. How many Nobel Prizes have been awarded since 1901?
2. How many Prizes were unshared?
3. May a prize amount be divided between more than 3 persons?
4. Who was awarded the Nobel Prize in Chemistry twice?
5. Who was the youngest Nobel Laureate in Chemistry?
6. Who was the oldest Nobel Laureate in Chemistry?
7. Are there any women awarded with the Nobel Prize in Chemistry?
8. How many multiple Nobel Laureates are there in Chemistry?
9. Who forbade three German Nobel Laureates from receiving the Nobel Prize?
10. Whom were the laurel wreaths awarded in ancient Greece to?

Facts on the Nobel Prize in Chemistry

On 27 November 1895, Alfred Nobel signed his last will and testament, giving the largest share of his fortune to a series of prizes, the Nobel Prizes. As described in Nobel's will one part was dedicated to "the person who shall have made the most important chemical discovery or improvement".

Number of Nobel Prizes in Chemistry
102 Nobel Prizes in Chemistry have been awarded since 1901. It was not awarded on eight occasions: in 1916, 1917, 1919, 1924, 1933, 1940, 1941 and 1942.

Why were the Chemistry Prizes not awarded in those years? In the statutes of the Nobel Foundation it says: "If none of the works under consideration is found to be of the importance indicated in the first paragraph, the prize money shall be reserved until the following year. If, even then, the prize cannot be awarded, the amount shall be added to the Foundation's restricted funds." During World War I and II, fewer Nobel Prizes were awarded.

Number of shared and unshared Nobel Prizes in Chemistry

62 Chemistry Prizes have been given to one Laureate only.

22 Chemistry Prizes have been shared by two Laureates.

18 Chemistry Prizes have been shared between three Laureates.

Why is that? In the statutes of the Nobel Foundation it says: "A prize amount may be equally divided between two works, each of which is considered to merit a prize. If a work that is being rewarded has been produced by two or three persons, the prize shall be awarded to them jointly. In no case may a prize amount be divided between more than three persons."

Number of Nobel Laureates in Chemistry

The Nobel Prize in Chemistry has been awarded to 160 Laureates. As Frederick Sanger has been awarded twice, there are **159** individuals who have received the Nobel Prize in Chemistry since 1901.

Youngest Chemistry Laureate

To date, the youngest Nobel Laureate in Chemistry is Frederic Joliot, who was 35 years old when he was awarded the Chemistry Prize in 1935, together with his wife, Irene Joliot-Curie.

Oldest Chemistry Laureate

The oldest Nobel Laureate in Chemistry to date is John B. Fenn, who was 85 years old when he was awarded the Chemistry Prize in 2002.

Female Nobel Laureates in Chemistry

Of the 159 individuals awarded the Nobel Prize in Chemistry, only four are women. Two of these four women, Marie Curie and Dorothy Crowfoot Hodgkin, were awarded with unshared Chemistry Prizes.

1911 - Marie Curie (also awarded the 1903 Nobel Prize in Physics)

1935 - Irene Joliot-Curie (daughter of Marie Curie and wife to Frederic Joliot)

1964 - Dorothy Crowfoot Hodgkin

2009 - Ada Yonath

Multiple Nobel Laureates in Chemistry

Marie Curie
Physics 1903
Chemistry 1911

Linus Pauling
Chemistry 1954
Peace 1962

Frederick Sanger
Chemistry 1958
Chemistry 1980

Linus Pauling is the only person who has been awarded two unshared Nobel Prizes.

Family Nobel Laureates in Chemistry

The Curies were the most successful "Nobel Prize family". The husband-and-wife partnership of Marie Curie and Pierre Curie were awarded the 1903 Nobel Prize in Physics. Marie Curie herself was awarded the Nobel Prize a second time, receiving the 1911 Nobel Prize in Chemistry. Marie and Pierre Curie's daughter, Irene Joliot-Curie, was awarded the 1935 Nobel Prize in Chemistry, together with her husband, Frederic Joliot. **More "Nobel Prize families", where at least one member was awarded the Nobel Prize in Chemistry:** Hans von Euler-Chelpin (father), Nobel Laureate in Chemistry 1929.
Ulf von Euler (son), Nobel Laureate in Physiology or Medicine 1970.
Arthur Kornberg (father), Nobel Laureate in Physiology or Medicine 1959.
Roger D. Kornberg (son), Nobel Laureate in Chemistry 2006.

Two Nobel Laureates in Chemistry have been forced by authorities to decline the Nobel Prize

Adolf Hitler forbade three German Nobel Laureates from receiving the Nobel Prize - two of whom were awarded the Nobel Prize in Chemistry, Richard Kuhn in 1938 and Adolf Butenandt in 1939. The third person, Gerhard Domagk was awarded the Nobel Prize in Physiology or Medicine in 1939. All of them could receive the Nobel Prize Diploma and Medal later, but not the prize amount.

Why are the individuals and organisations awarded a Nobel Prize called Nobel Laureates?

The word "Laureate" refers to being signified by the laurel wreath. In Greek mythology, the god Apollo is represented wearing a laurel wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greek laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

Task 12

1. Read and translate the article:

The Nobel Prize in Physiology or Medicine

"The said interest shall be divided into five equal parts, which shall be apportioned as follows: /- - -/ one part to the person who shall have made the most important discovery within the domain of physiology or medicine ..."

(Excerpt from the will of Alfred Nobel)

Alfred Nobel had an active interest in medical research. Through Karolinska Institutet he came into contact with Swedish physiologist Jons Johansson around 1890. Johansson worked in Nobel's laboratory in Sevran, France for a time that year. Physiology or medicine was the third prize area Nobel mentioned in his will. In 1901, Emil von Behring was awarded the first Nobel Prize in Physiology or Medicine for his work on serum therapy, particularly for its use in the treatment of diphtheria. The Medicine Prize has subsequently highlighted a number of important discoveries including penicillin, genetic engineering and blood-typing. The Nobel Prize in Physiology or Medicine is awarded by the Nobel Assembly at Karolinska Institutet.

1. **Find the English equivalents in the article:**
   Рівні частини, важливе відкриття, в галузі фізіології, медичні дослідження, згадувати у заповіті, серотерапія, відзначити ряд відкриттів, генна інженерія, групи крові.

2. **Read the facts on the Nobel Prize in Physiology or Medicine and answer the following questions:**
   1. How many Nobel Prizes have been awarded since 1901?
   2. How many Prizes were unshared?
   3. May a prize amount be divided between more than 3 persons?
   4. Who was the youngest Nobel Laureate in Physiology or Medicine?

