МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ
федеральное государственное бюджетное образовательное учреждение высшего образования
«Пермская государственная фармацевтическая академия»
Министерства здравоохранения Российской Федерации

Кафедра_иностранных языков.___

МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ ПО ДИСЦИПЛИНЕ АНГЛИЙСКИЙ ЯЗЫК

для студентов 2 курса, обучающихся по направлению 33.02.01 Фармация

GREAT ENGLISH SCIENTISTS

Составитель Томилова В.М.

Методические указания утверждены
на методическом заседании кафедры
Протокол № 9 от 27 мая 2017г.
Зав. кафедрой____

Тема «Великие английские ученые» (Генри Кавендиш, Хамфри Дейви)

Цель работы: профессионально-ориентированное информативное чтение в процессе изучения материалов кейса – коммуникативное взаимодействие в процессе обсуждение кейса **(**ролевая/деловая игра, ток-шоу, круглый стол, конференция, презентация)

Что такое кейс-метод? Метод обсуждения кейсов или конкретных ситуаций (КС) стал наиболее известным в программах подготовки менеджеров, в том числе в программах MBA. Он используется в образовательной практике для формирования таких ключевых профессиональных компетенций как коммуникабельность, лидерство, умение анализировать в короткие сроки большой объем неупорядоченной информации, принятие решений в условиях стресса и недостаточной информации. Это метод обучения предполагает, что студенты и преподаватели (instructors) участвуют в непосредственных дискуссиях по проблемам или случаям (cases) бизнеса. Примеры случаев обычно готовятся в письменном виде как отражение определенной проблемы, изучаются студентами, затем обсуждаются ими самостоятельно, что дает основу для совместных дискуссий и обсуждений в аудитории под руководством преподавателя.

Задачи при работе с материалом кейса:

- прочитать и понять (перевести фрагменты текста, вызывающие затруднения),

- выбрать, зафиксировать слова и выражения, характерные для данной темы,

выбрать информацию в соответствии с поставленной задачей (заполнение таблиц, ответы вопросы, составление планы, денотата),

- зафиксировать информацию (устно, письменно)

- подготовить презентацию информации в зависимости от поставленной цели (эссе, реферат, доклад, сообщение, викторина).

Информация кейса «Великие английские ученые» (Генри Кавендиш, Хамфри Дейви): тексты из Интернета **(Wikipedia, the free encyclopedia)**

UNIT 1 “HENTY CAVENDISH”

Задание 1. Прочитайте текст № 1, определите, о чем он.

Задание 2. Вы определили, что перед Вами биография Генри Кавендиша. Зафиксируйте (письменно в тетради):

-полное имя ученого;

-географические названия, связанные с местом его рождения, проживания, учебы, научной деятельности;

- имена ученых, связанных с исследованиями Генри Кавендиша.

Задание 3. Выпишите слова, характерные для темы «Биография», записав их в таблицу 1:

существительное	глагол	наречие
son of…	was born	
father (father’s name)	studied	
discoverer	discovered	
chemist	attended	
	entered	successfully

Задание 4. Вы выписали лексику по теме «Биография». Составьте по данной схеме краткий справочный материал о Генри Кавендише на английском языке (таблица 2):

	является первооткрывателем
	родился
	был сыном (кого?)
	учился
	поступил
Генри Кавендиш	получил/ не получил степень
	построил лабораторию
	изучал
	исследовал
	открыл
	известен как
	похоронен (где?)

Задание 5. Отметьте, есть ли в тексте информация о:

Scientist’s childhood	
Scientist’s youth	

Scientist’s school years	
Scientist’s experiments	
Scientist’s personal character	
Scientist’s publications	
Scientist’s death	

Задание 6. Проверьте себя, можете ли вы дать развернутый ответ на следующие вопросы:

1. Why do we know the name of H. Cavendish?
2. When and where was he born?
3. What family did he belong to?
4. What were the spheres of his interests?
5. What did he study?
6. What discoveries was he famous for?
7. What is the Cavendish experiment?

Задание 7. Зафиксируйте полученную информацию письменно, будьте готовы использовать данную информацию при обсуждении.

TEXT 1

Henry Cavendish

Henry Cavendish

Henry Cavendish

Born: October 10, 1731
Nice, France
Died: February 24, 1810
London, England
English physicist and chemist

Henry Cavendish, (10 October 1731 - 24 February 1810) was a British scientist noted for his discovery of hydrogen or what he called "inflammable air" He described the density of inflammable air, which formed water on combustion, in a 1766 paper "On Factitious Airs". Antoine Lavoisier later reproduced Cavendish's experiment and gave the element its name. Cavendish is also known for the Cavendish experiment, his measurement of the Earth's density, and early research into electricity.

The English physicist and chemist Henry Cavendish determined the value of the universal constant of gravitation, made noteworthy electrical studies, and is credited with the discovery of hydrogen and the composition of water.

Early years

Henry Cavendish was born in Nice, France, on October 10, 1731, the oldest son of Lord Charles Cavendish and Lady Anne Grey, who died a few years after Henry was born. As a youth he attended Dr. Newcomb's Academy in Hackney, England. He entered Peterhouse, Cambridge, in 1749, but left after three years without taking a degree.

