ENGLISH FOR SAFETY

АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ ИГЗ

ФГБОУ ВО «Удмуртский государственный университет»
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для естественно-научных специальностей

ENGLISH FOR SAFETY

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Целью учебно-методического пособия является обучение студентов магистрантов по программам «Безопасность в электроэнергетике», «Безопасность в нефтегазовом комплексе», «Информационные технологии в техносферной безопасности», «Пожарная безопасность» чтению и переводу профессионально-ориентированных текстов. Тексты пособия раскрывают специфику профессиональной деятельности и особенности соблюдения норм безопасности в разных производственных сферах.

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СОДЕРЖАНИЕ

Предисловие	4
LET’S GET ACQUAINTANCE!	5
Part I. Introduction	6
General concepts of emergency	6
Engineering as a profession	9
Safety engineers	11
Part II. Electrical safety	14
The nature of electricity	14
Electrical measuring instruments and units	22
Electricity may be dangerous	23
Electrical safety testing	25
Part III. Oil & gas safety	28
A brief history of petroleum	29
Nature of the industry	34
Working conditions	39
Oil spill in Goodnews bay	46
Part IV. Information technologies in safety	52
How to become a programming expert	53
5 application of automation robotics in industry	54
Free personal safety apps that can call for help	58
What is a "smart home"?	59
Part V. Fire safety	62
Combustion	62
Classes of fires	65
Fire extinguishment	70
Fire investigation	74
Литература	78
Приложение	79

ПРЕДИСЛОВИЕ

Подготовка магистрантов в высших учебных заведениях включает в себя этап овладения навыками чтения и практического общения на иностранном языке в области профессионального взаимодействия. Современному специалисту, чтобы считаться полноценно развитой личностью, способной решать как сложные профессиональные задачи, так и проблемы в сферах социального и межкультурного взаимодействия необходимо развивать и совершенствовать умения иноязычного общения.

В процессе обучения студенты-магистранты приобретают коммуникативные компетенции (ОК-3, ОПК-3), необходимые для квалифицированной информационной и творческой деятельности в различных сферах и ситуациях делового партнерства, совместной производственной и научной работы. Студенты работают с профессионально-ориентированной литературой, готовят доклады и презентации на иностранном языке, учатся писать аннотации.

Предлагаемое учебно-методическое пособие охватывает сферу безопасности в различных производственных областях: нефтегазовая промышленность, электроэнергетика, пожарная безопасность, а так же использование информационных технологии в целях безопасности. В начале пособия вводится блок текстов, посвященный общей теории чрезвычайных ситуаций и особенностям профессии инженера по безопасности (Introduction).

Каждый блок включает в себя тексты по специальности и упражнения к ним и ставит своей целью развитие умения чтения и адекватного перевода специализированных текстов с учетом лексических и грамматических особенностей, умения выделить основную информацию в тексте и передать ее. Грамматический материал охватывает основные явления грамматики английского языка и направлен на закрепление знаний, полученных на бакалаврском уровне подготовки студентов.

В пособие для развития навыка аудирования включены видео с интернет источников. К видео подготовлены задания для закрепления профессиональной лексики.

Материалы для данного пособия были взяты из разнообразных источников: учебно-методические пособия различных авторов прошлых лет, книги и журналы по теории безопасности, интернет источники.

Данное пособие может быть использовано как на практических занятиях со студентами магистрантами, так и для организации их самостоятельной работы. Также, материал может быть использован для научно-исследовательской деятельности студентов и при подготовке специалистов в области профессионального перевода в рамках дополнительной квалификации.

LET'S GET ACQUAINTANCE!

Speak on your specialization touching the following items:

1. What institute/university did you graduate? When?
2. What area is your bachelor's degree in?
3. What background sciences did you study?
4. Why did you choose this specialization?
5. Why did you decide to get a master's degree?
6. Does your desirable profession require a wider qualification?
7. What background sciences do you have to study?
8. What are the responsibilities of safety engineers?
9. What natural hazards do the safety engineers encounter with?
10. How does negligence and man's activity influence the environment?

Read and translate the text:

WHY DO WE CHOOSE POSTGRADUATE STUDIES?

What does choosing the postgraduate course mean for a person? It is going up the level higher than the first degree. What are the reasons for taking postgraduate studies? The first one is the stimulus of the intellectual challenge: working with concepts, approaches, methods and ideas, developing skills of analysis and research among the researchers and academics. The second reason is the personal challenge. What is the difference between the undergraduate and the postgraduate level?

Undergraduate level develops study skills and the ability of independent studies, and the postgraduate course specifies skills perfection, responsibility, independence in one's own learning, ability to work with complex ideas and concepts and developing them.

Next, there is the serious problem of career prospects, more interesting and highly paid jobs. PhD degree or degree of Doctor of Science can be an obligatory requirement for entering the career, the researcher career or securing promotion to higher levels. In some professional fields the joint programs of universities and employers are undertaken both at undergraduate and postgraduate level and these programs are defined as the first stage of learning for the trainees.

For a number of postgraduates entering academic career as the university teacher and researcher is important. Besides, with rapid extension of higher education in some countries high - status academic position is available only with the Doctorate. It means the increase of the demand for people educated to Doctorate level.