5. Who was the oldest Nobel Laureate in Physiology or Medicine?
6. Are there any women awarded the Nobel Prize in Physiology or Medicine?
7. How many multiple Nobel Laureates are there in Physiology or Medicine?
8. Are there any Family Laureates in Physiology or Medicine?
9. Who forbade three German Nobel Laureates from receiving the Nobel Prize?
10. Whom were the laurel wreaths awarded in ancient Greece to?

Facts on the Nobel Prize in Physiology or Medicine

On 27 November 1895, Alfred Nobel signed his last will and testament, giving the largest share of his fortune to a series of prizes, the Nobel Prizes. As described in Nobel's will, one part was dedicated to "the person who shall have made the most important discovery within the domain of physiology or medicine".

Number of Nobel Prizes in Physiology or Medicine
101 Nobel Prizes in Physiology or Medicine have been awarded since 1901. It was not awarded on nine occasions: in 1915, 1916, 1917, 1918, 1921, 1925, 1940, 1941 and 1942.

Why were the Medicine Prizes not awarded in those years? In the statutes of the Nobel Foundation it says: "If none of the works under consideration is found to be of the importance indicated in the first paragraph, the prize money shall be reserved until the following year. If, even then, the prize cannot be awarded, the amount shall be added to the Foundation's restricted funds." During World War I and II, fewer Nobel Prizes were awarded.

Number of shared and unshared Nobel Prizes in Physiology or Medicine
38 Medicine Prizes have been given to one Laureate only.
31 Medicine Prizes have been shared by two Laureates.
32 Medicine Prizes have been shared between three Laureates.

Why is that? In the statutes of the Nobel Foundation it says: A prize amount may be equally divided between two works, each of which is considered to merit a prize. If a work that is being rewarded has been produced by two or three persons, the prize shall be awarded to them jointly. In no case may a prize amount be divided between more than three persons.

Number of Nobel Laureates in Physiology or Medicine
196 individuals have been awarded since 1901.

Youngest Medicine Laureate
To date, the youngest Nobel Laureate in Physiology or Medicine is Frederick G. Banting, who was 32 years old when he was awarded the Medicine Prize in 1923.

Oldest Medicine Laureate
The oldest Nobel Laureate in Physiology or Medicine to date is Peyton Rous, who was 87 years old when he was awarded the Medicine Prize in 1966.

Female Nobel Laureates in Physiology or Medicine
Of the 196 individuals awarded the Nobel Prize in Physiology or Medicine, only ten are women. Of these eight, Barabara McClintock is the only one who has received an unshared Nobel Prize.
1947 - Gerty Cori
1977 - Rosalyn Yalow
1983 - Barbara McClintock
1986 - Rita Levi-Montalcini
1988 - Gertrude B. Elion
1995 - Christiane Nusslein-Volhard
2004 - Linda B. Buck
2008 - Francoise Barre-Sinoussi
2009 - Elizabeth H. Blackburn and Carol W. Greider

Oldest living Nobel Laureate
The Nobel Laureate who has lived to the oldest age is Rita Levi-Montalcini, who was awarded the 1986 Nobel Prize in Physiology or Medicine. She celebrated her 101th anniversary on 22 April 2010!

Multiple Nobel Laureates in Physiology or Medicine
No one has been awarded the Nobel Prize in Physiology or Medicine more than once. Yet ...

Posthumous Nobel Prizes in Physiology or Medicine
There have been no posthumous Nobel Prizes in Physiology or Medicine. From 1974, the Statutes of the Nobel Foundation stipulate that a Prize cannot be awarded posthumously, unless death has occurred after the announcement of the Nobel Prize. Before 1974, the Nobel Prize has only been awarded posthumously twice: to Dag Hammarskjold (Nobel Peace Prize 1961) and Erik Axel Karlfeldt (Nobel Prize in Literature 1931).

Family Nobel Laureates in Medicine
Married couple:
Gerty Cori and Carl Cori, both awarded the 1947 Nobel Prize in Physiology or Medicine
Father & son:
Hans von Euler-Chelpin (Chemistry Prize) and Ulf von Euler (Medicine Prize)
Arthur Kornberg (Medicine Prize) and Roger D. Kornberg (Chemistry Prize)
Brothers:
Jan Tinbergen (Economics Prize) and Nikolaas Tinbergen (Medicine Prize)

One Nobel Laureate in Medicine has been forced by authorities to decline the Nobel Prize
Adolf Hitler forbade three German Nobel Laureates from accepting the Nobel Prize, including Gerhard Domagk, who was awarded the 1939 Nobel Prize in Physiology or Medicine. The other two Laureates were awarded the Nobel Prize in Chemistry, Richard Kuhn in 1938 and Adolf Butenandt in 1939. All of them could later receive the Nobel Prize Diploma and Medal, but not the prize amount.

Why are the individuals and organisations awarded a Nobel Prize called Nobel Laureates?
The word "Laureate" refers to being signified by the laurel wreath. In Greek mythology, the god Apollo is represented wearing a laurel wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greek laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

Task 13

1. Read and translate the article:

The Nobel Prize in Literature

"The said interest shall be divided into five equal parts, which shall be apportioned as follows: /- - -/ one part to the person who shall have produced in the field of literature the most outstanding work in an ideal direction ..."

(Excerpt from the will of Alfred Nobel)

Alfred Nobel had broad cultural interests. The interest that he developed in literature during his early youth lasted throughout his life. His library holds a rich spectrum of literature in different languages. Further evidence of Nobel's literary interest was that during the last years of his life, he began writing fiction again. Literature was the fourth prize area Nobel mentioned in his will.

The very first Nobel Prize in Literature was awarded in 1901 to the French poet and philosopher Sully Prudhomme, who in his poetry showed the "rare combination of the qualities of both heart and intellect". Over the years, the Nobel Prize in Literature has distinguished the works of authors from many different languages and cultural backgrounds. The Literature Prize has been awarded to unknown masters as well as authors acclaimed worldwide.

The Nobel Prize in Literature is awarded by the Swedish Academy.

1. Find the English equivalents in the article:

Широкі інтереси в області культури, тривати протягом життя, багатий обсяг літератури, бути присудженим, рідкісне поєднання, відзначити роботи, визнаний у всьому світі.

2. Read the facts on the Nobel Prize in Literature and answer the following questions:
  1. How many Nobel Prizes have been awarded since 1901?
  2. How many Prizes were unshared?
  3. May a prize amount be divided between more than 3 persons?
  4. Who was awarded with the Nobel Prize in Literature twice?
  5. Who was the youngest Nobel Laureate in Literature?
  6. Who was the oldest Nobel Laureate in Literature?
  7. Are there any women awarded the Nobel Prize in Literature?
  8. How many multiple Nobel Laureates are there in Literature?
  9. Are there any surprise Laureates in Literature?
  10. Are there any specific work singled out for particular recognition?

