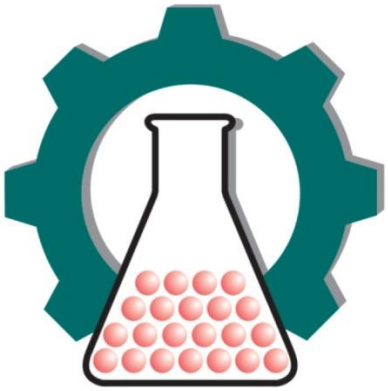
МИНИСТЕРСТВО ОБРАЗОВАНИЯ НОВГОРОДСКОЙ ОБЛАСТИ

ОГА ПОУ

«НОВГОРОДСКИЙ ХИМИКО-ИНДУСТРИАЛЬНЫЙ ТЕХНИКУМ»



МЕТОДИЧЕСКОЕ ПОСОБИЕ ПО АНГЛИЙСКОМУ ЯЗЫКУ

по профессии:

18.02.03

«Химическая технология неорганических веществ»

Разработала:

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ВЕЛИКИЙ НОВГОРОД, 2019

Пояснительная записка.

Методическое пособие предназначено для студентов, обучающихся по профессии: «***Химическая технология неорганических веществ***» и нацелено на развитие навыков устной речи и чтения и перевода литературы по специальности на английском языке.

В пособие включены тексты профессиональной направленности и задания к ним. Также в пособие включены задания для самостоятельной работы студентов и для контроля знаний.

Работа с материалом, представленным в пособии, поможет студентам овладеть английской технической терминологией из области химии и химических процессов. Пособие снабжено иллюстративным и справочным материалами и может использоваться как для аудиторной, так и для самостоятельной работы студентов.

Чтение текстов на английском языке - один из способов изучения языка.

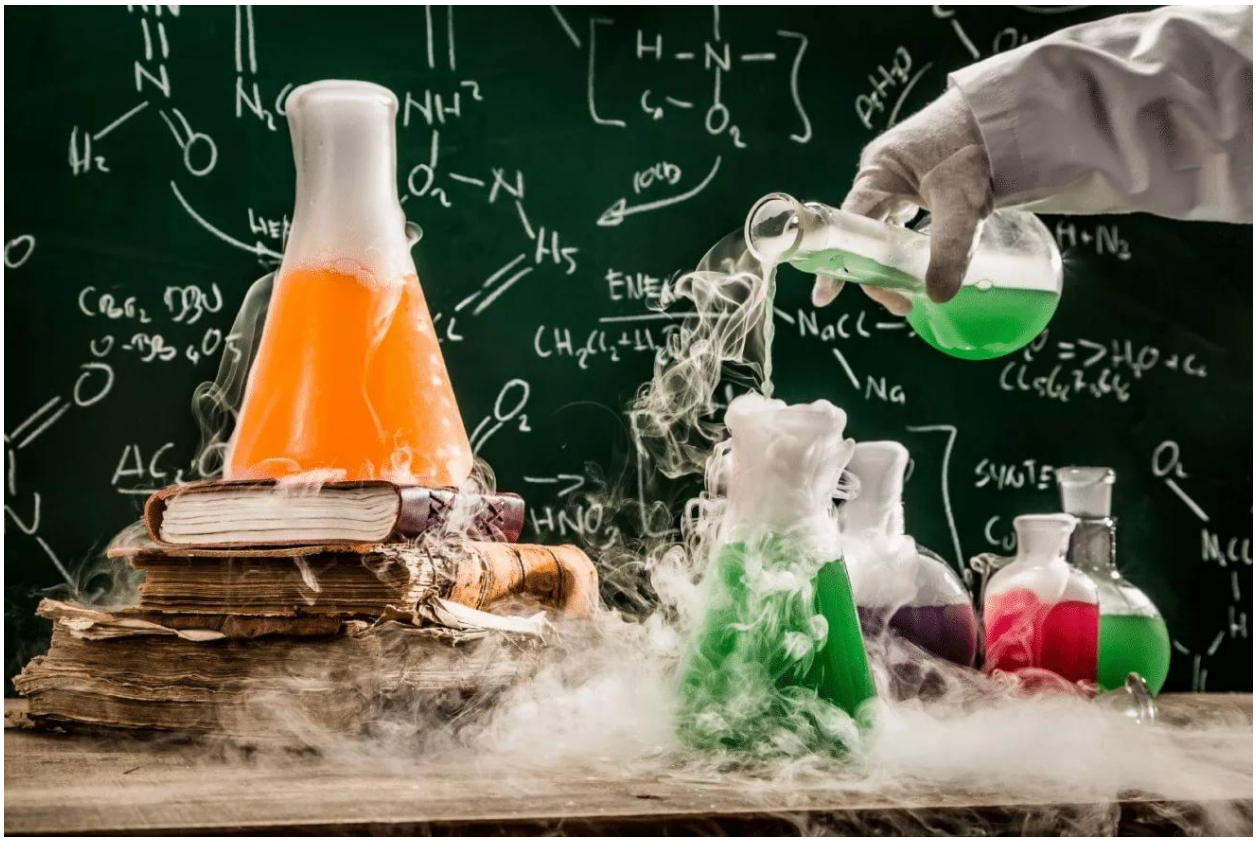
Хорошим вариантом работы с текстами на английском языке является чтение небольших текстов с приведенным в конце переводом наиболее сложных слов и выражений. Перевод слов сэкономит время на обращение к словарю.

Организационная информация	
Тема методического пособия	**CHEMISTRY AND CHEMISTS**
Дисциплина	Английский язык
Курс Профессия	3 курс *18.02.03* ***«Химическая технология неорганических веществ»***
Автор/ы (ФИО, должность)	Гомина Татьяна Олеговна , преподаватель английского языка
Образовательное учреждение	ОГАПОУ «Новгородский Химико-индустриальный техникум»
Цели (образовательные, развивающие, воспитательные)	**Образовательные:** Формирование умения употреблять профессиональную лексику в устной, письменной речи; Совершенствование грамматических навыков Повышение мотивации к изучению профессиональной лексики средствами английского языка.