Cavendish returned to London, England to live with his father. There, Cavendish built himself a laboratory and workshop. When his father died in 1783, Cavendish moved the laboratory to Clapham Common, where he also lived. He never married and was so reserved that there is little record of his having any social life except occasional meetings with scientific friends.

Contributions to chemistry

During his lifetime Cavendish made notable discoveries in chemistry, mainly between 1766 and 1788, and in electricity, between 1771 and 1788. In 1798 he published a single notable paper on the density of the earth. At the time Cavendish began his chemical work, chemists were just beginning to recognize that the "airs" that were evolved in many chemical reactions were clear parts and not just modifications of ordinary air. Cavendish reported his own work in "Three Papers Containing Experiments on Factitious Air" in 1766. These papers added greatly to knowledge of the formation of "inflammable air" (hydrogen) by the action of dilute acids (acids that have been weakened) on metals.

Cavendish's other great achievement in chemistry is his measuring of the density of hydrogen. Although his figure is only half what it should be, it is astonishing that he even found the right order. Not that his equipment was crude; where the techniques of his day allowed, his equipment was capable of precise results. Cavendish also investigated the products of fermentation, a chemical reaction that splits complex organic compounds into simple substances. He showed that the gas from the fermentation of sugar is nearly the same as the "fixed air" characterized by the compound of chalk and magnesia (both are, in modern language, carbon dioxide).

Another example of Cavendish's ability was "Experiments on Rathbone-Place Water"(1767), in which he set the highest possible standard of accuracy. "Experiments" is regarded as a classic of analytical chemistry (the branch of chemistry that deals with separating substances into the different chemicals they are made from). In it Cavendish also examined the phenomenon (a fact that can be observed) of the retention of "calcareous earth" (chalk, calcium carbonate) in solution (a mixture dissolved in water). In doing so, he discovered the reversible reaction between calcium carbonate and carbon dioxide to form calcium bicarbonate, the cause of temporary hardness of water. He also found out how to soften such water by adding lime (calcium hydroxide).

One of Cavendish's researches on the current problem of combustion (the process of burning) made an outstanding contribution to general theory. In 1784 Cavendish determined the composition (make up) of water, showing that it was a combination of oxygen and hydrogen. Joseph Priestley (1733–1804) had reported an experiment in which the explosion of the two gases had left moisture on the sides of a previously dry container. Cavendish studied this, prepared water in measurable amount, and got an approximate figure for its volume composition.

TEXT 2

Задание 1. Прочитайте текст. Определите, какие новые слова необходимо внести в таблицу 1.

Задание 2. Прочитайте текст. Определите, какую новую информацию содержит текст. Прочеркните данный фрагмент текста и выполните его перевод (фрагментарный перевод)

Задание 3. Если Вы поняли текст, Вы сможете ответить на данные вопросы:

1. What personal characteristics made Cavendish looking asocial?
2. Was he ill?
3. Did he publish all his works?

Задание 4. Прочитайте описания опытов. Кратко запишите их описание в тетради. Подчеркните слова, относящиеся к теме «Химический элемент».

Задание 5. Определите, какие ученые, и в какой ассоциации упомянуты в тексте, например, Joseph Priestley

TEXT 2.

Henry Cavendish was born on 10 October 1731 in Nice, France, where his family was living at the time. His mother was Lady Anne Grey, daughter of the Duke of Kent and his father was Lord Charles Cavendish, son of the second Duke of Devonshire. The family traces its lineage across eight centuries to Norman times and was closely connected to many aristocratic families of Great Britain.

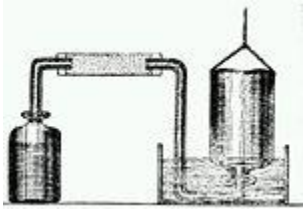
At age 11, Cavendish was a pupil at Peter Newcome's School in Hackney. At age 18 (in 1749) he entered the University of Cambridge in St Peter's College, now known as Peterhouse, but left four years later without graduating. His first paper, "Factitious Airs", appeared thirteen years later, in 1766.

Cavendish was silent, and solitary, viewed as somewhat eccentric, and formed no close personal relationships outside his family. By one account, Cavendish had a back staircase added to his house in order to avoid encountering his housekeeper because he was especially shy of women. The contemporary accounts of his personality have led some modern commentators, such as Oliver Sacks, to speculate that he had Asperger's syndrome, though he may have been merely painfully shy. His only social outlet was the Royal Society Club, whose members dined together before weekly meetings. Cavendish seldom missed these meetings, and was profoundly respected by his contemporaries. However his shyness made those who "sought his views... speak as if into vacancy. If their remarks were...worthy, they might receive a mumbled reply." He also enjoyed collecting fine furniture exemplified by his purchase of a set of "ten inlaid satinwood chairs with matching cabriole legged sofa" documented to have been acquired by Cavendish himself.[3]

Because of his asocial and secretive behavior, Cavendish often avoided publishing his work, and much of his findings were not even told to his fellow scientists. It wasn't until the late nineteenth century, long after his death, that James Clerk Maxwell looked through Cavendish's papers and found things for which others had been given credit. Examples of what was included in Cavendish's discoveries or anticipations were Richter's Law of Reciprocal Proportions, Ohm's Law, Dalton's Law of Partial Pressures, principles of electrical conductivity (including Coulomb's Law), and Charles's Law of Gases.