Facts on the Nobel Prize in Literature

On 27 November 1895, Alfred Nobel signed his last will and testament, giving the largest share of his fortune to a series of prizes, the Nobel Prizes. As described in Nobel's will one part was dedicated to "the person who shall have produced in the field of literature the most outstanding work in an ideal direction". Learn more about the Nobel Prize in Literature from 1901 to 2010.

Number of Nobel Prizes in Literature

103 Nobel Prizes in Literature have been awarded since 1901. It was not awarded on seven occasions: in 1914, 1918, 1935, 1940, 1941, 1942, and 1943.

Number of shared and unshared Nobel Prizes in Literature

The Nobel Prize in Literature has been shared between two individuals on four occasions only. This is a more common phenomenon within the other Nobel Prize areas.

Number of Nobel Laureates* in Literature

107 individuals have been awarded the Nobel Prize in Literature since 1901.

Youngest Literature Laureate

To date, the youngest Literature Laureate is Rudyard Kipling, best known for *The Jungle Book*, who was 42 years old when he was awarded the Literature Prize in 1907.

Oldest Literature Laureate

The oldest Nobel Laureate in Literature to date is Doris Lessing, who was 88 years old when she was awarded the Prize in 2007.

Female Nobel Laureates in Literature

12 women have been awarded the Nobel Prize in Literature. Swedish author Selma Lagerlof (1858-1940) was the first woman to be awarded in 1909. Selma Lagerlof was awarded five years before she was elected to the Swedish Academy, the Nobel Prize awarding institution responsible for selecting Nobel Laureates in Literature.

Two people have declined the Nobel Prize in Literature

Boris Pasternak, the 1958 Nobel Prize in Literature, "Accepted first, later caused by the authorities of his country (Soviet Union) to decline the Prize". Jean Paul Sartre, the 1964 Nobel Prize in Literature, declined the prize because he had consistently declined all official honours.

Multiple Nobel Prize Laureates in Literature

No one has been awarded the Nobel Prize in Literature more than once.

Posthumous Nobel Prizes in Literature

In 1931, the Nobel Prize in Literature was awarded posthumously to Erik Axel Karlfeldt. From 1974, the Statutes of the Nobel Foundation stipulate that a Nobel Prize cannot be awarded posthumously, unless death has occurred after the announcement of the Nobel Prize. Dag Hammarskjold was also awarded a posthumous prize, the Nobel Peace Prize in 1961.

Awarded members of the Swedish Academy

One particular problem faced during the nomination and selection process for the Nobel Prize in Literature is how to deal with candidates who are members of the Swedish Academy, the Nobel Prize awarding institution responsible for selecting Nobel Laureates in Literature. All six Swedish Nobel Laureates in Literature were members of the Swedish Academy. In virtually every case it appears that they have declined nomination and a routine has been established, were they are not subjected to the appraisal of either an expert or the Nobel Committee for Literature.

Number of Nobel Laureates in Literature sorted in languages

Alfred Nobel had an international horizon in his will, though it rejected any consideration for the nationality of the candidates: the most worthy should be chosen, "whether he be Scandinavian or not".

Surprise Literature Laureate?

Many believe that Winston Churchill was awarded the Nobel Peace Prize, but he was actually awarded the 1953 Nobel Prize in Literature. In fact, Churchill was nominated both for the Literature Prize and for the Nobel Peace Prize.

Awarded for a particular literary work

While the Nobel Prize in Literature is for a writer's life work, there are nine Literature Laureates for whom the Swedish Academy singled out a specific work for particular recognition.

Why are the individuals and organisations awarded a Nobel Prize called Nobel Laureates?

The word "Laureate" refers to being signified by the laurel wreath. In Greek mythology, the god Apollo is represented wearing a laurel wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greek laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

Task 14

1. Read and translate the article:

The Nobel Prize in Peace

"The said interest shall be divided into five equal parts, which shall be apportioned as follows: /- - -/ one part to the person who shall have done the most or the best work for fraternity between nations, the abolition or reduction of standing armies and for the holding and promotion of peace congresses."
(Excerpt from the will of Alfred Nobel)

Alfred Nobel was interested in social issues. He developed a special engagement in the peace movement. An important factor in Nobel's interest in peace was his acquaintance with Bertha von Suttner. Perhaps his interest in peace was also due to the use of his inventions in warfare and assassination attempts. Peace was the fifth and final prize area that Nobel mentioned in his will.

Henry Dunant, founder of the Red Cross, shared the first Nobel Peace Prize in 1901 with Frederic Passy, a leading international pacifist of the time. In addition to humanitarian efforts and peace movements, the Nobel Peace Prize has been awarded for work in a wide range of fields including advocacy of human rights, mediation of international conflicts, and arms control.

The Nobel Peace Prize is awarded by a committee of five persons who are chosen by the Norwegian Storting.

1. **Find the English equivalents in the article:**
Рівні частини, цікавитися соціальними питаннями, рух за мир, використання винаходів, спроби вбивства, згадувати у заповіті, розділити премію, захист прав людини, посередництво у міжнародних конфліктах.

2. **Read the facts on the Nobel Peace Prize and answer the following questions:**
   1. How many Nobel Prizes have been awarded since 1901?
   2. How many Prizes were unshared?
   3. May a prize amount be divided between more than 3 persons?

4. Who was the youngest Peace Laureate?
5. Who was the oldest Peace Laureate?
6. Are there any women awarded with the Nobel Peace Prize?
7. How many multiple Nobel Peace Laureates are there?
8. Are there any surprise Peace Laureates?
9. Who has declined the Nobel Peace Prize?
10. Whom were the laurel wreaths awarded in ancient Greece to?

Facts on the Nobel Peace Prize

On 27 November 1895, Alfred Nobel signed his last will and testament, giving the largest share of his fortune to a series of prizes, the Nobel Prizes. As described in Nobel's will, one part was dedicated to "the person who shall have done the most or the best work for fraternity between nations, for the abolition or reduction of standing armies and for the holding and promotion of peace congresses". Learn more about the Nobel Peace Prize from 1901 to 2010.

Number of Nobel Peace Prizes
91 Nobel Peace Prizes have been awarded since 1901.