Показатели	**Показатель:** обучающиеся правильно применяют профессиональную лексику в устной и письменной речи. **Развивающие:** Формирование умения анализировать текст; Развитие памяти, речи, внимания, коммуникативных компетенций. **Показатель:** умеют выбирать термины по заданной теме, умеют формировать речевые высказывания по теме, умеют правильно отвечать на вопросы по заданной теме. **Воспитательные:** Формирование уважительного отношения к своей профессии, Формирование выпускника международного уровня, востребованного на рынке труда. **Показатель:** обучающиеся понимают необходимость в изучении иностранного языка.
Задачи	- применять на практике знание лексических единиц по специальности «Химические технологии», - продолжить развитие навыков чтения технических текстов с выявлением специфических деталей. - строить речевые высказывания по теме урока.
Используемые педагогические технологии, методы и приемы	Личностно - ориентированный, репродуктивный, иллюстративный. Прием: контекстуальная догадка, привлечение обучающихся к иноязычной профессиональной среде, активизация лексики по теме.
Время реализации	20 часов
Необходимое оборудование и материалы	Раздаточный материал, мультимедийная презентация

Список учебной и дополнительной литературы	Английский язык для направления «Химия» Степанова Т.А. 2014 г.»Академия» Planet of EnglishУчебник английского языка Безкоровайная Г.Т 2017г. «Академия»
Ссылки на использованные интернет-ресурсы	http://www.chemicalformula.org/chemistry-help/chemistry-worksheets http://technic-en.ru/organic-chemistry-topical-texts/ http://www.docbrown.info/ks3chemistry/7EmcHP6.htm

Unit I



ORGANIC CHEMISTRY

Organic chemistry is the study of compounds containing carbon. It is called «organic» because scientists used to think that these compounds were found only in living things or fossils. However, vast numbers of different carbon-containing compounds can now be produced artificially in laboratories and factories, for use in industry. For example, drugs, plastics, and pesticides are all synthetic organic substances. About 4. 5 million of the 5 million compounds known today contain carbon.

An important nonmetallic element, carbon occurs naturally in three forms, or allotropes. There are graphite, diamond and buckminster-fullerence. Carbon can form millions of different compounds (combinations of elements). This is because a carbon atom can bond with up to four atoms (of carbon or other elements) and because the carbon atoms can link up in chains and rings of different sizes and patterns.

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Organic (carbon-containing) compounds can be divided into two major groups – aliphatic and aromatic compounds – according to the way in which the carbon atoms bond. In aliphatic compounds, the carbon atoms are linked in chains. These chains can contain anything from two to many thousands of carbon atoms, with other types of atoms attached to each carbon atom. In aromatic compounds, the carbon atoms are joined in a ring.

Acid are substances that release hydrogen ions in water. Alkalis are substances that release hydroxide ions (ions made up of hydrogen and oxygen) in water. If acids and alkalis are mixed, the two types of ions cancel each other out, and a new substance called a chemical salt is formed. The acidity or alkalinity of a substance can be measured using the pH (potential for hydrogen) scale, which runs from 1 to 14. All acids have a pH lower than 7; the stronger the acid, the lower the pH. All alkalis have a pH greater than 7; the stronger the alkali, the higher the ph. Neutral substances, such as water, is neither acidic nor alkaline. They have a pH of 7.

The Earth provides all the raw materials we need. The problem is to separate the substances we want from the mixtures in which they naturally exist. Chemists use a variety of different methods of separation, depending on the type of mixture and the properties of the substances it contains. We sometimes need to separate substances at home, too. In a coffee-maker, for example, a filter separates the ground coffee beans from the liquid coffee. This is known as filtration.

A chemical reaction occurs when substances change into new substances. For this to happen, the bonds between atoms and molecules must break and re-form in different ways. Because the bonds can be strong, energy, usually in the form of heat, is often needed to start a reaction. The new substances (products) have properties different from those of the original substances (reactants). Chemical reactions do not occur only in laboratories; they happen all around us – for example, when cars rust and when food is cooked.

A solution forms when one substance (usually a solid) dissolves in another (usually a liquid). The solid (called the solute) breaks up into tiny particles and spreads throughout the liquid (the solvent) so that you can no longer see any solid. Solutions are always clear; if the mixture is cloudy, it is a suspension. Solid particles spread throughout the liquid, but the particles are bigger than those of a solution. If you leave a suspension to stand, most of the solid particles will eventually sink. A solution will not separate out in this way.

At room temperatures, water is a clear tasteless and odorless liquid. It is made up of hydrogen and oxygen atoms grouped together as molecules. The molecules draw together at the surface of water to form surface tension, which acts like a kind of skin. They are also drawn to the molecules of other substances, which is why water «wets» things, like drinking glasses, or our bodies when we swim.

Find equivalents:

A	***B***
1. carbon	a. разновидность
2. fossil	b. цепь
3. suspension	c. вытеснять

4. drug	d. отделять
5. allotrope	e. искусственно
6. solution	f. щелочь
7. bond (up to)	g. реагент
8. artificially	h. связывать
9. pattern	i. освобождать
10. excess	j. избыток
11. chain	k. углерод
12. acid	l. модель
13. release	m. растворять
14. alkali	n. кислота
15. cancel out	o. расплавленный
16. separate	p. лекарство
17. molten	q. ископаемое
18. dissolve	r. суспензия
19. reactant	s. растворитель
20. solvent	t. раствор

Answer the questions:

1. What compounds does the organic chemistry study?

2. Where carbon containing compounds can be found and produced?

3. How many compounds known today do contain carbon?

4. Why does carbon enable to form millions of combinations of elements?

5. Why are the organic compounds divided onto aliphatic and aromatic ones?

6. What happens if acids and alkalis are mixed?

7. Where can we observe filtration at home?

8. What energy is necessary to start a chemical reaction?

9. What chemical reactions happen all around us?

10. What colour does a solution usually have?

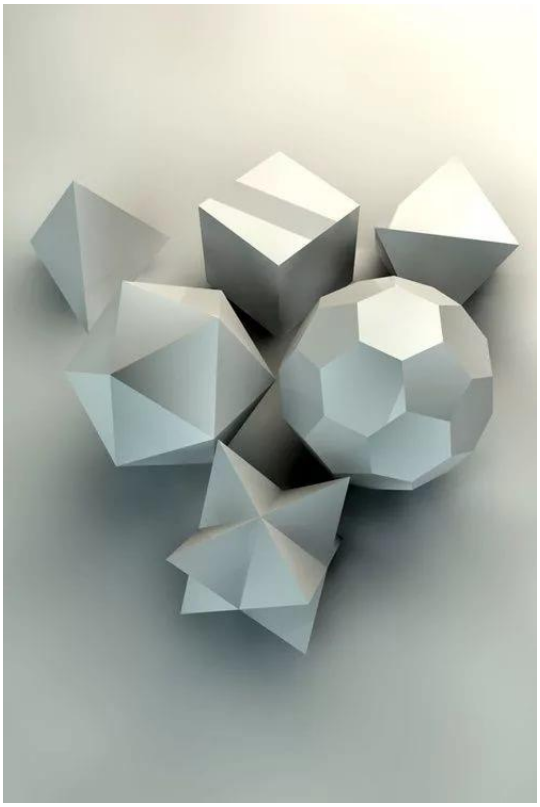
11. Are the solid particles bigger than those of a solution?

12. What atom elements is water made up of?

13. How is water surface formed?

14. What things can water «wet»?

Unit II



SOLIDS

A solid is a compact substance, created by closely packed atoms that form a regular pattern called a lattice. There are strong forces holding the atoms together, which allow only slight movement. The hardness of a solid depends on the pattern and movement of its atoms. The element carbon, for example, can exist in a soft form called graphite, or in one of the hardest solid forms on Earth, the diamond. The difference is due to variations in the arrangements of atoms.