Cavendish died in 1810 and was buried in the church that is now Derby Cathedral, along with many of his ancestors. The University of Cambridge's Cavendish Laboratory was endowed by one of Cavendish's later relatives, William Cavendish, 7th Duke of Devonshire (Chancellor of the University from 1861 to 1891).

Gases and the atmosphere



Cavendish's apparatus for making and collecting hydrogen.

Cavendish is considered to be one of the so-called pneumatic chemists of the eighteenth and nineteenth centuries, along with, for example, Joseph Priestley, Joseph Black, and Daniel Rutherford. By combining metals with strong acids, Cavendish made hydrogen (H_2) gas, which he isolated and studied. Although others, such as Robert Boyle, had prepared hydrogen gas earlier, Cavendish is usually given the credit for recognizing its elemental nature.

Cavendish observed that hydrogen, which he called "inflammable air", reacts with oxygen, then known as "dephlogisticated air", to form water. James Watt and Antoine Lavoisier made a similar observation, resulting in a controversy as to who should receive credit for it.

Cavendish also accurately determined the composition of Earth's atmosphere. He found that 79.167% is "phlogisticated air", now known to be nitrogen and argon, and 20.8333% is "dephlogisticated air", now known to be 20.95% oxygen. Cavendish also found that 1/120 of the Earth's atmosphere is composed of a third gas, which was identified as argon about 100 years later by William Ramsay and Lord Rayleigh.

Density of the Earth

Artist's rendition of Cavendish conducting his experiment with the torsion balance.

In addition to his achievements in chemistry, Cavendish is also known for the Cavendish experiment, the first to measure the force of gravity between masses in a laboratory and to produce an accurate value for the Earth's density. His work led others to accurate values for the gravitational constant (*G*) and the Earth's mass.

The equipment Cavendish used was designed and built by geologist John Michell, who died before he could begin the experiment. The apparatus was sent in crates to Cavendish, who completed the experiment in 1797 – 1798, and published the results. The experimental apparatus consisted of a torsion balance to measure the gravitational attraction between two 350-pound lead spheres and a pair of 2-inch 1.61-pound lead spheres. Using this equipment, Cavendish found that the Earth's average density is 5.48 times greater than that of water. Poynting later noted that the data should have led to a value of 5.448, and indeed that is the average value of the twenty-nine determinations Cavendish included in his paper.

It is not unusual to find books that erroneously describe Cavendish's work as a measurement either of the gravitational constant (*G*) or the Earth's mass, and this mistake has been pointed out by several authors. In reality, Cavendish's stated goal was to measure the Earth's density, and his result was later used to calculate *G*. The first time that this constant was used was in 1873, almost 100 years after the Cavendish experiment. Cavendish's results also can be used to calculate the Earth's mass. Cavendish performed his experiment in an outbuilding in the garden of his Clapham Commons estate. For years afterward, his neighbors would point out the building and tell their children that it was where the world was weighed.

Electrical researches

Cavendish wrote papers on electrical topics for the Royal Society but the bulk of his electrical experiments did not become known until they were collected and published by James Clerk Maxwell a century later, in 1879, long after other scientists had been credited with the same results. Among Cavendish's discoveries were the following:

- The concept of electric potential, which he called the "degree of electrification"
- An early unit of capacitance, that of a sphere one inch in diameter
- The formula for the capacitance of a plate capacitor
- The concept of the dielectric constant of a material
- The relationship between electric potential and current, now called Ohm's Law. (1781)
- Laws for the division of current in parallel circuits, now attributed to Charles Wheatstone
- Inverse square law of variation of electric force with distance, now called Coulomb's Law

Задание 6. Определите, что вы можете рассказать о Г. Кавендише. Дополните таблицу.

Scientist’s childhood	
Scientist’s youth	
Scientist’s school years	
Scientist’s experiments	
Scientist’s personal character	
Scientist’s publications	
Scientist’s death	

TEXT 3

Задание 1. Прочитайте текст. Определите, какую новую информацию содержит текст.

Задание 2. Если Вы поняли текст, Вы сможете ответить на данные вопросы:

1. What is the Cavendish Laboratory?

2. Were is it located?

3. What scientists worked at the laboratory?

Задание 3. Подчеркните слова, относящиеся к теме «Химический элемент», запишите их в тетради.

Задание 4. Определите, какие ученые, и в какой ассоциации упомянуты в тексте.

The Cavendish Laboratory

The Cavendish Laboratory has an extraordinary history of discovery and innovation in Physics since its opening in 1874 under the direction of James Clerk Maxwell, the University's first Cavendish Professor of Experimental Physics. Up till that time, physics meant theoretical physics and was regarded as the province of the mathematicians. The outstanding experimental contributions of Isaac Newton, Thomas Young and George Gabriel Stokes were all carried out in their colleges. The need for the practical training of scientists and engineers was emphasized by the success of the Great Exhibition of 1851 and the requirements of an industrial society. The foundation of the Natural Sciences Tripos in 1851 set the scene for the need to build dedicated experimental physics laboratories and this was achieved through the generosity of the Chancellor of the University, William Cavendish, the Seventh Duke of Devonshire. He provided £6,300 to meet the costs of building a physics laboratory, on condition that the Colleges provided the funding for a Professorship of Experimental Physics. This led to the appointment of Maxwell as the first Cavendish professor.