Number of shared and unshared Nobel Peace Prizes
62 Peace Prizes have been given to one Laureate only.
28 Peace Prizes have been shared by two Laureates.
1 Peace Prizes has been shared between three persons. (Yasser Arafat, Shimon Peres, Yitzhak Rabin)

Number of Nobel Peace Prize Laureates
The Nobel Peace Prize has been awarded to 121 Laureates - 98 times to individuals and 23 times to organizations. Since Comite International de la Croix Rouge (International Committee of the Red Cross) was awarded three times and Office of the United Nations High Commissioner for Refugees was awarded twice there are **98** individuals and **20** organizations that have been awarded the Nobel Peace Prize.

Youngest Peace Laureate
To date, the youngest Nobel Peace Prize Laureate is Mairead Corrigan, who was 32 years old when she was awarded the Peace Prize in 1976.

Oldest Peace Laureate

The oldest Nobel Peace Prize Laureate to date is Joseph Rotblat, who was 87 years old when he was awarded the Prize in 1995.

Female Nobel Peace Prize Laureates

Of the 97 individuals awarded the Nobel Peace Prize, 12 are women. The first time a Nobel Peace Prize was awarded to a woman was in 1905, to Bertha von Suttner.

Multiple Nobel Peace Prize Laureates

The work of the International Committee of the Red Cross (ICRC) has been honoured the most - three times - by a Nobel Peace Prize. In addition, the founder of the ICRC, Henry Dunant, was awarded the first Nobel Peace Prize in 1901.

Linus	ICRC	UNHCR
Pauling	1917	1954
Chemistry	1944	1981
1954	1963	
Peace 1962		

One Peace Laureate has declined the Nobel Peace Prize

The Vietnamese politician Le Duc Tho, awarded the 1973 Nobel Peace Prize jointly with US Secretary of State Henry Kissinger, is the only person who has declined the Nobel Peace Prize. They were both awarded the Prize for negotiating the Vietnam peace accord. Le Doc Tho said that he was not in a position to accept the Nobel Prize, citing the situation in Vietnam as his reason.

Three Nobel Peace Prize Laureates have been under arrest at the time of the award

German pacifist and journalist Carl von Ossietzky
Burmese politician Aung San Suu Kyi
Chinese human rights activist Liu Xiaobo

Posthumous Nobel Peace Prizes

There is one posthumous Nobel Peace Prize, to Dag Hammarskjold in 1961. From 1974, the Statutes of the Nobel Foundation stipulate that a Prize cannot be awarded posthumously, unless death has occurred after the announcement of the Nobel Prize. Before 1974, the Nobel Prize was also awarded posthumously to Erik Axel Karlfeldt (Nobel Prize in Literature 1931).

Surprise Nobel Peace Laureate?

Many believe that Winston Churchill was awarded the Nobel Peace Prize, but he was actually awarded the 1953 Nobel Prize in Literature. In fact, Churchill was nominated both for the Literature Prize and for the Nobel Peace Prize.

Number of nominated individuals for the Nobel Peace Prize in 2009

Every year, the Norwegian Nobel Committee sends out thousands of letters inviting a qualified and select number of people to submit their nominations for the Nobel Peace Prize. The names of the nominees cannot be revealed until 50 years later, but the Nobel Peace Prize committee does reveal the *number* of nominees each year.

Nobel Peace Prizes and nominations in 100 years

The 109 awarded organizations and individuals over the first one hundred years of the Nobel Peace Prize (1901-2001), and the 4857 nominees, can be distributed geographically and by organization as shown below:

Examples of nominated individuals who did not receive the Nobel Peace Prize (1901-1950)

The three most common searches on individuals in the Nobel Peace Prize nomination data base are Adolf Hitler, Mahatma Gandhi and Joseph Stalin.

How many times can someone be nominated?

Jane Addams was nominated 91 times between 1916 and 1931, when she was finally awarded the Nobel Peace Prize. By contrast Emily Green Balch, Fridtjof Nansen and Theodore Roosevelt received the Nobel Peace Prize the first year that they were nominated.
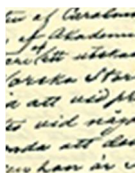
Why a Norwegian Nobel Committee for the Nobel Peace Prize?

All Nobel Prizes are awarded in Stockholm, Sweden, except for the Nobel Peace Prize, which is awarded in Oslo, Norway. The founder of the Nobel Prize, Alfred Nobel, was a Swedish cosmopolitan. In his will, he declared that the Nobel Peace Prize should be awarded by a Norwegian committee. When Alfred Nobel was alive, Norway and Sweden were united under one monarch, until 1905 when Norway became an independent kingdom.

Why are the individuals and organisations awarded a Nobel Prize called Nobel Laureates?

The word "Laureate" refers to being signified by the laurel wreath. In Greek mythology, the god Apollo is represented wearing a laurel

wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greek laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

Task 15
1. Read and translate the article:

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel

In 1968, Sveriges Riksbank (Sweden's central bank) established the Prize in Economic Sciences in Memory of Alfred Nobel, founder of the Nobel Prize. The Prize is based on a donation received by the Foundation in 1968 from Sveriges Riksbank on the occasion of the Bank's 300th anniversary. The first Prize in Economic Sciences was awarded to Ragnar Frisch and Jan Tinbergen in 1969.
The Prize in Economic Sciences in Memory of Alfred Nobel is awarded by the Royal Swedish Academy of Sciences according to the same principles as for the Nobel Prizes that have been awarded since 1901.

1. Find the English equivalents in the article:
Заснувати премію, базуватися на пожертвах, з нагоди ювілею, присуджуватися, згідно з тими ж принципами,

2. Read the facts on the Nobel Prize in Economic Sciences and answer the following questions:
1. How many Nobel Prizes have been awarded since 1969?
2. How many Prizes were unshared?
3. May a prize amount be divided between more than 3 persons?
4. Who was awarded the Nobel Prize in Economic Sciences twice?
5. Who was the youngest Nobel Laureate in Economic Sciences?
6. Who was the oldest Nobel Laureate in Economic Sciences?

7. Are there any women awarded with the Nobel Prize in Economic Sciences?
8. How many multiple Nobel Laureates are there in Physics?
9. Are there any Family Laureates in Economic Sciences?
10. Whom were the laurel wreaths awarded in ancient Greece to?

Facts on the Prize in Economic Sciences
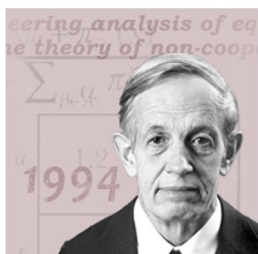
In 1968, Sveriges Riksbank (Sweden's central bank) established this Prize in memory of Alfred Nobel, founder of the Nobel Prize. Here are some facts and figures regarding The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, awarded from 1969 to 2010.