Metals are a group of elements that share certain properties. They conduct heat and electricity well, which is why cooking pans and electrical wires are made of metal. They are also strong and can be shaped easily; this is why they are used to make structures such as bridges. Although there are many similarities between metals, there are also differences that determine how suitable a metal is for a particular use. Of the 109 elements known

today, 87 are metals. They are rarely used in their pure state – they are usually mixed with other metals or nonmetals to form combinations known as alloys.

Only 22 of the elements are non-metals. The properties of non-metals are usually opposite to those of metals – the other group of elements. For example, they do not usually conduct heat and electricity and they cannot be formed into shapes easily. Useful non-metals include chlorine, which is used in swimming pools to kill germs, and hydrogen, which is a good fuel. Some elements, although classified as non-metals, have characteristics somewhere between those of a metal and those of a non-metal; they are known as semimetals or metalloids.

Many substances form crystals. A crystal is a type of solid matter that always forms the same shape. For example, crystals of common salt always for tiny cubes, and emerald crystals are always hexagonal (six-sided). Crystals often form when molten rocks cool down and solidify or when solutions containing minerals evaporate. Crystals can also be made in the laboratory. Some crystalline substances, such as rubies and diamonds, are used in jewelry. Others are useful in industry; quartz, for example, is used in watches.

Find equivalents:

A	***B***
1. jewelry	a. сходство
2. evaporate	b. противоположный
3. solidify	c. рубин
4. hexagonal	d. решетка
5. emerald	e. сплав
6. ruby	f. подходящий
7. metalloid (semimetal)	g. изумруд
8. germ	h. испаряться
9. opposite	i. затвердевать
10. alloy	j. шестиугольный
11. rarely	k. благодаря
12. pure	l. мягкий
13. suitable	m. чистый
14. similarity	n. твердость
15. although	o. плотный
16. due to	p. хотя
17. soft	q. редко
18. hardness	r. полуметалл
19. lattice	s. микроб
20. compact	t. ювелирное искусство

Complete the sentences:

1. A solid is

2. Strong forces holding the atoms together allow only

3. Carbon exists in forms called

4. A group of elements sharing certain properties is

5. Metals can

6. Differences between metals determine

7. Metals are rarely used in

8. Non-metals are unable

9. Semimetals or metalloids have the characteristics of

10. A type of solid matter that always forms the same shape is

11. Crystals are formed when

12. Crystalline substances find their application in

Answer the questions:

1. What does the hardness of a solid depend on?

2. Why can a solid have soft and hard forms?

3. Why is metal available for being used in industry?

4. How many metals and non-metals are known today?

5. What is an alloy?

6. Why do some non-metals contain chlorine and hydrogen?

7. How many sided can crystals be?

8. Can crystals be produced artificially?

9. What crystalline substances are used in jewelry?

10. What crystal is applied in watches?

Find synonyms:

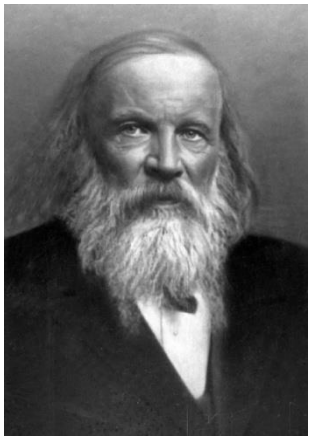
solid, free, investigate, respectively, degree, certain, however, draw together, rarely, harden, later, break up, solidify, extent, attract, correspondingly, consider, hard, split, seldom, observe, regard, release, yet, eventually, definite.

Find antonyms:

excess, artificially, solid, shortage, release, soft, naturally, hold.

Unit III

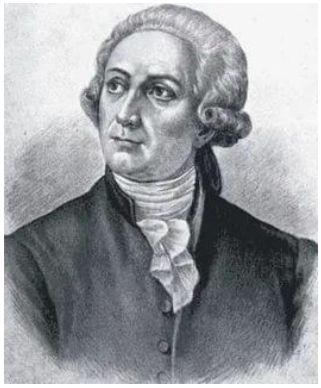
Read and translate the texts



Dmitry Mendeleyev

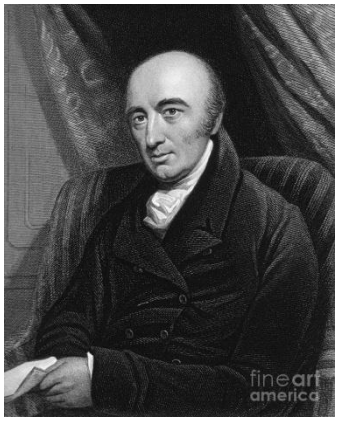
The Russian chemist Dmitry Mendeleyev is regarded as the father of the periodic table of chemical elements.

He studied all the elements known at the time and discovered that they showed a regular repetition of properties when arranged in a certain order. He also predicted the discovery and properties of new elements. All of these have now been isolated and named; one, mendelevium, is named for Mendeleyev. Mendeleyev also experimented with agricultural production based on scientific principles, increasing its efficiency to such an extent that his methods came to be applied in many Russian industries.



Antoine Lavoisier

The French chemist Antoine Lavoisier is regarded as the father of modern chemistry. He is remembered particularly for his work on gases, gunpowder, and combustion. He discovered and named both oxygen and hydrogen, observing that these two gases combine to produce water. This led him to describe elements and compounds, giving many the names by which they are known today. Lavoisier and his wife Marie (1758–1836) were meticulous scientists who produced some important manuals describing scientific experiments. In the aftermath of the French Revolution, Lavoisier was executed by revolutionaries.



William Hyde Wollaston

William Hyde Wollaston was an English chemist and physicist who is famous for discovering two chemical elements and for developing a way to process platinum ore into malleable ingots. During his studies he became interested in chemistry, crystallography, metallurgy and physics. In 1800, after he had received a large sum of money from one of his older brothers, he left medicine and concentrated on pursuing these interests instead of his trained vocation.

Define определить

compound соединение; смесь, состав

carbon углерод

slightly слегка, немного, едва

distinguish различать, отличать

attach относить

convenient удобный

available доступный

solution решение

affect оказывать влияние, воздействовать

surveyобозревать; обзор

determination определение

weight вес

attract привлекать

accept принимать

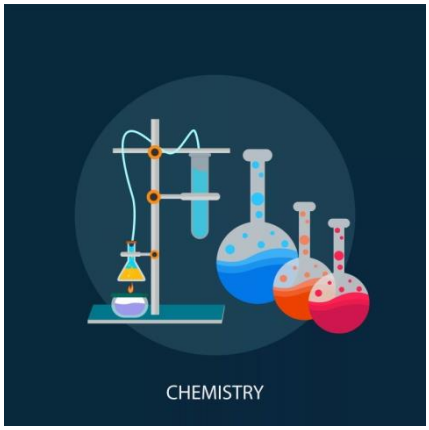
substance вещество, суть

provide обеспечивать

strength сила

exciting возбуждающий, волнующий

Unit IV



PROGRESS OF CHEMISTRY

We shall define chemistry today as the study of formation, composition, structure and reactions of the chemical elements and their compounds. Many will say that this is not the definition of chemistry but inorganic chemistry.