Since its foundation, the Laboratory has had great fortune in appointing Cavendish professors who, between them, have changed completely our understanding of the physical world. Maxwell did not live to see his theories of electricity, magnetism and statistical physics fully confirmed by experiment, but his practical legacy was the design and equipping of the new Laboratory. Maxwell died in 1879 at the early age of 48 and was succeeded by Lord Rayleigh, who was responsible for setting up a systematic course of instruction in experimental physics, which has remained at the core of the Laboratory's teaching programmed. JJ Thomson succeeded Rayleigh in 1884 and began the revolution in physics which was to lead to the discovery of quantum mechanics in the 1920s. During Thomson's long tenure, the University allowed students from outside Cambridge to study for the new degree of Doctor of Philosophy in 1895. Among the first generation of physics graduate students were Ernest Rutherford and Charles Wilson, who, along with JJ Thomson, were to win Nobel prizes for their researches. The discovery of the electron by Thomson, the invention of the Cloud chamber by Wilson, the discovery of artificial nuclear fission by Rutherford are examples of the extraordinary advances in experimental technique which ushered in what became known as modern physics.

In 1919, Thomson was succeeded by his former student Rutherford, under whose tenure Francis Aston discovered the isotopes of the chemical elements, Patrick Blackett first photographed artificial nuclear interactions, James Chadwick discovered the neutron and John Cockcroft and Ernest Walton carried out the experiment which produced the first controlled nuclear disintegrations induced by accelerated high energy particles.

Lawrence Bragg succeeded Rutherford as Cavendish professor in 1938 and developed the use of X-ray crystallography as an extraordinarily powerful tool for understanding the structure of biological molecules. The culmination of these studies was the determination of the double-helix structure of the DNA molecule by Francis Crick and James Watson. The scope of physics continued to expand with the push to very low temperatures through research conducted in the Mond Laboratory and to very high energies with the construction of the next generation of particle accelerators.

Bragg was succeed by Nevill Mott in 1954 and under his leadership, many pioneering studies were carried out in what is now be termed condensed matter physics, including his own work on amorphous semiconductors which was to lead to his Nobel prize. The Laboratory continued to expand at a great rate until the site in central Cambridge became so overcrowded that a move to a new green-field site in West Cambridge, managed by Brian Pippard, Mott's successor as Cavendish Professor in 1971, was deemed necessary.

The move was completed in 1974 and a completely new phase of discovery began. Large facilities were developed in radio astronomy and semiconductor physics, which continue to be frontier areas of research within the Laboratory. Completely new disciplines were fostered. With Sam Edward's appointment as Pippard's successor in 1984, soft condensed matter became a major component of the Laboratory's programme. This led in turn to major initiatives in biological physics and the physics of medicine. Polymer semiconductor physics has flourished under Edwards' successor Richard Friend. In the first decade of the 21st century, new frontiers have been opened up in the areas of nanotechnology, cold atoms and ultra-low temperature physics.

The next phase of development is the reconstruction of the Laboratory to meet the challenges of the 21st century. The necessary major redevelopment programme continues the tradition of innovation and originality that has been at the heart of the Laboratory's programme since its foundation.

TEXT 3

Задание 1. Прочитайте текст. Определите, какую новую информацию содержит текст.

Задание 2. Если Вы поняли текст, Вы сможете ответить на данные вопросы:

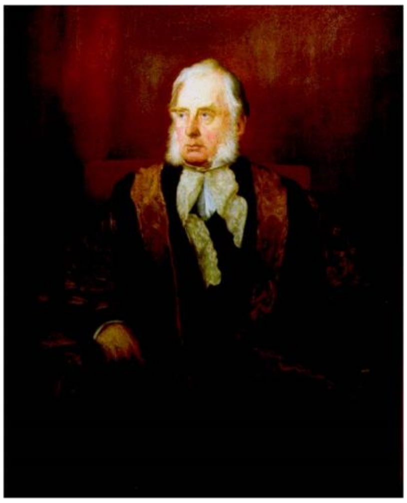
1. What is the Cavendish Laboratory?
2. Were is it located?
3. What was regarded as the province of the mathematicians?
4. What do you know about the Great Exhibition of 1851?
5. What was the cost of building a physics laboratory that time?
6. What scientists worked at the laboratory?
7. What Nobel Prize winners worked at the laboratory?

Задание 3. Подчеркните слова, относящиеся к теме «Открытие химического элемента», запишите их в тетради, например: Innovation, contributions…

Задание 4. Определите, какие ученые, и в какой ассоциации упомянуты в тексте.

TEXT 4.

The History of the Cavendish Laboratory



The Seventh Duke of Devonshire,
William Cavendish
(27 Apr 1808 - 21 Dec 1891)

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Задание 5. Сформулируйте вопросы, на которые интересно ответить, при характеристике Г.Кавендиша как ученого и человека.

Задание 6. Составьте тест (вопросы для викторины) по теме «Биография Г. Кавендиша.

1. H. Cavendish was born in……(England, France, Italy)
2. H. Cavendish' father was ….. (a teacher, economist, the Duke)

Задание 7. Составьте план сообщения о Г. Кавендише.

Задание 8. Подготовьте сообщение о ученом.

Обратите внимание!