PART I. INTRODUCTION

Train the reading of the words:

extreme [IksˈtrI:m]	avalanche [ˈævəlɑ:nʃ]
extremity [Iksˈtre:mItI]	glacier slide [ˈglæsjəslaId]
measure [ˈmeʒə]	negligence [ˈneglI:dʒəns]
hazardous [ˈhæzədəs]	superfluous [sju:ˈpə:fluəs]
earthquake [ˈə:θkweIk]	chemicals [ˈkemIkls]
tornado [tɔ:ˈneIdou]	vehicle [ˈvI: Ikl]
tsunami [tsuˈnɑ:mI]	disease [dIˈzI:z]
drought [drɔ:t]	environment [InˈvaIərənmənt]
safety [ˈseɪftɪ]	cause [kɔ:z]
emergency [ɪˈmɜ:dʒənsɪ]	threat [θret]
accident [ˈæksɪdənt]	circumstances [ˈsɜ:kəmstənsɪz]
flood [flʌd]	toxic [ˈtɔksɪk]

Text 1:

GENERAL CONCEPTS ON EMERGENCY

An emergency is a situation arising from an event or set of circumstances (such as an aircraft or rail accident, fire, explosion, radioactive or toxic release, major storm or flooding), which **threatens** or **causes** serious disruption to life, property, businesses or the environment. Emergency management is the process of mitigating threats and preparing for, responding to, and recovering from an emergency.

Emergency management is a vast discipline that includes planning, hazard identification, mitigation, preparedness, training, testing and coordination. Proper and effective emergency management can only be done with a wide ranging understanding and experience of the subject.

The process can be broken up into the following steps:

- assess: identification and classification of all threats;
- evaluate: assess likelihood and impact of each threat;
- mitigate: identify actions that may reduce the risks in advance or mitigate the consequences;
- prepare: plan for contingent operations;

- respond: take the necessary actions to minimize the impact of the risks that materialize;
- recover: return to normal as soon as possible.

The first step in any emergency plan is to identify what would constitute an emergency for a given business, workforce or local population. For example, in a nuclear facility a worst-case scenario might be a heavy aircraft crashing into the reactor containment building.

Other prominent threats would be external events such as fire or floods. Internal threats could be safety and control equipment failure, accidental criticality or loss of coolant. For other industries, the threats could include a breach of security, loss of workforce or loss of services.

The level of threat must then be evaluated. An understanding of how failures occur and progress can be a valuable tool. Once the hazards are identified, the risks prioritized and the failure scenarios developed, teams and persons responsible for each stage of events must be arranged.

In planning the response to an emergency, some of the key questions that need to be asked are:

- communication: **do the staff know** one another, where the telephone is, what to say and if there is sufficient signage;
- equipment: **do the people** who need access to safety equipment **know** where it is and how to use it; is it accessible at all times;
- evacuation plan: **do the staff know** the alarms and how to respond, where the assembly points are and to whom they should report?
- training: are key staff trained to understand and carry out the emergency procedures; **do they have** the necessary skills and experience; are the procedures rehearsed and who is responsible for the recovery process?

The recovery stage begins as soon as the consequences of the incident are known. Emergency management is a valuable tool, which if done systematically **will enable** an organization to reduce the likelihood of an emergency, mitigate its consequence, and ultimately recover. Although industrial accidents are less common, the threat of terrorist attack **is growing**. But by adopting these fundamental principles, the impact of emergencies can be minimized.

Grammar questions:

1. What is the function of the verb *to be*? What forms does it have?

2. What grammar structures are bolded and what grammar structures are underlined?
3. What can you tell about such verbs as *may, can, could, must, need, should?*

Exercise 1. *Answer the questions:*

1. What circumstances may cause an emergency situation?
2. How is it possible to mitigate threats of emergency?
3. What are internal and external threats?
4. What are the stages of mitigating the hazard?
5. What is it necessary to undertake under emergency conditions?
6. Can be the recovery stage fully realized?

Exercise 2. *Insert the proper word into the sentence:*

1. An emergency is a situation which threatens by serious (разрушение) to life.
2. Emergency planning is the way (уменьшение) threats.
3. One of emergency management steps is (установление) and classification of all threats.
4. The usual emergency threats are (пожар и наводнение).
5. The other threat can be (поломка) of equipment and (нарушение) of security.
6. Evacuation plan makes the staff know the alarms and how (справляться с бедствием).
7. Training implies (репетиция) of emergency procedures.
8. The recovery period starts after (последствия) of the incident are known.

Exercise 3. *Translate into English:*

1. К чрезвычайным ситуациям можно отнести такие обстоятельства, как крушение самолета, взрыв, распространение токсических веществ, шторм, пожар и т.д.
2. Управление чрезвычайными ситуациями включает определение бедствия, ликвидацию его последствий, подготовку персонала.

3. Готовность к чрезвычайной ситуации заключается в способности предпринять необходимые действия, чтобы свести к минимуму воздействие бедствия.
4. Чтобы уменьшить степень риска, нужно определить характер чрезвычайной ситуации для каждого отдельного предприятия или отрасли.
5. При планировании ответа на чрезвычайную ситуацию необходимо решить ряд ключевых вопросов.
6. Хорошее управление чрезвычайными ситуациями дает возможность уменьшить угрозу, последствия и восстановиться после происшествия.
7. Принимая основные принципы планирования, можно свести к минимуму воздействия чрезвычайной ситуации.

Text 2:

ENGINEERING AS A PROFESSION

Engineering require specialized knowledge and intensive preparation with continued study after leaving the university. The profession has a strong organizational structure, requires high standards, and operates in the public service. These attributes are commonly associated with the word professional as it is used here. It is also sometimes used in reference to level of experience. Most important is the fact that engineers see themselves as professionals. They have to be technically competent and operate with responsibility in conformity with accepted notions of professionalism.

The type of responsibility for the engineer, the result of his labors - be it a bridge, air-conditioning unit, automobile or computer - is interposed between himself and the user. However, since people's lives are often at stake if an error is made, a high level of competence is essential.

Engineering is somewhat tainted in the public eye. It is recognized that technology, or its misapplication, is responsible for the various pollution threats and also for devastating weapons of war, and the public assumes that it is the engineers who have brought us to this pass. It should be realized that technology, too operates according to demands, and just as the demand for goods, and comfort has led to environmental damage, so

technology can also correct this. In one sense engineers with their machines are the tools of society, and it is society that ultimately determines how they are to be used.