A modern chemist slightly distinguishes between inorganic, organic and physical chemistry. He will attach organic groups to a metal atom if it is more convenient for investigation; he will use any of the available methods of physical chemistry if necessary for the solution of his problems.

Two facts helped the development of inorganic chemistry: the growth of the theoretical techniques of quantum mechanics and new optical, electrical and magnetic techniques of physical measurement by which they can be investigated. For a full understanding of the way in which these achievements affected the development of organic chemistry, we'll make a short survey of the history of the subject.

We shall start with 1828, the year in which Wohler, the pioneer of organic synthesis, showed the interrelationship between inorganic and organic chemistry. For the next fifty years inorganic and organic chemistry progressed side by side. The main work in inorganic chemistry dealt with the preparation of new compounds and the development of methods of analysis. Great numbers of new compounds were described and important work was carried out on the determination of atomic weights. At the same time organic chemistry developed into a system in which structure could be determined. Organic chemistry constantly attracted workers of inorganic chemistry. The year 1887 may be accepted as the date of appearance of physical chemistry.

People say that facts give a science its substance, but it is the theory which provides its strength. It is owing to the development of the theory that chemistry has before it such exciting prospects at the present time.

NOTES

1. **slightly-** почти не

2. **physical measurement** – физические измерения

3. **short survey** – краткий обзор

4. **side by side** – рядом, рука об руку

5. **deal with** – иметь дело с

6. **it is owing to** - именно благодаря…

Find in the text English equivalents for these words and word combinations:

1. *многие скажут 2. определение химии 3. более удобно 4. доступные методы 5. решение проблем 6. квантовая механика 7. полное понимание 8. краткий обзор 9. взаимоотношения 10. рука об руку 11. большое количество 12. определение атомного веса 13. в то же самое время 14. именно теория.*

Quote the sentences in which the following words and word combinations are used in the text:

To define, modern chemist, the solution of the problem, to affect the development, to show the interrelationship, to deal with, to carry out, to develop into a system, to attract workers, it is owing to

Compose sentences, using the following words and wordcombinations:

To define, the definition of, to distinguish between, to be more convenient, the growth of, to make a short survey, to deal with, to describe, at the same time, to provide

Finish the sentences:

1. *Chemistry today is…*
2. *A modern scientist slightly distinguishes between…*
3. *Two facts helped to…*
4. *In 1828 Wohler showed…*
5. *Inorganic and organic chemistry progressed…*
6. *The year 1887 is the date of…*
7. *The facts give a science…*
8. *The theory provides …*

Answer the questions:

1. *What is the chemistry?*
2. *What will many say about this definition?*
3. *What are the main branches of chemistry today?*
4. *What facts helped the development of inorganic chemistry?*
5. *What did Wohler show in 1828?*
6. *How did organic and inorganic chemistry appear?*
7. *What work was carried out?*
8. *When did physical chemistry appear?*
9. *What system did organic chemistry develop?*
10. *What do people say about facts and the theory?*
11. *What prospects does chemistry have at the present time?*

Translate into English:

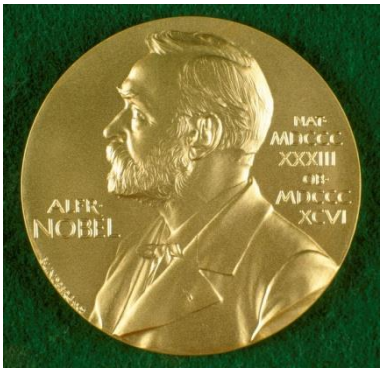
1. *Краткий обзор истории данного предмета помогает определить его состояние сегодня.*
2. *На протяжении последующих ста лет было открыто большое число новых элементов.*
3. *Благодаря развитию теории мы можем говорить о прогрессе науки в целом.*
4. *Органическая химия постоянно привлекает внимание многих выдающихся ученых.*
5. *Если необходимо, то я помогу тебе в решении этой проблемы.*

6. *Мы начнем сначала, если вы не возражаете.*

Present Progressive or Present Simple.

1. *I (read) an English textbook.*
2. *Usually my friend (read) a lot.*
3. *What you (do) tonight?*
4. *What you usually (do) at the weekend?*
5. *Is mother in the kitchen? – Yes, she is. She (cook) something. She always (cook) at that time.*
6. *Our teacher (speak) two foreign languages.*
7. *Hello. This is Brown speaking. – Sorry, I do not hear you well. Who (speak)?*
8. *What they (do)? – They are going to the lecture. Professor M. (deliver) a course of lectures on chemistry and the students always (listen) to his lectures with pleasure.*

Unit V



The 2017 Nobel Prize

The 2017 Nobel Prize in chemistry has gone to three scientists for their work on photographing molecules. Professors Jacques Dubochet, Joachim Frank and Richard Henderson will share the $1,090,000 prize. They developed a special way of taking photos of molecules. Molecules are the very smallest building blocks that make up the cells in our body. Everything and everyone is made of molecules. The three chemists developed a technique called cryo-electron microscopy (cryo-EM). This allows scientists to zoom in to amazing new levels. Scientists can now see things in our bodies that we have never seen before. They can see how the building blocks of life move.

True or False?

1. The Nobel Prize for Chemistry was won by three scientists. **T / F**
2. The winners shared a prize of just under $1,000,000. **T / F**
3. Only people are made up of molecules. **T / F**
4. Scientists can't now see how the building blocks of life move. **T / F**

Answer the questions

1. How many chemists won the Nobel Chemistry Prize?
2. How much did the prizewinners win?
3. What did the article say is made up of molecules?

4. What can scientists now do to new levels?
5. What can scientists now see the building blocks of life do?

Choose one variant

How many chemists won the Nobel Chemistry Prize?
a) 1
b) 4
c) 2
d) 3

2) How much did the prizewinners win?
a) $1,900,000
b) $1,090,000
c) $1,009,000
d) $1,000,009

3) What did the article say is made up of molecules?
a) rocks
b) animals
c) humans
d) everyone and everything

4) What can scientists now do to new levels?
a) research
b) write
c) zoom in
d) work

5) What can scientists now see the building blocks of life do?
a) vibrate
b) reproduce
c) break down
d) move

Put these words into the spaces in the paragraph below.
special
levels
work
cells
zoom
blocks
share
technique

The 2017 Nobel Prize in chemistry has gone to three scientists for their (1) _____ on photographing molecules. Professors Jacques Dubochet, Joachim Frank and Richard Henderson will (2) _____ the $1,090,000 prize. They developed a (3) _____ way of taking photos of molecules. Molecules are the very smallest building blocks that make up the (4) _____ in our body. Everything and everyone is made of molecules. The three chemists

developed a (5) _____ called cryo-electron microscopy (cryo-EM). This allows scientists to (6) _____ in to amazing new (7) _____. Scientists can now see things in our bodies that we have never seen before. They can see how the building (8) _____ of life move.