Сообщение – это небольшой по объёму устный доклад, в краткой форме передающий ясную и четкую суть информации. Пишется в краткой форме и не имеет излишних художественных оборотов и словосочетаний. Основная задача сообщения донести определенную информацию не выходя из рамок заданной темы. Сообщаемая информация носит характер уточнения или обобщения, несёт новизну, отражает современный взгляд по определённым проблемам. Сообщение отличается от доклада не только объёмом информации, но и её характером – сообщения дополняют изучаемый вопрос фактическими или статистическими достоверными материалами. Основные способы изложения - повествование, рассуждение. Регламент времени на озвучивание сообщения – до 5 мин.

В сообщении выделяются три части: вступление - выступающий называет тему сообщения; основная часть - сообщаются факты, данные, указывается точное время действия и т. п.; заключение - обобщается все сказанное, делаются выводы.

Этапы подготовки сообщения:

1. Изучение темы, подбор литературы;
2. Тщательное изучение материалов;
3. Выделение самого главного, что относится к заданной тематике;
4. Составление подробного поэтапного плана сообщения;
5. Написание по пунктам плана текста;
6. Озвучивание сообщения в установленный срок согласно регламента;
7. Оценивание сообщения.

UNIT 2. HUMPHRY DAVY

Задание 1. Прочитайте текст № 1, определите, о ком и о чем он.

Задание 2. Вы определили, что перед Вами биография великого ученого Х. Дейви. Зафиксируйте (письменно в тетради):

-полное имя ученого;

-географические названия, связанные с местом его рождения, проживания, учебы, научной деятельности;

- имена ученых, связанных с его исследованиями .

Задание 3. Выпишите слова, характерные для темы «Биография», записав их в таблицу 1:

существительное	глагол
Place of birth…	
Father (father's name)	studied
	to qualify in (medicine)
chemist	
	entered

Задание 4. Вы выписали лексику по теме «Биография». Используя лексику темы, составьте по данной схеме краткий справочный материал о на английском языке (таблица 2):

	известен как
	родился
	был сыном (кого?)
	учился
	поступил
Хамфри Дейви	получил образование
	работал (где?, с кем?)
	изучал
	исследовал
	интересовался (чем?)
	открыл

Задание 5. Прочитайте текст и отметьте, есть ли в тексте информация о:

Scientist's childhood	

Scientist’s youth	
Scientist’s school years	
Scientist’s experiments	
Scientist’s personal character hobby	
Scientist’s friends, colleagues	
Scientist’s publications	
Scientist’s death	

Задание 6. Проверьте себя, какие вопросы по тексту Вы можете составить, зафиксируйте в рабочей тетради. Например,

1. What is H.Davy remembered for?
2. .....

TEXT 1.

Sir Humphry Davy, Baronet British chemist

born Dec. 17, 1778, Penzance, Cornwall, Eng. died May 29, 1829, Geneva

English chemist who discovered several chemical elements (including sodium and potassium) and compounds, invented the miner’s safety lamp, and became one of the greatest exponents of the scientific method.

Early life.

Davy was the elder son of middle-class parents, who owned an estate in Ludgvan. He was educated at the grammar school in nearby Penzance and, in 1793, at Truro. In 1795, a year after the death of his father, Robert, he was apprenticed to a surgeon and apothecary, and he hoped eventually to qualify in medicine. An exuberant, affectionate, and popular lad, of quick wit and lively imagination, he was fond of composing verses, sketching, making fireworks, fishing, shooting, and collecting minerals. He loved to wander, one pocket filled with fishing tackle and the other with rock specimens; he never lost his intense love of nature and, particularly, of mountain and water scenery.

While still a youth, ingenuous and somewhat impetuous, Davy had plans for a volume of poems, but he began the serious study of science in 1797, and these visions "fled before the voice of truth." He was befriended by Davies Giddy (later Gilbert; president of the Royal Society, 1827–30), who offered him the use of his library in Tradea and took him to a chemistry laboratory that was well equipped for that day. There he formed strongly independent views on topics of the moment, such as the nature of heat, light, and electricity and the chemical and physical doctrines of A.-L. Lavoisier. In his small private laboratory, he prepared and inhaled nitrous oxide (laughing gas), in order to test a claim that it was the "principle of contagion," that is, caused diseases. On Gilbert's recommendation, he was appointed (1798) chemical superintendent of the Pneumatic Institution, founded at Clifton to inquire into the possible therapeutic uses of various gases. Davy attacked the problem with characteristic enthusiasm, evincing an outstanding talent for experimental inquiry. He investigated the composition of the oxides and acids of nitrogen, as well as ammonia, and persuaded his scientific and literary friends, including Samuel Taylor Coleridge, Robert Southey, and P.M. Roget, to report the effects of inhaling nitrous oxide. He nearly lost his own life inhaling water gas, a mixture of hydrogen and carbon monoxide sometimes used as fuel. The account of his work, published as Researches, Chemical and Philosophical (1800), immediately established his reputation, and he was invited to lecture at the newly founded Royal Institution of Great Britain in London, where he moved in 1801, with the promise of help from the British-American scientist Sir Benjamin Thompson (Count von Rumford), the British naturalist Sir Joseph Banks, and the English chemist and physicist Henry Cavendish in furthering his researches; e.g., on voltaic cells, early forms of electric batteries. His carefully prepared and rehearsed lectures rapidly became important social functions and added greatly to the prestige of science and the institution. In 1802 he became professor of chemistry. His duties included a special study of tanning: he found catechu, the extract of a tropical plant, as effective as and cheaper than the usual oak extracts, and his published account was long used as a tanner's guide. In 1803 he was admitted a fellow of the Royal Society and an honorary member of the Dublin Society and delivered the first of an annual series of lectures before the board of agriculture. This led to his *Elements of Agricultural Chemistry* (1813), the only systematic work available for many years. For his researches on voltaic cells, tanning, and mineral analysis, he received the Copley Medal in 1805. He was elected secretary of the Royal Society in 1807.