The usual structure of engineering curricula includes four main components. First are the basic sciences of physics, chemistry and mathematics. Then a block of humanities courses is required. The engineering courses fall in the general areas of mechanics of solids, properties of materials, mechanics of fluids, thermodynamics, electrical science, transfer and rate processes and systems. Finally are the design courses which put it all together. It is this design discipline which exemplifies engineering in action, for it illustrates how engineers solve practical problems by applying their scientific knowledge and skills in the interactive decision-making process. This is how engineers adapt science to human needs.

Translate the summary of the text into English:

Текст называется "Инженерия как профессия". В статье говорится о том, что инженерно-строительное искусство как профессия основывается на специализированных знаниях. Согласно автору, данная профессия требует высокой квалифицированной подготовки специалистов и обладает точными техническими свойствами. Отмечается, что после окончания университета специалисту, чтобы стать настоящим профессионалом, необходим опыт на производстве. Не менее важным фактором является то, чтобы он сам мог ощутить себя профессионалом. Для инженера огромную роль играют результаты его деятельности: изготовление оборудования, компьютеров, автомобилей, что и является связующим звеном специалиста с потребителем. Но производство необходимых товаров современности ведет к загрязнению окружающей среды. Не нужно забывать, что производство военного оборудования и различного оружия - это тоже результат деятельности инженеров. Инженерная технология базируется на основных принципах, а именно: на точных науках, на гуманитарном цикле, на механической отрасли. В заключении подчеркивается, что самым важным принципом является тот, который соединяет все принципы вместе и позволяет направить все умения инженера в нужное русло.

Text 3:

SAFETY ENGINEERS

Safety engineers serve vital roles in a wide range of workplace settings, including manufacturing and the service sector. Safety engineers' jobs revolve around implementing and maintaining safety policies, procedures and equipment. Workers' lives can depend on safety engineers' thoroughness and effectiveness. Because of this, safety engineer positions include strict applicant requirements. Safety Audits

Safety engineers regularly perform audits of the facilities, systematically checking various mechanical components and work processes to ensure they are compliant with safety standards. Engineers will check things like emergency switches for factory equipment, hardhats and hazard warning systems on construction sites, and roller coaster machinery in theme parks. Safety audits often include checking required safety documentation, such as maintenance logs for equipment, to ensure that employees are following procedures.

Monitoring

Technology facilitates the gathering of large amounts of data. Part of a safety engineer's job is to review a range of statistical reports on vital safety issues. On any given day, a safety engineer may review reports showing the percentage increase or decrease in reported accidents for the month, or the number of times machinery has been shut down for maintenance, for example. Engineers monitor these reports to spot potential safety hazards and address issues early.

Safety Programs

It is the job of safety engineers to develop the formal safety compliance programs of their companies or job sites. Engineers put

policies in place to implement a comprehensive safety program, so that all employees know their duties and emergency procedures. Engineers continually assess current safety standards, making changes as operations change.

Training

In addition to companywide safety policies, safety engineers may be required to create and lead training programs for new hires and existing employees. Employees must be trained in a range of safety procedures, such as automatic external defibrillator (AED) operation, emergency evacuation procedures and hazard reporting systems. Safety engineers may conduct advanced training courses for employees with especially dangerous job roles. Construction workers who work on high beams, for example, require special training on the use of safety harnesses and safety-related communication on the job.

Educational requirements

You generally need a bachelor's degree in science or engineering to become a safety engineer. It usually takes a minimum of four years to get this formal training. Some employers prefer to hire graduates with special degrees in safety management or occupational safety and health. Others look for people who have a master's degree or some work experience in a related field. Undergraduate courses should include behavioral, medical, and social sciences. Many companies provide additional training for their employees. In some cases engineers need to be licensed by the state in which they work. They generally need a degree from an approved engineering college, about four years of work experience as an engineer, and a passing grade on a state examination before being licensed as professional engineers.

Exercise 1. *Translate into English:*

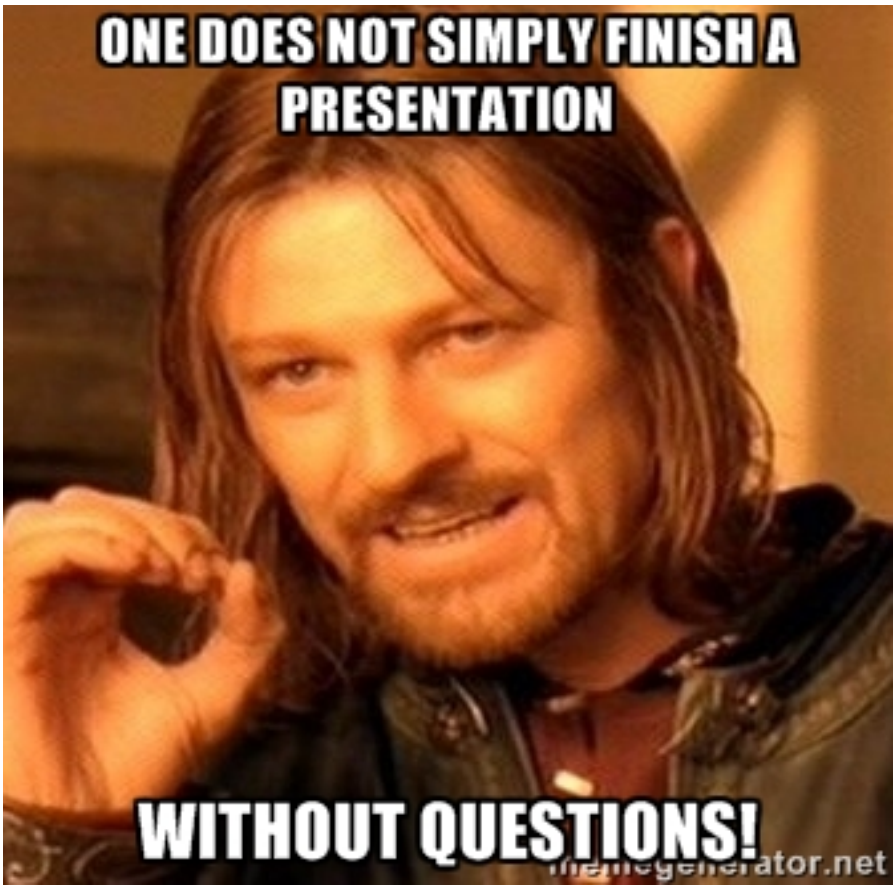
Проводить проверку оборудования, соответствовать нормам безопасности, аварийные выключатели, система аварийной сигнализации, выявлять потенциальные риски, порядок действий в аварийной обстановке, система оповещения об опасности.