Number of Prizes in Economic Sciences

42 Prizes in Economic Sciences have been awarded every year since 1969.
22 Prizes in Economic Sciences have been given to one Laureate only.
15 Prizes in Economic Sciences have been shared by two Laureates.
5 Prizes in Economic Sciences have been shared between three Laureates

Number of Laureates in Economic Sciences
67 individuals have been awarded since 1969.

Youngest Laureate in Economic Sciences
To date, the youngest Laureate in Economic Sciences is Kenneth J. Arrow, who was 51 years old when he was awarded in 1972.

Oldest **Laureate in Economic Sciences**
The oldest Laureate in Economic Sciences to date is Leonid Hurwicz, who was 90 years old when he was awarded in 2007. He is also the oldest Laureate to be awarded the Nobel Prize in all Prize areas.

Female Laureates in Economic Sciences
Elinor Ostrom is the first female Laureate in Economic Sciences. Elinor Ostrom was awarded the Prize in 2009.

Multiple Laureates in Economic Sciences
There have been no multiple Laureates in Economic Sciences.

Posthumous Prizes in Economic Sciences

There have been no posthumous Prizes in Economic Sciences. From 1974, the Statutes of the Nobel Foundation stipulate that a Prize cannot be awarded posthumously, unless death has occurred after the announcement of the Prize. Before 1974, the Nobel Prize has only been awarded posthumously twice: to Dag Hammarskjold (Nobel Peace Prize 1961) and Erik Axel Karlfeldt (Nobel Prize in Literature 1931).

Family Laureates in Economic Sciences
Brothers:
Jan Tinbergen (Economic Sciences in 1969) and Nikolaas Tinbergen (Physiology or Medicine in 1973)
Married couple:
Gunnar Myrdal (Economic Sciences in 1974) and Alva Myrdal (Nobel Peace Prize in 1982)

Why are the individuals awarded a Prize in Economic Sciences called Laureates?
The word "Laureate" refers to being signified by the laurel wreath. In Greek mythology, the god Apollo is represented wearing a laurel wreath on his head. A laurel wreath is a circular crown made of branches and leaves of the bay laurel (In latin: *Laurus nobilis*). In ancient Greek laurel wreaths were awarded to victors as a sign of honour - both in athletic competitions and in poetic meets.

UNIT II

TURING AWARD AND ITS WINNERS

Task 1
1. Read and translate the article:

The Turing Award

The **Turing Award**, in full **The ACM A.M. Turing Award**, is an annual award given by the Association for Computing Machinery (ACM) to "an individual selected for contributions of a technical nature made to the computing community. The contributions should be of lasting and major technical importance to the computer field. The Turing Award is recognized as the "highest distinction in Computer science".

The award is named after Alan Mathison Turing, a British scientist, mathematician and Reader in Mathematics at the University of Manchester. Turing is "frequently credited for being the Father of theoretical computer science and artificial intelligence. As of 2007, the award is accompanied by a prize of $250,000, with financial support provided by Intel and Google.

The first recipient, in 1966, was Alan Perlis, of Carnegie Mellon University. Frances E. Allen of IBM, in 2006, was the first female recipient in the award's forty year history. The 2008 award also went to a woman, Barbara Liskov.

1. **Find English equivalents in the article:**

Щорічна нагорода, внесок технічного характеру, тривале значення, найвища відзнака, віддавати належне, штучний розум, фінансова підтримка, отримувач премії.

2. **Answer the following questions:**
11. What is the Turing Award?
12. What contribution should be to get the Turing Award?
13. Whom is the award named after?
14. What is the award accompanied by?
15. Are there any female recipients of the award?

3. **Give the summary of the article.**

Task 2
1. Read and translate the article:

Alan Turing

Alan Mathison Turing, (23 June 1912 – 7 June 1954), was an English mathematician, logician, cryptanalyst (*the study of methods for obtaining the meaning of* encrypted *information, without access to the* secret *information*) and computer scientist. He was highly influential in the development of computer science, providing a formalisation of the concepts of "algorithm" and "computation" with the Turing machine, which played a significant role in the creation of the modern computer. Turing is widely considered to be the father of computer science and artificial intelligence.

During the Second World War, Turing worked for the Government Code and Cypher School at Bletchley Park, Britain's code breaking centre. For a time he was head of Hut 8, the section responsible for German naval cryptanalysis. He devised a number of techniques for breaking German ciphers, including the method of the bomb, an electromechanical machine that could find settings for the Enigma machine. After the war he worked at the National Physical Laboratory, where he created one of the first designs for a stored-program computer, the ACE.

Towards the end of his life Turing became interested in mathematical biology. He wrote a paper on the chemical basis of morphogenesis, and he predicted oscillating chemical reactions such as the Belousov–Zhabotinsky reaction, which were first observed in the 1960s.

1. Find English equivalents in the article:

Математик, криптоаналітик, інформатика, обчислення, відігравати значну роль, широко вважатися, розробити техніку, зламування шифру, математична біологія, передбачити коливальні хімічні реакції, вперше спостерігатися.

2. Answer the following questions:
1. What is Alan Turing?
2. What is cryptoanalysis?
3. What is Turing considered to be?
4. What did he devise during the Second World War?
5. What did he create after the war?
6. What was his achievement in mathematical biology?

3. Give the summary of the article.

Task 3
1. Read and translate the article:

Barbara Jane Liskov

From Year of the Award

Barbara Liskov (born **Barbara Jane Huberman** on November 7, 1939) is a computer scientist. She is currently the Professor of Engineering in Electrical Engineering and Computer Science Department and an Institute Professor at the Massachusetts Institute of Technology.

She earned her BA in Mathematics at the University of California, Berkeley in 1961. In 1968 Stanford University made her one of the first women in the United States to be awarded a Ph.D. from a Computer Science Department. The topic of her Ph.D. thesis was a computer program to play chess and games. Liskov has led many significant projects, including the Venus operating system, a small, low-cost and interactive timesharing system; the design and implementation of CLU; Argus, the first high-level language to support implementation of distributed programs and to demonstrate the technique of promise pipelining; and Thor, an object-oriented database system. With Jeannette Wing, she developed a particular definition of subtyping, commonly known as the Liskov substitution principle. She leads the Programming Methodology Group at MIT, with a current research focus in Byzantine fault tolerance and distributed computing.

Liskov is a member of the National Academy of Engineering and a fellow of the American Academy of Arts and Sciences and of the Association for Computing Machinery (ACM). In 2004 she won the John von Neumann Medal for "fundamental contributions to programming languages, programming methodology, and distributed systems". She is the author of three books and over a hundred technical papers.