Unit VI

Chemistry

Chemistry is the science which deals with materials, their properties and the transformations they undergo. So chemistry is the study of the composition and properties of matter, their changes, the conditions under which such changes take place, and the energy changes which accompany them.

Chemistry is concerned with the nature of fire and the structure of water, it deals with colours, catalysis and crystal structure, with physical properties and chemical reactivity.

Chemistry is one of the fundamental sciences. At present it plays an important part in the development of biochemistry, physics, geology, and many other fields of science. Chemistry's origin goes back to ancient times, with the manufacture of bronze, iron, ceramics, glass.

At the end of the sixteenth century sufficient facts, entirely free of magic which surrounded the work of the alchemists, appeared.

In the 17th century modern chemistry began with the work of Robert Boyle. He was the first one who studied quantitatively the relationship between the volume of a gas and the external pressure upon it. Later A. Lavoisier introduced the concept of the chemical elements.

In the 19th century A. Avogardo introduced the concept of molecules. He stated that equal volumes of gases under the same conditions of temperature and pressure contain the same number of molecules.

F.A. Kekule and A. M. Butlerov introduced the structural theory of organic chemistry.

In 1869 D. I. Mendeleyev discovered regularities in the properties of the elements. D.I. Mendeleyev's discovery was the greatest one in chemistry.

Many great scientists devoted their life to he development of chemistry, among them Bohr whose theory of the hydrogen atom was very important, the Curies who in 1934 announced the preparation of artificial radio-active elements, Marie Curie who discovered radium and the element polonium.

Many great Russian chemists made a great contribution to the world science. Among them, the outstanding Russian chemists M. V. Lomonosov, D. I. Mendeleyev, A. M. Butlerov, Academician N. N. Semenov, and many others.

Everyone now understands the importance of chemistry. The future of chemistry is practically unlimited. It will help to understand better many phenomena in nature. Rapid development of chemical industry will make it possible to create many new goods, machines, plastics, polymers.

In your study of chemistry you will learn thoroughly many things about substances, compounds, materials, chemical and physical changes, chemical properties, reactions and many other interesting and important things. It is to be remembered that:

1.Chemistry is the study of substances, their structure, their properties, and their reactions.

2.Matter exists as solids, liquids, or gases.

3.Homogeneous material is material with the same properties throughout.

4.Heterogeneous material is material consisting of parts with different properties.

5.Compound is a substance that can be decomposed into two or more substances.

6.Substance is a homogeneous species of matter with definite chemical composition.

7.Chemical reactions are the processes that convert substances into other substances.

8.Alloy is a metallic material containing two or more elements.

Notes to the text:

to deal with–иметь дело, рассматривать, касаться

to take place–иметь место, происходить

to be concerned with– иметь дело с

to devote to – посвящать ч-л.

to make a contribution to– делать вклад

to play an important part in – играть важную роль в

Answer the questions:

1. Does chemistry belong to natural or applied sciences? 2. What does chemistry study? 3. What does chemistry deal with? 4. Why is chemistry one of the fundamental sciences? 5. When did sufficient fact about chemistry appear? 6. When did modern chemistry begin? 7. Who was the first to study quantitatively the relationship between the volume of a gas and the external pressure upon it? 8. What did Lavoisier introduce? 9. Who discovered regularities in the properties of the elements? 10. What can you tell about the future of chemistry?

Retell the text according to the following plan:

1. The definition of chemistry.

2. The relation of chemistry to other fields of science.

3. The origin of chemistry.

4. The great chemist Robert Boyle and his theory.

5. A. Avogadro's formulation of molecules.

6. D.I. Mendeleyev's Periodic Law.

7. Great scientists of the 19^{th} century.

8.The future of chemistry.

Translate the sentences paying attention to the words in bold type:

1. The article **dealt with** the changes which **took place** during the reaction. 2. Inorganic chemistry **is concerned with** mineral substances, organic chemistry **deals with** the compounds of carbon. 3. The students of these two departments can attend **the same** lectures. 4. The experimental method involves **some** observations of phenomena which **take place** in nature 5. **It doesn't matter** what method we will employ in our work. 6. **It is a matter of common observation** that discovery of the electron was the beginning of a new era in all the sciences. 7. Different **matters** can be classified according to their properties.

Translate the words in the brackets into English:

1. Chemistry is the science which (рассматривает) with materials and their properties. 2. We think that the exhibition of our achievements (состоится) at the end of September. 3. This scientist (внёс большой вклад) both in chemistry and physics. 4. All his life he worked in the field of chemistry, and we can say that he (посвятил) his life to science. 5. All the changes which (сопровождали) this reaction play a very important role. 6. Later Lavoisier (ввёл) the concept of the chemical elements. 7. Though these two teams work under (одинаковые)

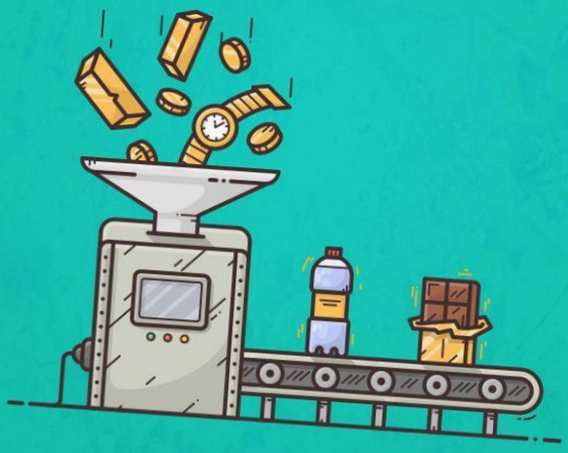
conditions the results of their work are different.8. This article (касается) the development of our industry.

Unit VII

MEL Chemistry

#104

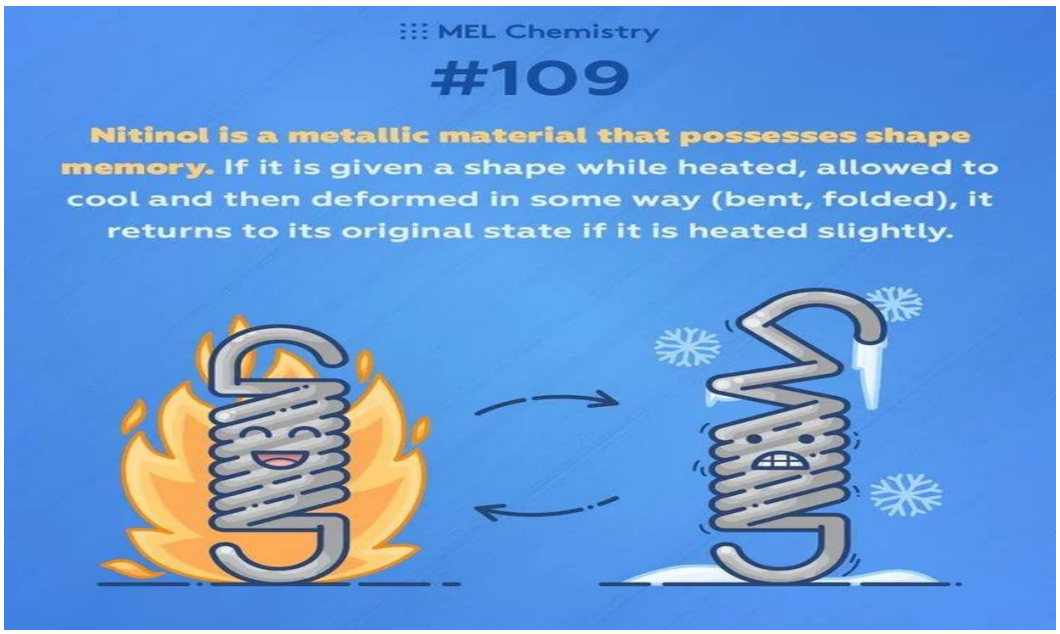
Gold is a food additive which is labelled as colorant E175.