Exercise 2. *Complete the sentences using information from the text which describes your future profession:*

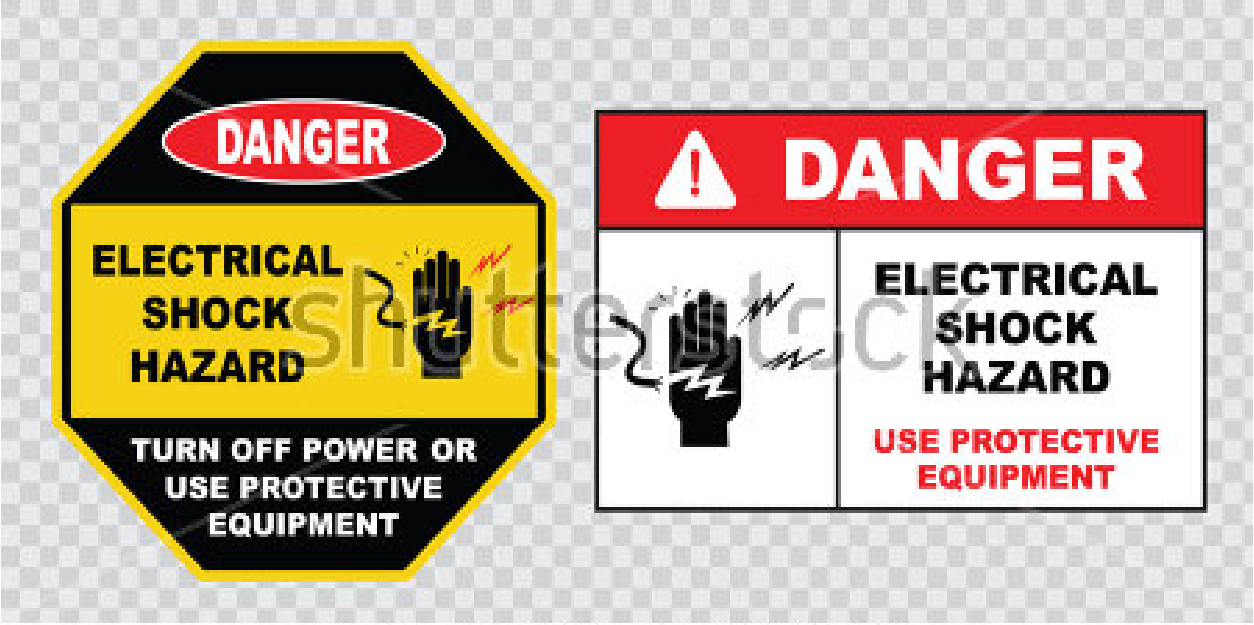
My future job involves _____.
I'll have to _____.
I can work in _____.

Exercise 3*. Prepare a presentation or make a report about the profession of safety engineer. Follow the plan.*

Professional scope
Typical tasks
Job characteristics
Personal qualities required for the job
Educational requirements
Career possibilities



PART II. ELECTRICAL SAFETY



Pre-reading task*: guess the meaning of the following international words:*

electricity, electron, effect, structure, combination, material, mass, energy, atom, orbit.

Text 1:

THE NATURE OF ELECTRICITY

Practical electricity is produced by small atomic particles known as electrons. It is the movement of these particles which produces the effects of heat and light.

The pressure that forces these atomic particles to move, the effects they encounter opposition and how these forces are controlled are some of the principles of electricity.

Accepted atomic theory states that all matter is electrical in structure. Any object is largely composed of a combination of positive and negative particles of electricity. Electric current will pass through a wire, a body, or along a stream of water. It can be established in some substances more readily than in others, that all matter is composed of electric particles despite some basic differences in materials. The science of electricity then

must begin with a study of the structure of matter.

Matter is defined as any substance which has mass (or weight) and occupies space. This definition should be broad enough to cover all physical objects in the universe. Wood, water, iron, and paper are some examples of matter. Energy is closely related to, but not to be confused with, matter. Energy does not have mass, and it does not occupy space. Heat and light are examples of energy.

The smallest particle of matter which can be recognized as an original substance was thought to be a unit called the atom. Recently scientists have found particles even smaller than atoms, but our theories are still based on the atom. The atom consists of a nucleus and a cloud of electrons. It is generally agreed that the electrons are small particles of electricity, which are negative in nature. These particles orbit the nucleus in much the same fashion that planets orbit a sun.

Electric current

The electric current is a quantity of electrons flowing in a circuit per second of time. The unit of measure for current is ampere. If one coulomb passes a point in a circuit per second then the current strength is 1 ampere. The symbol for current is **I**.

The current which flows along wires consists of moving electrons. The electrons move along the circuit because the electromotive force drives them. The current is directly proportional to the e. m. f.

In addition to traveling through solids, however, the electric current can flow through liquids as well and even through gases. In both cases it produces some most important effects to meet industrial requirements.

Some liquids, such as melted metals for example, conduct current without any change to themselves. Others, called electrolytes, are found to change greatly when the current passes through them.

When the electrons flow in one direction only, the current is known to be d.c., that is, direct current. The simplest source of power for the direct current is a battery, for a battery pushes the electrons in the same direction all the time (i.e., from the negatively charged terminal to the positively charged terminal).