Liskov received the 2008 Turing Award from the ACM for her work in the design of programming languages and software methodology that led to the development of object-oriented programming. Specifically, Liskov developed two programming languages, CLU in the 1970s and Argus in the 1980s. The ACM cited her contributions to the practical and theoretical foundations of "programming language and system design, especially related to data abstraction, fault tolerance, and distributed computing."

1. **Find the English equivalents:**

Факультет електротехніки та інформатики, отримати ступінь бакалавра в галузі математики, отримати ступінь доктора, тема докторської дисертації, розробка і реалізація, конкретне визначення.

2. Answer the following questions:
1. What is Barbara Liskov currently?
2. What was the topic of her Ph.D thesis?
3. What group does she lead?
4. What medal did she win?
5. What did she receive the Turing Award for?

3. Make an annotation of the article.

Task 4
1. Read and translate the article:

From Year of the Award

Frances E. Allen

Frances Elizabeth "Fran" Allen (born August 4, 1932) is an American computer scientist and pioneer in the field of optimizing compilers. Her achievements include seminal work in compilers, code optimization, and parallelization. She also had a role in intelligence work on programming languages and security codes for the National Security Agency.

Allen was the first female IBM Fellow and in 2006 became the first woman to win the Turing Award.

Allen grew up on a farm in upstate New York and graduated from The New York State College for Teachers (now State University of New York at Albany) with a B.Sc. degree in Mathematics in 1954. She earned an M.Sc. degree in Mathematics at the University of Michigan in 1957 and began teaching at school in Peru, New York

Allen is a fellow of the IEEE, the Association for Computing Machinery (ACM) and the Computer History Museum. She is currently on the Computer Science and Telecommunications Board, the Computer Research Associates (CRA) board and National Science Foundation's CISE Advisory Board. She is a member of the National Academy of Engineering and the American Philosophical Society. She was elected a Fellow of the American Academy of Arts and Sciences in 1994.

In 1997, Allen was inducted into the WITI Hall of Fame. She retired from IBM in 2002 and won the Augusta Ada Lovelace Award that year from the Association for Women in Computing.

In 2007 Allen was recognized for her work in high performance computing when she received the A.M. Turing Award for 2006. She became the first woman recipient in the forty year history of the award which is considered the Nobel Prize for computing and is given by the Association for Computing Machinery. She was awarded an honorary doctor in science degree at the winter commencement at

SUNY University at Albany. In interviews following the award she hoped it would give more "opportunities for women in science, computing and engineering". In 2009 she was awarded an honorary doctor of science degree from McGill University for "pioneering contributions to the theory and practice of optimizing compiler techniques that laid the foundation for modern optimizing compilers and automatic parallel execution".

1. Find the English equivalents:

Плідна робота, розвідувальна служба, ступінь магістра в галузі математики, бути введеним у Зал Слави, бути визнаним, лауреат (одержувач) премії, почесний доктор.

2. Answer the following questions:
1. What is Frances Allen?
2. What field was she considered to be the first female in?
3. What did she do after earning her Master's Degree?
4. What Academy is she elected a fellow of?
5. When did she receive the A. Turing award for?

3. Make an annotation of the article.

Task 5

1. Read and translate the article:

Alan Jay Perlis

United States – 1966

From Year of the Award

By David Nofre

CITATION

For his influence in the area of advanced programming techniques and compiler construction.

Alan Jay Perlis was born on April 1, 1922 into a Jewish family in Pittsburgh, Pennsylvania. He attended primary schools in his hometown, starting with the Colfax Public School in his Squirrel Hill neighborhood. In 1933 Perlis enrolled in the public but prestigious Taylor Allderdice High School. Six years later he entered Carnegie Institute of Technology and graduated with honors in Chemistry on December 20, 1942.

Two days after graduation, Perlis started his war-time experience: on the morning of December 22 he signed up for the Aviation Cadet Meteorology Program of the US Army Air Force. After nine months of training he became a 2nd lieutenant in the meteorology services. He was assigned to the Army Air Force Intelligence School in Harrisburg, Pennsylvania, a training center for photo interpretation and combat intelligence. Perlis was later sent to the operational headquarters of the 9th US Army Air Force in the United Kingdom, where he served for eighteen months as intelligence officer and weather officer with a reconnaissance squadron.

In September 1945, he returned to civilian life and enrolled in the California Institute of Technology for graduate study in chemistry. He quickly realized that this was not his passion and switched to the study of mathematics at the Massachusetts Institute of Technology. At MIT Perlis carried out research on numerical analysis methods, under the supervision of Philip Franklin, which led to the completion of a master thesis in 1949 (The solution of linear integral equations by iterative methods) and a PhD dissertation in 1950 (On integral equations, their solution by iteration and analytic continuation).

In 1971 Perlis moved to Yale University as the Eugene Higgins Professor of Computer Science in their new Computer Science Department. Except a brief interlude in the 1977-1978 academic year, when he was appointed Gordon and Betty Moore Professor of Computer Science at the California Institute of Technology, Perlis remained at Yale until his death on February 7, 1990.

2. Make up 5 questions on the article.

3. Give an annotation of the article.

Task 6

1. Read and translate the article:

Judea Pearl

United States – 2011
From Year of the Award
By Stuart J. Russell

CITATION
For fundamental contributions to artificial intelligence through the development of a calculus for probabilistic and causal reasoning.

Judea Pearl created the representational and computational foundation for the processing of information under uncertainty.

He is credited with the invention of *Bayesian networks*, a mathematical formalism for defining complex probability models, as well as the principal algorithms used for inference in these models. This work not only revolutionized the field of artificial intelligence but also became an important tool for many other branches of engineering and the natural sciences. He later created a mathematical framework for causal inference that has had significant impact in the social sciences.

Judea Pearl was born on September 4, 1936, in Tel Aviv, which was at that time administered under the British Mandate for Palestine. He grew up in Bnei Brak, a Biblical town his grandfather went to reestablish in 1924. In 1956, after serving in the Israeli army and joining a Kibbutz, Judea decided to study engineering. He attended the Technion, where he met his wife, Ruth, and received a B.S. degree in Electrical Engineering in 1960.

Pearl's outside interests include music (several early conferences were entertained by his impromptu piano renditions and very realistic trumpet imitations), philosophy, and early books – particularly the great works of science throughout history, of which he possesses several first editions. Judea and Ruth Pearl had three children, Tamara, Michelle, and Daniel. Since Daniel's kidnap and murder in Pakistan in 2002, Professor Pearl has devoted a significant fraction of his time and energy to the Daniel Pearl Foundation, which he and his wife founded to promote Daniel's values of "uncompromised objectivity and integrity; insightful and unconventional perspective; tolerance and respect for people of all cultures; unshaken belief in the effectiveness of education and communication; and the love of music, humor, and friendship."