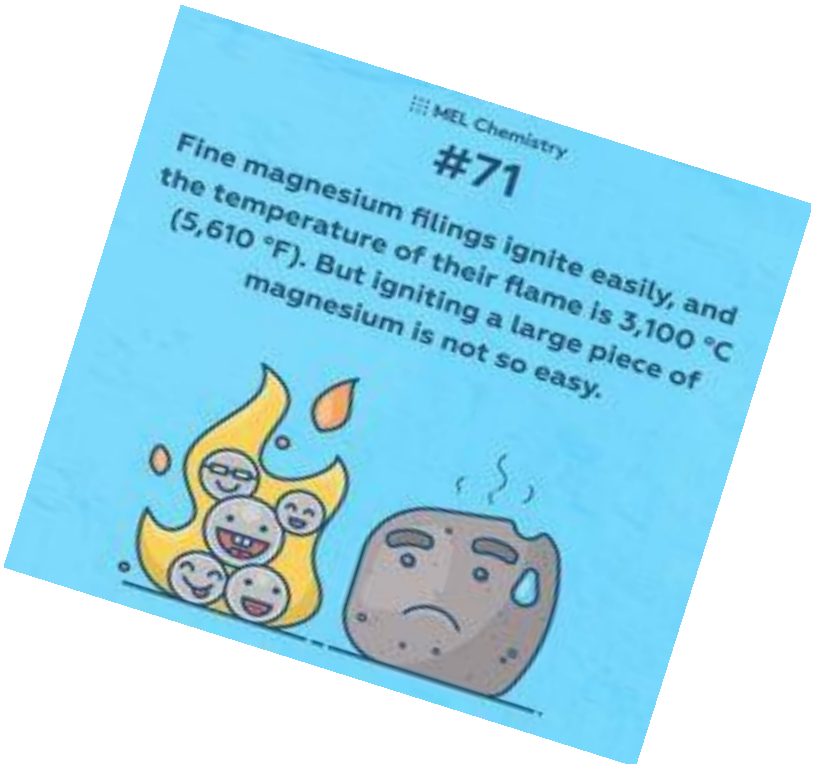


MEL Chemistry

#70

Rust can be removed from metal objects with Coca-Cola. The drink contains phosphoric acid (H_3PO_4). It softens rust, making it easier to wipe off. The compound is added to the drink as an acidity regulator.


MEL Chemistry
#109
Nitinol is a metallic material that possesses shape memory. If it is given a shape while heated, allowed to cool and then deformed in some way (bent, folded), it returns to its original state if it is heated slightly.


MEL Chemistry
#71
Fine magnesium filings ignite easily, and the temperature of their flame is 3,100 °C (5,610 °F). But igniting a large piece of magnesium is not so easy.


Oxygen
is the most sociable element.
It interacts with everything
apart from inert gases.
Ar
Ag
O
Na
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Some Facts about Chemistry

The science of chemistry deals with substances. Chemistry is the investigation and discussion of the properties of substances.

Common examples of substances are: water, sugar, salt, copper, iron and many others.

Chemists study substances in order to learn as they can about their properties and about the reactions that change them into other substances. This knowledge is very important as it can make the word a better place to live in, it can make people happier, it can raise their living standard.

Chemists discovered many laws, investigated many important phenomena in life. They produced many artificial substances which have valuable properties.

Chemistry has two main aspects: descriptive chemistry, the discovery of chemical facts, and theoretical chemistry, the formulation of theories.

The broad field of chemistry may also be divided in other ways. An important division of chemistry is that into the branches of organic chemistry and inorganic chemistry.

Organic chemistry is the chemistry of the compounds of carbon that occur in plants and animals.

Inorganic chemistry is the chemistry of the compounds of elements other that carbon. Each of these branches of chemistry is in part descriptive and in part theoretical.

The field of chemistry is now a very large one. There are more than 30 different branches of chemistry. Some of them are inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry, pharmaceutical chemistry, nuclear chemistry, industrial chemistry, colloidal chemistry, electrochemistry, magnetochemistry, and biochemistry.

Inorganic chemistry. It was originally considered that the field of inorganic chemistry consists of the study of materials not derived from living organisms. However, it now includes all substances except the hydrocarbons and their derivatives.

Organic chemistry. At one time it was thought that all substances found in plants and animals could be made only by using part of a living plant or animal. The study of these substances, most of which contain carbon, was therefore called organic chemistry. It is now know that this idea is quite wrong. In 1828 Fr. Wohler, a German scientist, made in "organic" substance using a simple laboratory process. Organic chemistry now merely means the chemistry of carbon compounds.

Physical chemistry. This field of chemistry is concerned with those parts of chemistry which are closely linked with physics as, for instance, the behaviour of substances when a current of electricity is passed through them.

Electrochemistry is concerned with the relation between electrical energy and chemical change. Electrolysis is the process whereby electrical energy causes a chemical change in

the conducting medium, which usually is a solution or a molten substance. The process is generally used as a method of deposition metals from a solution.

Biochemistry. Just as the physical chemist works on the boundaries between physics and chemistry, so the biochemists work on the boundaries between biology and chemistry. Much of the work of the biochemist is connected with foodstuffs and medicines as well as chemical processes taking place in the cellular level. The medicines known as antibiotics, of which penicillin is an early example, were prepared by biochemists.

Notes to the text:

branch –отрасль, область, ветвь

It was… considered (thought) – предполагали, считали

It is now known– теперь известно

to cause– вызывать, быть причиной

relation– соотношение, зависимость

conducting medium– проводящая среда

method of deposition metals– метод отложения металлов

just as– точно так же, как

Match the words and word-combinations in A with their equivalents in B

A	**B**
1. Colloidal Chemistry	a. is the study of crystal structure of solids
2. Analytical Chemistry	b. is the study of all carbon derivatives
3. Chemistry of Crystals	c. is th estudy of chemical processes in weightlessness and the creation of new composites
4. Magnetochemistry	d. is the study of suspensions and colloids
5.Physical Chemistry	e.is the study of behaviour of a chemical substance in a electric field
6.Organic Chemistry	f. is the study of behaviour of a chemical substance in a magnetic field
7.Space Chemistry	g.is the study of qualitative and quantitative composition of substances and their systems

Unit VIII

Chemistry as a Profession

Read the text and guess:

a) which word in paragraph 1 means "work with another"?