The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one. The a.c. used for power and lighting purposes is assumed to go through 50 cycles in one second. One of the great advantages of a.c. is the ease with

which power at low voltage can be changed into an almost similar amount of power at high voltage and vice versa. Hence, on the one hand alternating voltage is increased when it is necessary for long-distance transmission and, on the other hand, one can decrease it to meet industrial requirements as well as to operate various devices at home.

Although there are numerous cases when d.c. is required, at least 90 per cent of electrical energy to be generated at present is a.c. In fact, it finds wide application for lighting, heating, industrial, and some other purposes.

Electric circuits

The concepts of electric charge and potential are very important in the study of electric currents. When an extended conductor has different potentials at its ends, the free electrons of the conductor itself are caused to drift from one end to the other. The potential difference must be maintained by some electric source such as electrostatic generator or a battery or a direct current generator. The wire and the electric source together form an electric circuit, the electrons are drifting around it as long as the conducting path is maintained.

There are various kinds of electric circuits such as: open circuits, closed circuits, series circuits, parallel circuits and short circuits.

To understand the difference between the following circuit connections is not difficult at all. If the circuit is broken or “opened” anywhere, the current is known to stop everywhere. The circuit is broken when an electric device is switched off. The path along which the electrons travel must be complete otherwise no electric power can be supplied from the source to the load. Thus the circuit is “closed” when an electric device is switched on.

When electrical devices are connected so that the current flows from one device to another, they are said “to be connected in series”. Under such conditions the current flow is the same in all parts of the circuit as there is only a single path along which it may flow. The electrical bell circuit is considered to be a typical example of a series circuit. The “parallel” circuit provides two or more paths for the passage of current. The circuit is divided in such a way that part of the current flows through one path and part through another. The lamps in the houses are generally connected in parallel.

The “short” circuit is produced when the current can return to the

source of supply without control. The short circuits often result from cable fault or wire fault. Under certain conditions the short circuit may cause fire because the current flows where it was not supposed to flow. If the current flow is too great a fuse is used as a safety device to stop the current flow.

Exercise 1. *Translate into English:*

производить, частица, тепло и свет, напряжение, сила, вещество, положительный, отрицательный, электрический ток, вес, ядро, течь, протекать, цепь, схема, единица измерения, провод, электродвижущая сила, твердое тело, жидкость, проводить (ток), источник энергии, постоянный ток, переменный ток, напряжение, электрические цепи, электрический заряд, проводник, сопротивление, движение электронов, изолятор, короткое замыкание, энергия.

Exercise 2. *Translate into Russian:*

atomic particle, effects of heat and light, encounter opposition, principles of electricity, composed (of), pass through a wire, structure of matter, occupy space, physical objects, a cloud of electrons, in the same fashion, electric, ampere, symbol, proportional, industrial, metal, electrolyte, battery, generate, to meet industrial requirements, melted metals, to push in the same direction, negatively (positively) charged terminal, power and lightning purposes, long-distance transmission, to operate devices, to find wide application, concept, potential, electrostatic generator, aluminum, parallel, typical, control.

Exercise 3. *Complete the sentences using the text*:

1. Electricity is produced by …
2. The effects of heat and light are produced by …
3. According to the accepted atomic theory all matter is …
4. Any object is composed of …
5. Matter is defined as …
6. Energy must not be confused with …
7. The atom consists of …
8. The smallest particle of matter is …

9. Most theories are based on …
10. Electrons are …
11. The potential difference must be maintained by …
12. Materials that offer slight opposition are called …
13. The best insulators are …
14. There are various kinds of electric circuits such as …
15. We “open” the circuit when …
16. We “close” the circuit when …
17. The “short” circuit is produced when …
18. A fuse is …

Exercise 4. *Fill in the blanks, using the words from the box:*

direct current, solids, conduct, electric current, liquids, voltage, alternating current

A quantity of moving electrons flowing in a circuit is the a) _____. The current can flow through b) _____ and c) _____. Some liquids d) _____ current without any change to themselves. When the electrons flow in one direction only, the current is known to be e) _____. The current flowing first in one direction and then in the opposite one is f) _____. Such advantage of alternating current as alternating g) _____ finds wide industrial and household application.

Grammar questions:

What is the word order to make question sentences?

***Exercise* 5.** *Make the questions to the underlined words:*

1. Melted metals conduct current without any change to themselves.
2. Alternating voltage can be changed to operate various devices at home.
3. A battery pushes the electrons in the same direction.
4. The alternating current is used for power and lightning purposes.
5. Alternating current accounts for 90 per cent of electrical energy generated now.

Exercise 6. *Answer the questions:*

1) What are the principles of electricity?
2) What must the science of electricity begin with?
3) Are there any differences between energy and matter? What are they?
4) What is recognized as an original substance now?
5) What concepts are very important in study of electric current?
6) What forms an electric circuit?
7) What materials are the best conductors and insulators?
8) What kinds of electric circuits do you know?
9) How can we open and close the circuit?
10) When are electrical devices connected in series?
11) What is an example of a series circuit?
12) What can you say about “parallel” circuits?
13) What does the short circuit often result from?

Exercise7*. True or false:*

1. The symbol for current is I.
2. The electric current can flow only through liquids.
3. The current can be of two types: direct current and alternating current.
4. The alternating current flows in one direction.
5. A battery is the simplest source of power for the direct current.
6. Direct current finds wider application than alternating current.
7. Electrolytes don’t change greatly when current passes through them.
8. One of the great advantages of alternating current is the ease with which voltage can be changed.
9. When an extended conductor has the same potential at its ends, free electrons are drifting from one end to another.
10. The wire and the electric source together form an electric circuit.
11. A path of any material will allow current to exist.
12. Silver, copper and gold oppose very strongly.
13. The slighter the opposition is, the better the insulator is.
14. There is only one type of electric circuit.
15. We close the circuit when we switch on our electric device.