Pearl will donate a major portion of the Turing Prize money to support the projects of the Daniel Pearl Foundation and another portion to promote the introduction of causal inference in statistics education.

2. Make up 5 questions on the article.

3. Give an annotation of the article.

THE DRAPER PRIZE AND ITS WINNERS

Task 1
1. Read and translate the article:
The Charles Stark Draper Prize

From Day in the Life

The National Academy of Engineering annually awards the **Charles Stark Draper Prize**, which is given for the advancement of engineering and the education of the public about engineering. It is one of three prizes that constitute the "Nobel Prizes of Engineering" - the others being the Academy's Russ and Gordon Prizes. The winner of each of these prizes receives $500,000. The Draper prize is named for Charles Stark Draper, the "father of inertial navigation", an MIT professor and founder of Draper Laboratory.

Charles Stark Draper Prize

Areas of Interest:
Honoring Engineers
Project Type:
NAE Program, Contest/Award
Latest Update: July 15, 2011

It is a goal of the National Academy of Engineering to honor those who have contributed to the advancement of engineering and to improve public understanding of the importance of engineering and technology.

Recognized as one of the world's preeminent awards for engineering achievement, the Charles Stark Draper Prize honors an engineer whose accomplishment has significantly impacted society by improving the quality of life, providing the ability to live freely and comfortably, and/or permitting the access to information.

The Draper Prize is awarded annually, the recipient receives a $500,000 cash award, and the prize recognizes achievements in all engineering disciplines. NAE members and non-members worldwide are eligible to receive the Draper Prize.

2. **Find the English equivalents:**
Присуджувати щорічно, досягнення у техніці, Нобелівська премія у техніці, удосконалювати розуміння, видатна нагорода, відзначати нагородою, досягнення, істотно вплинути на суспільство, мати право отримати премію.

3. Answer the following questions:
1. What is the Draper Prize awarded for?
2. Whom is this Prize named for?
3. What is the goal of the National Academy of Engineering?
4. What engineers does the Draper Prize honor?
5. Who is eligible to receive this Prize?

4. Give an annotation of the article:

Task 2
1. Read and translate the article:

Charles Stark Draper

From Day in the Life

Charles Stark Draper (October 2, 1901 – July 25, 1987) was an American scientist and engineer, often referred to as "the father of inertial navigation." He was the founder and director of the MIT Instrumentation Laboratory, later renamed the Charles Stark Draper Laboratory, which under his direction designed and built the Apollo Guidance Computer for NASA, which made the Apollo moon landings possible.

Born in Windsor, Missouri, he attended the University of Missouri in 1917, then transferred to Stanford University, California in 1919, from which he earned a B.A. in psychology in 1922. After Stanford, he attended Massachusetts Institute of Technology (MIT), from which he earned an S.B. in electrochemical engineering in 1926, and an S.M. and Sc.D. in physics in 1928 and 1938 respectively.

He started teaching while at MIT, first as an assistant, then quickly became a full professor in aeronautical engineering in 1939. It was here that he founded the Instrumentation Laboratory in the 1930s, later spun off as The Charles Stark Draper Laboratory, Inc. In 1961, Draper and the Instrumentation Lab were awarded the first contract given out for the Apollo program to send humans to the moon, which had just been announced by President John F. Kennedy. This led to the creation of the Apollo Guidance Computer, a one-cubic-foot computer that controlled the navigation and guidance of the Lunar Excursion Module to the surface of the moon during six successful landings.

His interest in flight instrumentation also spun from becoming a pilot with an engineering training in the 1930s: although he failed to become an Air Corps pilot, he learned to fly by enrolling in a civilian course.

Draper invented and developed inertial navigation, a technology used in aircraft, space vehicles, and submarines that allows such vehicles to navigate by sensing changes in direction, using gyroscopes, and speed, using accelerometers. A pioneering figure in the aircraft engineering field, he also contributed to the Apollo space program with his knowledge of guidance systems. For his inventions and contributions, Draper was inducted to the National Inventors Hall of Fame in 1981.

He was awarded the Howard N. Potts Medal in 1960. In 1964, he was awarded the National Medal of Science.

The Charles Stark Draper Prize is a prominent prize in engineering devoted to the memory of Charles Stark Draper. Charles Stark Draper's relatives were rather prominent in his Missouri birthplace, including his cousin, Governor Lloyd C. Star

2. Make up 5 questions on the article.

3. Give an annotation of the article.

Task 3
1. Read and translate the article:

The Draper Prize

From Draper Prize Winners

One of the world's preeminent awards for engineering achievement, the Charles Stark Draper Prize was established by the National Academy of Engineering and endowed by Draper Laboratory in 1988 to recognize innovative engineering achievements and their reduction to practice in ways that have led to important benefits and significant improvement in the well-being and freedom of humanity.

The Prize recognizes achievement in all engineering disciplines, and engineers worldwide are eligible to receive it. The Prize is awarded annually during National Engineers Week in Washington, D.C.

2011 Draper Prize Recipients

Frances Arnold and Willem Stemmer
Developers of directed protein evolution

Directed Protein Evolution Researchers Receive Draper Prize
The 2011 Charles Stark Draper Prize, the nation's top engineering honor, has been awarded to Drs. Frances Arnold and Willem Stemmer for their pioneering contributions that enable researchers to guide the creation of desirable properties in proteins and cells. The prize, which includes a $500,000 award, honors engineers whose accomplishments have significantly benefited society, and is considered the Nobel Prize of engineering.

2. Find the English equivalents:
Видатна нагорода, надаватися, визнати досягнення, важливі переваги, щорічно, бажані властивості, білки, клітина, значні досягнення, принести користь суспільству.

3. Answer the following questions:
1. Whom was the Charles Stark Draper Prize established by?
2. What achievements does the Prize recognize?
3. When and where is the Prize awarded?
4. Who was awarded the 2011 Charles Stark Draper Prize?
5. What was the 2011 Charles Stark Draper Prize awarded for?

4. Give a summary of the article.

Task 4

1. Read and translate the article:

2009 Winner: Robert H. Dennard
Press announcement
News
For his invention and contributions to the development of Dynamic Random Access Memory (DRAM), used universally in computers and other data processing and communication systems.

Robert Dennard's invention of dynamic random access memory (DRAM) using one-transistor cells paved the way for the worldwide explosion of computing.