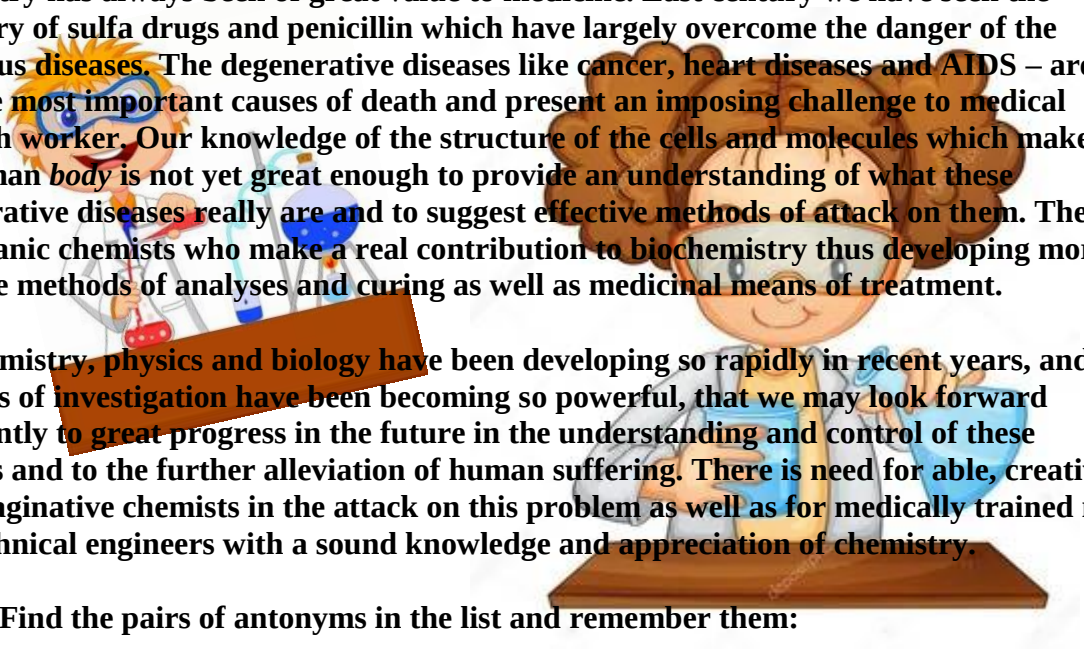
b) which word in paragraph 2 means "keep, preserve, continue to have"?

c) which word in paragraph 2 means "able to flow easily, like water or gas"?

d) which word in paragraph 4 means "making less (pain or suffering)?

A person who selects chemistry as profession does not thereby place narrow limitation on what he will do with his life. He still has many roads open to him. He may become a lecture and at the same time work to discover something new to bring deeper understanding into the science; he may be a research man working either with inorganic substances or with organic ones, with metals or with drugs; he may help either engineers in the control of great industrial processes, to develop new ones or collaborate with medical workers in the control and treatment of diseases. Even if he selects a profession other than chemistry he may find himself using his chemical knowledge not only in his everyday work but also in overcoming unexpected problems.

The improvements that chemistry has made in metals and alloys, other structural materials such as plastics and other materials such as oils which are used in the machines of our mechanical civilization have been so numerous that they cannot be listed. One may be mentioned as an example – the discovery of a special oils and lubricants which does not get thin and useless in hot weather or thick and sluggish in freezing weather, but which retains a constant viscosity independent of temperature.



Chemistry has always been of great value to medicine. Last century we have seen the discovery of sulfa drugs and penicillin which have largely overcome the danger of the infectious diseases. The degenerative diseases like cancer, heart diseases and AIDS – are now the most important causes of death and present an imposing challenge to medical research worker. Our knowledge of the structure of the cells and molecules which make up the human *body* is not yet great enough to provide an understanding of what these degenerative diseases really are and to suggest effective methods of attack on them. They are organic chemists who make a real contribution to biochemistry thus developing more effective methods of analyses and curing as well as medicinal means of treatment.

But chemistry, physics and biology have been developing so rapidly in recent years, and the methods of investigation have been becoming so powerful, that we may look forward confidently to great progress in the future in the understanding and control of these diseases and to the further alleviation of human suffering. There is need for able, creative and imaginative chemists in the attack on this problem as well as for medically trained men and technical engineers with a sound knowledge and appreciation of chemistry.

Find the pairs of antonyms in the list and remember them:

thin, hot, help, retain, violent, organic, fluid, sluggish, interfere, quiet, inorganic, solid, liquid, freezing, thick, lose.

Find endings

1. If a person selects a profession of chemistry...

2. Last century we have seen the discovery of sulfa drugs and penicillin...

3. Our knowledge of the cells and molecules which make up the human body is not yet great enough to provide an understanding of …

4. Chemists developed such oils…

5. Even if somebody selects a profession other than chemistry…

a ... what these diseases really are.

b ... which have largely overcome the danger of the infectious diseases.

c …he places no limitations on what he will do with his life.

d ... which retain constant viscosity in any weather.

e ... he may use his chemical knowledge in overcoming unexpected problems.

Before reading the following text make sure whether you can translate these phrases:

make a choice**,** a highly paid/ a low-paid job, get satisfaction from, suit one's interests, promotional prospects, profound knowledge, to work indoors or outdoors, take into account smth..

Read and understand the text. Answer the questions in the text.

When choosing a future career, we should consider different factors. In my opinion, money is one of the most important factors when you make a choice. There are highly paid jobs and low-paid jobs. I think everybody wants to earn as much money as possible.

Are the professions of chemist, chemical engineering technologist or chemical laboratory analyst highly paid jobs nowadays?

On the other hand, it's good when you get satisfaction from your job. It is very important to choose a profession that suits your interests. In my opinion, a job should be interesting and socially important.

Does your future speciality suit your interests? Do you consider it to be socially important?

Training, promotional prospects and conditions should be also taken into account. You should also decide whether you want to work indoors or outdoors.

Which of these factors would you take into account first of all? Would you like to work indoors or outdoors? Would you like to have many business trips or study tours?

To make the right choice, you should take into account your traits of character. It goes without saying that to become a good doctor you must be patient, caring and kind. Teacher's work requires love for children, profound knowledge of subjects, and the ability to explain. A secretary has to be efficient and careful in order to do her work quickly and accurately.

What traits of character should a person have to become a good chemist?

There are so many people who influence us in choosing our occupation. Parents and friends play a very important role in our choices. My father works for an international company as a managing director. It is a highly paid job and it offers a lot of opportunities. My father is a friendly person and he is easy to talk to. But he thinks that I must choose my future profession according to my own taste and preferences.

Who influenced you in choosing your occupation?