Exercise 8. *Rearrange the segments of the translation in the right order:*

I. WHAT IS ELECTRICITY

Electricity is a flow of negative charges ailed electrons. (Electrons are particles that form a part of all atoms.) These electric charges are measured in units called coulombs. Electricity is a very versatile form of energy that can be converted into many other forms of energy, including light and heat. There are two types of electricity: direct current (DC), which flows in one direction only, and alternating current (AC), which changes direction 60 times per second.

(a) электричество;
(b) эти электрические заряды измеряются единицами;
(c) называемых электронами;
(d) электроны - это частицы;
(e) который изменяет на правление потока 60 раз в секунду;
(f) существует два вида электричества: постоянный ток (DC);
(g) которые входят в состав всех атомов;
(h) называемыми кулонами;
(i) электричество представляет собой весьма разностороннюю форму энергии;
(j) это поток отрицательных зарядов;
(k) которую можно превратить во многие другие формы энергии, включая свет и тепло;
(l) который идет только в одном направлении;
(m) и переменный ток (AC).

II. ELECTRICITY

Separating the different parts of a compound using electricity is called electrolysis. For this to work, the compound must be either in molten form or dissolved in water, and it must contain ions. Two electricity-conducting plates (called electrodes) are placed in the compound to be split (called the electrolyte). When the plates are connected to a battery, an electric current passes through the compound, which is gradually split into two parts. This happens because the negative electrode (the cathode) has an excess of negatively charged particles, so it attracts the positive ions of the compound.

(a) который постепенно расщепляет смесь на две части;
(b) отделение различных составляющих смеси при помощи электричества называется электролизом;
(c) чтобы смесь была в расплавленном состоянии или была растворена в воде;
(d) через смесь начинает проходить электрический ток;
(e) и что бы в ней содержались ионы;
(f) две электропроводящие пластины (называемые электродами) погружаются в подлежащую расщеплению смесь;
(g) (называемую электролитом);
(h) когда пластины подключаются к батарее;
(i) это происходит потому;
(j) что на отрицательно заряженном электроде (катоде) возникает избыточное количество отрицательно заряженных частиц;
(k) которые притягивают положительные ионы смеси;
(l) чтобы добиться этого, необходимо.

Exercise 9. *Translate the texts and check yourself (Appendix 1, 2):*

I. Электроника - это новая отрасль физики, которая - играет все более важную роль в нашей жизни. Она занимается вопросами применения электричества для производства сигналов, которые несут информацию и управляют такими устройствами, как компьютеры. В этих устройствах размещены элекроцепи, по которым проходит электрический ток. Управляющие элементы электроцепи называются компонентами, к ним относятся диоды и транзисторы. Компоненты могут усиливать электротоки, включать и выключать их, а также менять их направление.

II. Электроцепь - это не разрывный проводник электричества, протянутый от источника тока и обратно к нему. Она содержит три основные составляющие:
источник тока, проводник и нагрузку. Подача электрического тока осуществляется генератором или батареей. По проводнику идет ток, а нагрузкой служит такое электрическое устройство, как, например, электролампа.

Text 2:

ELECTRICAL MEASURING INSTRUMENTS AND UNITS

Any instrument which measures electrical values is called a meter. An ammeter measures the current in amperes. The abbreviation for the ampere is amp. A voltmeter measures the voltage and the potential difference in volts.

The current in a conductor is determined by two things – the voltage across the conductor and the resistance of the conductor. The unit by which resistance is measured is called the ohm. The resistance in practice is measured with the ohm-meter. A wattmeter measures electrical power in watts. Very delicate ammeters are often used for measuring very small currents. A meter whose scale is calibrated to read a thousandth of an ampere is called a micro ammeter or galvanometer.

Whenever an ammeter or voltmeter is connected to a circuit to measure electric current or potential difference, the ammeter must be connected in series and the voltmeter in parallel. To prevent a change in the electric current when making such an insertion, all ammeters must have a low resistance. Hence, most ammeters have a low resistance wire, called a shunt, connected across the armature coil.

A voltmeter, on the other hand, is connected across that part of the circuit for which a measurement of the potential difference is required. In order that the connection of the voltmeter to the circuit does not change tire electric current in the circuit, the voltmeter must have high resistance. If the armature coil does not have large resistance of its own, additional resistance is added in series.

The heating effect, electrostatic effect, magnetic and electromagnetic effects of electric current are used in order to produce the defleting torque. The resulting measuring instruments are called: (a) hot wire, (b) electrostatic, (c) moving iron, (d) moving coil, and (e) induction. Various types are used with both d.c. and a.c., but the permanent-magnet moving coil instrument are used only with d.c., and the induction type instruments are limited to a.c.

All, except the electrostatic type instruments, are current measuring devices, fundamentally ammeters. Consequently, most voltmeters are ammeters designed also to measure small values of current directly

proportional to voltage to be measured.

Exercise 1. *Translate into Russian:*

Instrument, fact, abbreviation, voltmeter, ohm, ohm-meter, wattmeter, galvanometer, shunt, resistance, to offer, scale, to prevent, armature, connection, heating effect.

Exercise 2. *Translate into English:*

амперметр, разница потенциалов, определять, чувствительный, градуировать, вставка, катушка, переменный ток (второй термин).

Exercise 3. *Answer the questions:*

1. How are electrical values measuring instruments called?
2. How must the ammeter and the voltmeter be connected?
3. What resistance must the ammeter and the voltmeter have?
4. What resulting measuring instruments do you know?
5. What types of instruments are used with both d.c. and a.c.?
6. What instruments are used only with d.c. and limited to a.c.?