Major discoveries.

Davy early concluded that the production of electricity in simple electrolytic cells resulted from chemical action and that chemical combination occurred between substances of opposite charge. He therefore reasoned that electrolysis, the interactions of electric currents with chemical compounds, offered the most likely means of decomposing all substances to their elements. These views were explained in 1806 in his lecture "On Some Chemical Agencies of Electricity," for which, despite the fact that England and France were at war, he received the Napoleon Prize from the Institut de France (1807). This work led directly to the isolation of sodium and potassium from their compounds (1807) and of the alkaline-earth metals from theirs (1808). He also discovered boron (by heating borax with potassium), hydrogen telluride, and hydrogen phosphide (phosphine). He showed the correct relation of chlorine to hydrochloric acid and the untenability of the earlier name (oxymuriatic acid) for chlorine; this negated Lavoisier's theory that all acids contained oxygen. He explained the bleaching action of chlorine (through its liberation of oxygen from water) and discovered two of its oxides (1811 and 1815), but his views on the nature of chlorine were disputed. He was not aware that chlorine is a chemical element, and experiments designed to reveal oxygen in chlorine failed.

In 1810 and 1811 he lectured to large audiences at Dublin (on agricultural chemistry, the elements of chemical philosophy, geology) and received £1,275 in fees, as well as the honorary degree of LL.D., from Trinity College. In 1812 he was knighted by the Prince Regent (April 8), delivered a farewell lecture to members of the Royal Institution (April 9), and married Jane Apreece, a wealthy widow well known in social and literary circles in England and Scotland (April 11). He also published the first part of the Elements of Chemical Philosophy, which contained much of his own work; his plan was too ambitious, however, and nothing further appeared. Its completion, according to a Swedish chemist, J.J. Berzelius, would have "advanced the science of chemistry a full century."

His last important act at the Royal Institution, of which he remained honorary professor, was to interview the young Michael Faraday, later to become one of England's great scientists, who became laboratory assistant there in 1813 and accompanied the Davys on a European tour (1813–15). By permission of Napoleon, he travelled through France, meeting many prominent scientists, and was presented to the empress Marie Louise. With the aid of a small portable laboratory and of various institutions in France and Italy, he investigated the substance "X" (later called iodine), whose properties and similarity to chlorine he quickly discovered; further work on various compounds of iodine and chlorine was done before he reached Rome. He also analyzed many specimens of classical pigments and proved that diamond is a form of carbon.

Later years.

Shortly after his return, he studied, for the Society for Preventing Accidents in Coal Mines, the conditions under which mixtures of firedamp and air explode. This led to the invention of the miner's safety lamp and to subsequent researches on flame, for which he received the Rumford medals (gold and silver) from the Royal Society and, from the northern mine owners, a service of plate (eventually sold to found the Davy Medal). After being created a baronet in 1818, he again went to Italy, inquiring into volcanic action and trying unsuccessfully to find a way of unrolling the papyri found at Herculaneum. In 1820 he became president of the Royal Society, a position he held until 1827. In 1823–25 he was associated with the politician and writer John Wilson Croker in founding the Athenaeum Club, of which he was an original trustee, and with the colonial governor Sir Thomas Stamford Raffles in founding the Zoological Society and in furthering the scheme for zoological gardens in Regent's Park, London (opened in 1828). During this period, he examined magnetic phenomena caused by electricity and electrochemical methods for preventing saltwater corrosion of copper sheathing on ships by means of iron and zinc plates. Though the protective principles were made clear, considerable fouling occurred, and the method's failure greatly vexed him. But he was, as he said, "burned out." His Bakerian lecture for 1826, "On the Relation of Electrical and Chemical Changes," contained his last known thoughts on electrochemistry and earned him the Royal Society's Royal Medal.

Davy's health was by then failing rapidly; in 1827 he departed for Europe and, in the summer, was forced to resign the presidency of the Royal Society, being succeeded by Davies Gilbert. Having to forgo business and field sports, Davy wrote Salmonia: or Days of Fly Fishing (1828), a book on fishing (after the manner of Izaak Walton) that contained engravings from his own drawings. After a last, short visit to England, he returned to Italy, settling at Rome in February 1829—"a ruin amongst ruins." Though partly paralyzed through stroke, he spent his last months writing a series of dialogues, published posthumously as Consolations in Travel, or the Last Days of a Philosopher (1830).

TEXT 2.

Задание 1. Прочитайте текст. Определите, какие новые слова необходимо внести в таблицу 1.

Задание 2. Прочитайте текст. Определите, какую новую информацию содержит текст. Прочеркните данный фрагмент текста и выполните его перевод (фрагментарный перевод)

Задание 3. Прочитайте описания экспериментов. Подчеркните слова, относящиеся к теме «Химический элемент».