DRAM is a form of computer memory that puts bits of data into capacitors – energy-storage devices within a miniaturized electronic circuit – and periodically recharges the capacitors so that the information in them is not lost. His one-transistor design was a vast improvement over the

six-transistor cell in use at that time. Dennard's ability to use only a single metal-oxide-semiconductor (MOS) transistor – a device that conducts electricity, amplifying the charge as the electricity is passed along – allowed his memory cell to be much smaller and simpler in design than its predecessor.

In addition, Dennard and associates developed the set of consistent scaling principles for miniaturizing MOS transistors and the integrated circuits using them, which are the basis for today's electronic microprocessor and DRAM chips. In the early 1970s the industry was concerned with how far MOS transistors could be miniaturized without affecting their switching ability. Dennard's IBM group introduced a theory – called constant-field scaling – which addressed these issues. This scaling allowed for computers to run faster on significantly less energy and thus be less costly to operate and is a major driver of the industry. His 1974 paper on MOS transistor scaling is universally referenced and has been reprinted as a "Classic Paper" in the *Proceedings of the IEEE.*

The availability of cheap, high-density memory that has come about due to the invention of the DRAM cell has enabled tremendous growth in computing over the past 40 years. The DRAM market is estimated to have totaled $420 billion in sales through 2008.

After earning B.S. and M.S. degrees in electrical engineering from Southern Methodist University and a Ph.D. from Carnegie Mellon University in 1958, Dennard spent his entire professional career in various positions at IBM, including holding the prestigious title of IBM Fellow beginning in 1979. He was elected to the NAE in 1984.
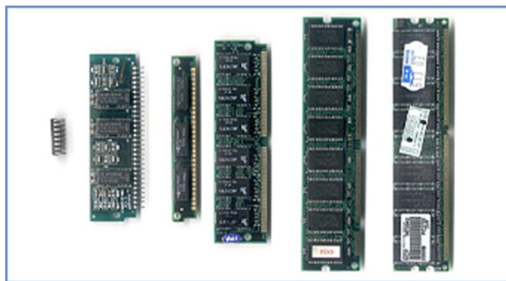
DRAM

Dynamic Random Access Memory, or DRAM, is the most common type of memory in computers today and is one of the reasons why modern computers are so fast and efficient. Unlike hard drives, DRAM is temporary memory: it stores (and releases) information very quickly but only for a short time. Since computers need to constantly juggle temporary information, this feature makes them run much faster. Although DRAM was not the first temporary memory system, its predecessors were very bulky – requiring six transistors per bit of data stored – and thus inefficient. DRAM shrank that requirement to one transistor per bit, meaning that much more of it can fit into a small space.

2. Make up 5 questions on the article.

3. Give an annotation of the article.

Task 5

1. Read and translate the article:

1989 Winners: Jack S. Kilby and Robert N. Noyce

From Draper Prize Winners

For their independent development of the monolithic integrated circuit.

Biographies

A pioneer in microelectronics, **Jack Kilby** invented the first monolithic integrated circuit (IC) and demonstrated it in September 1958. However, he was a modest genius, quick to point out that Fairchild scientist Robert Noyce designed an integrated circuit that was easier to manufacture. Today, Kilby and Noyce are considered co-inventors.

Kilby made his breakthrough while working at Texas Instruments (TI). His IC, fabricated on a single piece of semiconductor material half the size of a paper clip, would soon revolutionize the electronics world. By 1960, Texas Instruments was developing its first chips for customer evaluation, and two years later, it won a major integrated circuit contract for the Minuteman missile.

Kilby held several engineering management positions at TI and became a vice president at the company before retiring in 1986. But he was principally an engineer and inventor. He held more than 60 patents and was a co-inventor of the handheld electronic calculator and thermal printer.

A recipient of the Draper Prize in 1989, Kilby was also awarded the Nobel Prize in Physics in 2000 and the Kyoto Prize in Advanced Technology in 1993. He died in 2005.

Robert Noyce cofounded two companies that have shaped today's computer industry and Silicon Valley: Intel Corporation in 1968 and the Fairchild Semiconductor Corporation in 1957.

While at Fairchild, Noyce realized a whole circuit could be built on a single chip; he was the first to be awarded a patent for an integrated circuit in April 1961. During his career, Noyce was awarded 16 patents for semiconductor devices, methods, and structures.

Noyce served as research director, vice president and general manager at Fairchild, eventually leaving with Gordon Moore to found Intel. At Intel, he oversaw Ted Hoff's invention of the microprocessor -- another revolution in

computing. Noyce served as president of Intel until 1975 and as chairman of the board from 1975 to 1979.

Noyce received his B.A. in physics from Grinnell College in 1949 and earned a Ph.D. in physical electronics from MIT in 1953. The transistor industry was emerging while he was in college and one of his first jobs involved making transistors for the electronics firm Philco. He went on to work at Shockley Semiconductor before starting up Fairchild.

2. Make up 5 questions on the article.

3. Give an annotation of the article.

Task 6

1. Read and translate the article:
2007 Winner: Tim Berners-Lee
From Draper Prize Winners

For developing the World Wide Web.

Biography

Sir Timothy J. Berners-Lee is a graduate of Oxford University, England. He holds the 3Com Founders chair and is a Senior Research Scientist at the Laboratory for Computer Science and Artificial Intelligence (CSAIL) at the Massachusetts Institute of Technology (MIT), and directs the World Wide Web Consortium, founded in 1994.

In 1989, Berners-Lee invented the World Wide Web, an Internet-based hypermedia initiative for global information sharing while at CERN, the European Particle Physics Laboratory. He wrote the first web client and server. In 1990 the program, "WorldWideWeb," was first made available within CERN in December, and on the Internet at large in the summer of 1991. Berners-Lee specifications of URLs, HTTP and HTML were refined as Web technology spread.

In 2001, Berners-Lee became a fellow of the Royal Society. He has been the recipient of several international awards, including the Japan Prize, the Prince of Asturias Foundation Prize, the Millennium Technology Prize and most recently, Germany's Die Quadriga Award. In 2004, Berners-Lee was knighted by H.M. Queen Elizabeth. He is the author of "Weaving the Web."

World Wide Web

While the Internet has made it possible to connect millions of computers worldwide, the World Wide Web has made those connections far more useful. At its heart, the Web is simply a flexible and user-friendly way of organizing information. Using the Web's two primary tools – the Hyper Text Markup Language (HTML) and browser software that displays information written in this language – users can create pages of data that contain links to other pages, either locally or on an external network. Because these links were simple to make and use, a mesh of interconnected pages quickly arose, leading to the edifice that today supplies users with an enormous array of information.

2. Make up 5 questions on the article.

3. Give an annotation of the article.

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