Text 3:

ELECTRICITY MAY BE DANGEROUS

Many people have had strong shocks from the electric wires in a house. The wires seldom carry current at a higher voltage than 220, and a person who touches a bare wire or terminal may suffer no harm if the skin is dry. But if the hand is wet, he may be killed. Water is known to be a good conductor of electricity and provides

an easy path for the current from the wire to the body. One of the main wires carrying the current is connected to earth, and if a person touches the other one with a wet hand, a heavy current will flow through his body to earth and so to the others. The body forms part of an electric circuit.

When dealing with wires and fuses carrying an electric current, it is best to wear rubber gloves. Rubber is a good insulator and will not let the current pass to the skin. If no rubber gloves can be found in the house, dry cloth gloves are better than nothing. Never touch a bare wire with the wet hand, and never, in any situation, touch a water pipe and an electric wire at the same time.

People use electricity in their homes every day but sometimes forget that it is a form of power and may be dangerous. At the other end of the wire there are great generators driven by turbines turning at high speed. One should remember that the power they generate is enormous. It can burn and kill, but it will serve well if it is used wisely.

Electronics and Technical Progress

Large – scale application of electronic techniques is a trend of technical progress capable of revolutionizing many branches of industry.

Electronics as a science studies the properties of electrons, the laws of their motion, the laws of the transformation of various kinds of energy through the media of electrons.

At present it is difficult to enumerate all branches of science and technology which are based on electronic technique.

Electronics make it possible to raise industrial automation to a higher level, to prepare conditions for the future technical retooling of the national economy. It is expected to revolutionize the system of control over mechanisms and production processes. Electronics greatly helps to conduct fundamental research in nuclear physics, in the study of the nature of matter, and in realization of controlled thermonuclear reactions.

An ever greater role is being played by electronics in the development of the chemical industry.

Electronics embrace many independent branches. The main among them are vacuum, semiconductor, molecular and quantum electronics.

Protection and control equipment

In electrical systems for the generation, distribution and use of electrical energy, considerable control equipment is necessary. It can be divided into two classes:

a) equipment used at the generating and distributing end;
b) equipment used at the receiving end of the system.
c) secondary emission, in which electrons are driven from a material by the impact of electrons or other particles on its surface.
d) field emission, in which electrons are drawn from the surface of a metal by the application of very powerful electric fields.

Exercise 1. *Write down the summary to the text starting the following way:*

Текст называется "Электричество может быть опасным". В статье говорится о том, что ……..

Text 4:

ELECTRICAL SAFETY TESTING is essential to ensure safe operating standards for any product that uses electricity. Various governments and agencies have developed stringent requirements for electrical products that are sold world-wide. In most markets it is mandatory for a product to conform to safety standards promulgated by safety and standard agencies such as UL, CE, VDE, CSA, BSI, CCC and so on. To conform to such standards, the product must pass safety tests such as the high voltage test (also called as Dielectric voltage-withstand test or high potential test), Insulation Resistance Test, Ground (Earth) Bond & Ground Continuity Test & Leakage Current Test (also called as Line Leakage Test, Earth Leakage Current Test, Enclosure Leakage Current Test or Patient Leakage Current Test). These tests are described in IEC 60335, IEC 61010 and many other national and international standards.

In general, IEC 60335 is the most widely applied standard for electrical safety testing, especially for domestic appliances. Many safety testing standards in the world have been based on it. To safeguard workplace health and safety, many sections of the Occupational Health and Safety Regulation provide guidelines on electrical safety and the appropriate equipment required to work on low and high voltage electrical appliances.

High Voltage Test (Dielectric Voltage-withstand Test)

This test is carried out by applying a significantly higher than operating voltage to the device under test. In this test, the insulation of a

product, stressed to a greater extent than under normal operating conditions, should not be breached for the product to pass. In most cases, the device is stressed to twice its normal operating voltage. During type testing, i.e. testing during designing a product or for a double insulated product, however, much larger voltage may be applied. For all electrical products, the high voltage test is a universal test, meaning that every unit should pass before it can be used.

Insulation Resistance Test

This test is to measure the total resistance of a product's insulation by applying a voltage of 500V – 1000V for low voltage systems. The minimum acceptable value of resistance for a product to pass an insulation resistance test is 1 mega Ohm (1000 kohms). The insulation resistance test is not a substitute for the high voltage test. Many standards and safety agencies have specified this is a universal test for all products. This test may also be carried out after every maintenance procedure or repair.

Earth Continuity Test

This test is performed by measuring the resistance between the third pin (ground) and outside metal body of the product under test. The maximum acceptable value is generally 0.5 ohms although certain standards may specify 0.1 ohms. This test is generally carried out at a slightly higher current (e.g. 25-60A) so that the ground bond circuit maintains safe voltages on the chassis of the product, even at a high current, before the circuit breaker trips. This test is essential so that the product does not cause an electric shock resulting from insulation failure. In India current specified is 16A so the test is done at double of the current i.e.32A.

Leakage Current Test (Line Leakage Test)

This test is to measure the undesirable leakage current that flows through or across the surface of the insulation or the dielectric of a capacitor. This test is generally carried out at 100%-110% of the rated input voltage of the product under test. The maximum acceptable limit of a leakage current is generally 210 micro amperes. At first, this test was mandatory for medical devices only.

Watch the video "Bill Nye the Science Guy – Electricity"
https://www.youtube.com/watch?v=gixkpsrxk4Y.