Задание 4. Определите, с какими учеными работал Х.Дейви.

Humphry Davy

From Wikipedia, the free encyclopedia

Sir Humphry Davy, Bt

Portrait by Henry Howard, 1803

Born	17 December 1778 Penzance, Cornwall, Great Britain
Died	29 May 1829 (aged 50) Geneva, Switzerland
Nationality	British
Fields	Chemistry
Institutions	Royal Society, Royal Institution
Known for	Electrolysis, sodium, potassium, calcium, magnesium, barium, boron, Davy lamp
Influenced	Michael Faraday

Sir Humphry Davy, 1st Baronet December 1778 – 29 May 1829) was a British chemist and inventor.[1] He is probably best remembered today for his discoveries of several alkali and alkaline earth elements, as well as contributions to the discoveries of the elemental nature of chlorine and iodine.

Davy was born at Penzance in Cornwall on 17 December 1778. The parish register records 'Humphry Davy, son of Robert Davy January 22nd, 1779.' Robert Davy was a wood-carver at Penzance, who pursued his art rather for amusement than profit. As the representative of an old family he became possessor of a modest patrimony. His wife, Grace Millett, came of an old but no longer wealthy family. Robert Davy and his wife became the parents of five children—two boys, Humphry, the eldest, and John, and three girls. In Davy's childhood the family moved from Penzance to Varfell, Davy's boyhood was spent partly with his parents and partly with Tonkin, who placed him at a preparatory school kept by a Mr. Bushell, who was so much struck with the boy's progress that he persuaded the father to send him to a better school. Davy was at an early age placed at the

Penzance grammar school Numerous anecdotes show that Davy was a precocious boy, possessing a remarkable memory and being singularly rapid in acquiring knowledge of books. He delighted in reading history.

At the same time Davy acquired a taste for experimental science. This was mainly due to a member of the Society of Friends named Robert Dunkin, a saddler and a man of original mind and of the most varied acquirements. Dunkin constructed for himself an electrical machine, made models illustrative of the principles of mechanics. By the aid of these appliances he instructed Davy in the rudiments of science. As professor at the Royal Institution, Davy repeated many of the ingenious experiments which he had learned from his instructor. From the Penzance school Davy went in 1793 to Truro, and finished his education

Davy was introduced to Dr. Edwards, who was chemical lecturer in the school of St. Bartholomew's Hospital. Dr. Edwards permitted Davy to use the apparatus in his laboratory, and appears to have directed his attention to the floodgates of the port of Hayle, which were rapidly decaying from the contact of copper and iron under the influence of seawater. This galvanic action was not then understood, but the phenomenon prepared the mind of Davy for his experiments on the copper sheathing of ships in later days.

The Pneumatic Institution

On 2 October 1798 Davy joined the ‘Pneumatic Institution’ at Bristol. This institution was established for the purpose of investigating the medical powers of factitious airs and gases, and to Davy was committed the superintendence of the various experiments. . In December 1799 Davy visited London for the first time, and his circle of friends was there much extended.

In this year the first volume of the ‘West-Country Collections’ was issued. Half of the volume consisted of Davy's essays ‘On Heat, Light, and the Combinations of Light,’ ‘On Phos-oxygen and its Combinations,’ and on the ‘Theory of Respiration.’ On 22 February 1799 Davy, writing to Davies Gilbert, says: ‘I am now as much convinced of the non-existence of caloric as I am of the existence of light.’ In another letter written to Davies Gilbert, on 10 April, Davy informs him: I made a discovery yesterday which proves how necessary it is to repeat experiments. The gaseous oxide of azote (the laughing gas) is perfectly repairable when pure. It is never deleterious but when it contains nitrous gas. I have found a mode of making it pure.’ He then says that he breathed sixteen quarts of it for nearly seven minutes, and that it ‘absolutely intoxicated me.’ During this year Davy published his In after years Davy regretted that he had ever published these immature hypotheses, which he himself subsequently designated as ‘the dreams of misemployed genius which the light of experiment and observation has never conducted to truth.’

The Royal Institution

In 1800 Davy informed Davies Gilbert that he had been ‘repeating the galvanic experiments with success’ in the intervals of the experiments on the gases, which ‘almost incessantly occupied him from January to April.’ In these experiments Davy ran considerable risks. The respiration of nitrous oxide led, by its union with common air in the mouth, to the formation of nitrous acid, which severely injured the mucous membrane, and in his attempt to breathe carburetted hydrogen gas he ‘seemed sinking into annihilation.’ On being removed into the open air he faintly articulated, ‘I do not think I shall die,’ but some hours elapsed before the painful symptoms ceased. It is likely that the nitrous oxide he inhaled was contaminated by nitric oxide, a toxic gas which combines with oxygen to form nitric acid, a very strong acid and irritant, which explains the pain he felt.