I have always been interested in Chemistry and I am good at it. So my choice of profession is clear to me. A chemist is a person trained in the science of chemistry. Chemists study the composition of matter and its properties such as density and acidity. Then they describe them in terms of quantities, with detail on the level of molecules and their component atoms. Chemists also carefully measure substance proportions, reaction rates, and other chemical properties.

Can you do any of the things mentioned above? Do you do all these things during your practical classes?

Chemists use this knowledge to learn the composition, structure, chemical reactivity, and properties of unfamiliar substances, as well as to reproduce and synthesize large quantities of useful naturally occurring substances and create new artificial substances and useful processes. Chemists may specialize in any number of sub-disciplines of chemistry.

Chemistry typically is divided into several major sub-disciplines. There are also several main cross-disciplinary and more specialized fields of chemistry. There is a great deal of overlap between different branches of chemistry, as well as with other scientific fields such as biology, medicine, physics, and several engineering disciplines.

What sub-disciplines are or will you specialize in?

The three major employers of chemists are academic institutions, industry, especially the chemical industry and the pharmaceutical industry, and government laboratories.

What sphere would you like to be employed in?

Некоторые химические термины

Адсорбция	Adsorption	[æd'sɔ:pʃn]
Аминокислота	Amino acid	[ə'mi:nəʊ 'æsɪd]
Аммоний	Ammonium	[ə'məʊnjəm]
Амфотерный	Amphoteric	['æmfətərɪk]
Атом	Atom	['ætəm]
Белок	Protein	['prəʊti:n]
Бетон	Concrete	['kɔnkri:t]
Бронза	Bronze	[brɔnz]
Бутан	Butane	['bju:teɪn]
Валентность	Valency	['veɪlənsɪ]
Вещество	Substance	['sʌbstəns]
Восстановитель	Reductant	[rɪ'dʌktənt]
Газ	Gas	[gæs]
Гидрат	Hydrate	['haɪdreɪt]
Гидроксид	Hydroxide	[haɪ'drɔksaɪd]
Гидролиз	Hydrolysis	[haɪ'drɔlɪsɪs]
Глина	Clay	[kleɪ]
Гомогенный	Homogeneous	[hɔməʊ'ʤi:njəs]
Гомолог	Homologue	[hə'mɒləʤɪ]
Горное дело	Mining	['maɪnɪŋ]
Диоксид углерода	Carbon dioxide	['kɑ:bən daɪ'ɔksaɪd]
Диффузия	Diffusion	[dɪ'fju:ʒən]
Добывать	Extract	['ekstrækt]
Жидкость	Liquid	['lɪkwɪd]
Заряд	Charge	[ʧɑ:ʤ]

Изомерия	Isomerism	[ɪˈsʌmərɪzəm]
Ингибитор	Inhibitor	[ɪnˈhɪbɪtə]
Ион	Ion	[ˈaɪən]
Карбоновая кислота	Carboxylic acid	[kɑːbɒkˈsɪlɪk ˈæsɪd]
Катализатор	Catalyst	[ˈkætəlɪst]
Качественная реакция	Qualitative reaction	[ˈkwɔlɪtətɪv riːˈækʃn]
Кислота	Acid	[ˈæsɪd]
Ковалентный	Covalent	[ˈkʌvələnt]
Коррозия	Corrosion	[kəˈrəʊʒən]
Крекинг	Cracking	[ˈkrækɪŋ]
Кристалл	Crystal	[krɪstl]
Латунь	Brass	[brɑːs]
Металл	Metal	[metl]
Металлургия	Metallurgy	[meˈtælədʒɪ]
Минерал	Mineral	[ˈmɪnərəl]
Молекула	Molecule	[ˈmɔlɪkjuːl]
Моль	Mol	[mɔːl]
Молярная масса	Molar mass	[ˈməʊlə mæs]
Моноксид углерода	Carbon monoxide	[ˈkɑːbənmɔˈnɔksaɪd]
Нейтрон	Neutron	[ˈnjuːtrɔn]
Необратимая реакция	Irreversible reaction	[ɪrɪˈvɜːsəbl] [riːˈækʃn]
Неорганическая химия	Inorganic chemistry	[ɪnɔːˈgænɪk ˈkemɪstrɪ]
Нефть	Oil	[ɔɪl]
Обратимая реакция	Reversible reaction	[rɪˈvɜːsəbl riːˈækʃn]
Окислитель	Oxidant	[ˈɒksɪdənt]
Оксид	Oxide	[ˈɔksaɪd]
Органическая химия	Organic chemistry	[ɔːˈgænɪk ˈkemɪstrɪ]
Основание	Base	[beɪs]
Относительная атомная масса	Relative atomic mass	[ˈrelətɪv] [əˈtɔmɪk] [mæs]
Относительная молек. масса	Relative molecular mass	[ˈrelətɪv məʊˈlekjʊlə mæs]
Периодический закон	Periodic law	[pɪərɪˈɔdɪk lɔː]
Песок	Sand	[sænd]
Пиролиз	Pyrolysis	[paɪəˈrɒləsɪs]
Полимер	Polymer	[ˈpɔlɪmə]
Пропан	Propane	[ˈprəʊpeɪn]
Протон	Proton	[ˈprəʊtɔn]
Раствор	Solution	[səˈluːʃn]
Реактив	Reagent	[riːˈeɪdʒənt]
Руда	Ore	[ɔː]
Самородок	Nugget	[ˈnʌgɪt]
Свойство	Property	[ˈprɔpətɪ]
Сланец	Slate	[sleɪt]
Соль	Salt	[sɔːlt]
Спирт	Alcohol	[ˈælkəhɔl]
Сплав	Alloy	[ˈælɔɪ]
Сталь	Steel	[stiːl]
Степень окисления	Oxidation degree	[ɔksɪˈdeɪʃn dɪˈgriː]
Твёрдое вещество	Solid substance	[ˈsɔlɪd ˈsʌbstəns]

Тепловой эффект	Thermal effect	[ˈθɜːməl ɪˈfekt]
Углевод	Carbohydrate	[ˈkɑːbəʊˈhaɪdreɪt]
Угольный бассейн	Coal field	[kəʊl fiːld]
Удобрение	Fertilizer	[ˈfɜːtɪlaɪzə]
Фермент	Ferment	[ˈfɜːment]
Фреон	Freon	[ˈfriːən]
Химическая реакция	Chemical reaction	[ˈkemɪkəl riːˈækʃn]
Химическое равновесие	Chemical equilibrium	[ˈkemɪkəl iːkwɪˈlɪbrɪəm]
Химия	Chemistry	[ˈkemɪstrɪ]
Чистое вещество	Pure substance	[pjʊə ˈsʌbstəns]
Чугун	Cast iron	[ˈkɑːstˈaɪən]
Шахта	Mine	[maɪn]
Щёлочь	Alkali	[ˈælkəlaɪ]
Электролитическая	Electrolytic dissociation	[ɪlektrəˈlɪtɪk] [dɪˈsəʊsɪˈeɪʃn]
Электрон	Electron	[ɪˈlektrɔn]
Элемент	Element	[ˈelɪmənt]