Davy's ‘Researches,’ which was full of striking and novel facts, and rich in chemical discoveries, soon attracted the attention of the scientific world, and Davy now made his grand move in life. In 1799 Count Rumford had proposed the establishment in London of an ‘Institution for Diffusing Knowledge,’ i.e. the Royal Institution. The house in Albemarle Street was bought in April 1799. Rumford became secretary to the institution, and Dr. Garnett was the first lecturer. Garnett was forced to resign from ill-health in 1801. Rumford had already been empowered to treat with Davy. Personal interviews followed, and on 15 July 1801 it was resolved by the managers ‘that Humphry Davy be engaged in the service of the Royal Institution in the capacity of assistant lecturer in chemistry, director of the chemical laboratory, and assistant editor of the journals of the institution, and that he be allowed to occupy a room in the house, and be furnished with coals and candles, and that he be paid a salary of 100l. per annum.’ In 1801 he was nominated professor at the Royal Institution of Great Britain and Fellow of the Royal Society, over which he would later preside.

Davy was a pioneer in the field of electrolysis using the battery to split up common compounds and thus prepare many new elements. He went on to electrolyse molten salts and discovered several new metals, especially sodium and potassium, highly reactive elements known as the alkali metals. Potassium was discovered in 1807 by Davy, who derived it from caustic potash (KOH). Before the 18th century, no distinction was made between potassium and sodium. Potassium was the first metal that was isolated by electrolysis. Sodium was first isolated by Davy in the same year by passing an electric current through molten sodium hydroxide. Sodium quickly oxidizes in air and is violently reactive with water, so it must be stored in an inert medium, such as kerosene. Sodium is present in great quantities in the earth's oceans as sodium chloride (common salt). Davy went on to discover calcium in 1808 by electrolyzing a mixture of lime and mercuric oxide. Davy was trying to isolate calcium; when he heard that Berzelius and Pontin prepared calcium amalgam by electrolyzing lime in mercury, he tried it himself. He worked with electrolysis throughout his life and also discovered magnesium, boron and barium

Chlorine was discovered in 1774 by Swedish chemist Carl Wilhelm Scheele, who called it dephlogisticated marine acid (see phlogiston theory) and mistakenly thought it contained oxygen. Scheele produced chlorine by reacting manganese dioxide (MnO_2) with hydrogen chloride (HCl).

$$4\ HCl + MnO_2 \rightarrow MnCl_2 + 2\ H_2O + Cl_2$$

Scheele observed several properties of chlorine gas, such as its bleaching effect on litmus, its deadly effect on insects, its yellow-green colour, and the similarity of its smell to that of aqua regia. However, Scheele was unable to publish his findings at the time.

In 1810, chlorine was given its current name by Humphry Davy, who insisted that chlorine was in fact an element. He also showed that oxygen could not be obtained from the substance known as oxymuriatic acid (HCl solution). This discovery overturned Lavoisier's definition of acids as compounds of oxygen.

Popular public figure

Sir Humphry revelled in his public status, as his lectures gathered many spectators. He became well known due to his experiments with the physiological action of some gases, including laughing gas (nitrous oxide) - to which he was addicted, once stating that its properties bestowed all of the benefits of alcohol but was devoid of its flaws.

Davy later damaged his eyesight in a laboratory accident with nitrogen trichloride. Pierre Louis Dulong first prepared this compound in 1812, and lost two fingers and an eye in two separate explosions with it. Davy's own accident induced him to hire Michael Faraday as a coworker.

Sir Humphry Davy, 1830 engraving based on the painting by Sir Thomas Lawrence (1769-1830)

A diamond crystal in its matrix

In 1812, Davy was knighted, gave a farewell lecture to the Royal Institution, and married a wealthy widow, Jane Apreece. (While generally acknowledged as being faithful to his wife, their relationship was stormy, and in his later years Davy travelled to continental Europe alone.) In October 1813, he and his wife, accompanied by Michael Faraday as his scientific assistant (and valet), traveled to France to collect a medal that Napoleon Bonaparte had awarded Davy for his electro-chemical work. While in Paris, Davy was asked by Gay-Lussac to investigate a mysterious substance isolated by Bernard Courtois. Davy showed it to be an element, which is now called iodine.

The party left Paris in December 1813, travelling south to Italy. They sojourned in Florence, where, in a series of experiments conducted with Faraday's assistance, Davy succeeded in using the sun's rays to ignite diamond, proving it is composed of pure carbon. Davy's party continued to Rome, and also visited Naples and Mount Vesuvius. By June 1814, they were in Milan, where they met Alessandro Volta, and then continued north to Geneva. They returned to Italy via Munich and Innsbruck, and when their plans to travel to Greece and Constantinople (Istanbul) were abandoned after Napoleon's escape from Elba, they returned to England.

In January 1819, Davy was awarded a baronetcy, at the time the highest honour ever conferred on a man of science in Britain. A year later he became President of the Royal Society.

In 1815 Davy suggested that acids were substances that contained replaceable hydrogen – hydrogen that could be partly or totally replaced by metals. When acids reacted with metals they formed salts. Bases were substances that reacted with acids to form salts and water. These definitions worked well for most of the nineteenth century.

Death

Davy's grave, Plot 208, Plainpalais Cemetery, Rue des Rois, Geneva.

Davy died in Switzerland in 1829, his various inhalations of chemicals finally taking their toll on his health. He is buried in the Plain Palais Cemetery in Geneva.

Davy's laboratory assistant, Michael Faraday, went on to enhance Davy's work and in the end he became the more famous and influential scientist

Задание 5. Зафиксируйте ключевую информацию о великих открытиях ученого в виде:
1.сообщения