After watching practice the vocabulary and answer the questions:

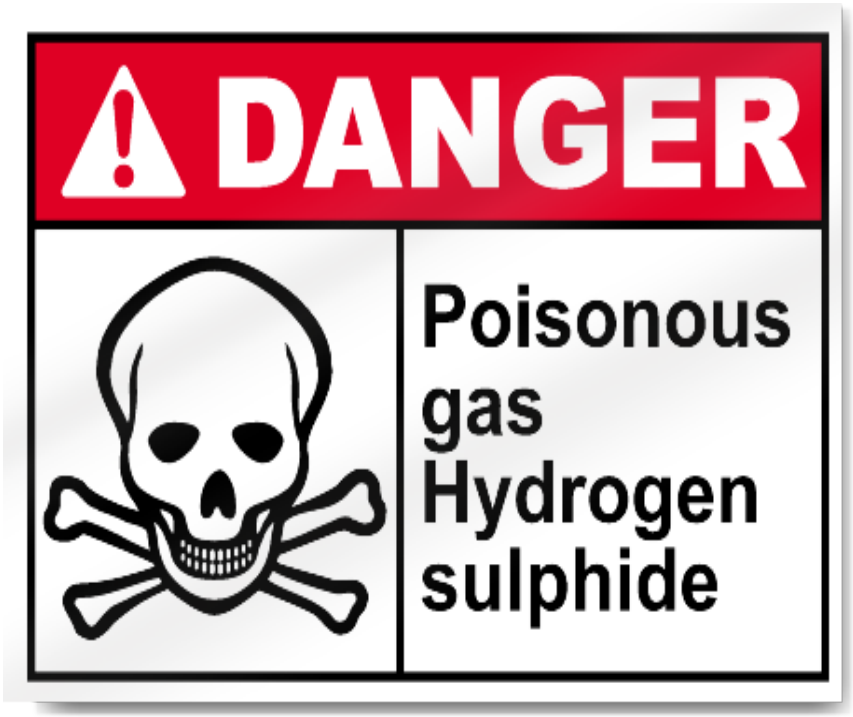
Exercise 1. *Translate into Russian:*

Discharge, voltage, quintillion, power plant, fossil fuel, to harness sth., alternating current, conductor, insulator, electrocution = electric shock, blackout.

Exercise 2. *Answer the questions:*

1. In what period was the nature of electricity first described?
2. Can we find any electric current in the nature?
3. What was one of the first places to have electric lights installed (as mentioned in the video)?
4. When did Thomas Edison present his electrical device?
5. The most important question: where does electricity come from? (what particles?)
6. What is voltage measured in and what is it?
7. What metal is used for high voltage lines?
8. How much current do you need to stop a human heart?

PART III. OIL & GAS SAFETY



Read and learn:

Oil – the thick, dark liquid from under the ground from which oil and petrol are produced;
Oil field – an area of land or sea under which there is oil;
Oil rig – a large structure with equipment for getting oil from under the ground, especially from under the sea bottom;
Oil tanker – a ship that has large containers for carrying oil;
Oil well – a hole that is dug in the ground to obtain oil;
Sediment – solid matter that settles at the bottom of a liquid;
Pore – a small hole in the rock;
Refinery – a factory where oil is refined;
Molecule – the smallest unit into which any substance can be divided without losing its own chemical nature;
Pipeline - a line of connecting pipes, often under the ground, used for taking gas, oil etc. over long distances;
Rock – stone or a type of stone that forms part of the Earth's surface;
Drill – to make a hole in something using a drill bit;
Drill bit – the sharp part of a tool for cutting or making holes;
Derrick – a tall tower built over an oil well to raise and lower the drill
Petroleum – oil that is obtained from below the surface of the Earth and is used to make petrol, paraffin and various chemical substances.
Petrol – a liquid that is used to supply power to engine of cars and other vehicles, which is obtained from petroleum.
Paraffin – an oil used for heating and in lamps, made from petroleum or coal.

Fuel – a substance such as coal, gas or oil that can be burned to produce heat or energy.
Formation – something, especially a rock, that is formed in a particular shape or the shape in which it is formed.
Deposit – a layer of a mineral, metal, etc. that is left in soil, rocks through a natural process.
Exploration – an examination of an area in order to find out what is there or what it is like.
Clay – heavy sticky soil that can be used for making pots, bricks.
Sand – a substance consisting of very small pieces of rocks and minerals, that forms beaches and deserts.
Drilling platform – a large structure in the sea used for drilling for oil, gas, etc.
Pump – to bring a supply of water, oil etc. to the surface from under the ground.
Cave in – if the top or sides of something cave in, they fall down or inwards.
Casing – an outer layer of metal, rubber etc. that covers and protects something (a well).

Text 1:

Vocabulary notes:

to comprise	охватывать, заключать в себе
residue	осадок, отстой
organic matter	органическое вещество
to convert into	преобразовывать, превращать в
hydrogen	водород
carbon	углерод
tiny droplets of oil	крошечные капельки нефти
flowing well	фонтанирующая скважина
value	ценность
to condense	сгущать, сжижать
removal	удаление, извлечение
chemical properties	химические свойства
basic unit	основная единица

to ransack	искать
cooper	бондарь, бочар
skullduggery	надувательство

A BRIEF HISTORY OF PETROLEUM

All of the oil world is divided into three: 1) The "upstream" comprises exploration and production; 2) The "midstream" are the tankers and pipelines that carry crude oil to refineries, and; 3) The "downstream" which includes refining, marketing, and distribution, right down to the corner gasoline station or convenient store. A company that includes together significant upstream and downstream activities is said to be "integrated".

By generally accepted theory, crude oil is the residue of organic waste--primarily microscopic plankton floating in seas, and also land plants--that accumulated at the bottom of oceans, lakes, and coastal areas. Over millions of years, this organic matter, rich in carbon and hydrogen atoms, was collected beneath successive levels of sediments. Pressure and underground heat "cooked" the plant matter, converting it into hydrocarbons--oil and natural gas. The tiny droplets of oil liquid migrated through small pores and fractures in the rocks until they were trapped in permeable rocks, sealed by shale rocks on top and heavier salt water at the bottom.

Typically, in such a reservoir, the lightest gas fills the pores of the reservoir rock as a "gas cap" above the oil. When a drill bit penetrates the reservoir, the lower pressure inside the bit allows the oil fluid to flow into the well bore and then to the surface as a flowing well. "Gushers" - "oil fountains" as they were called in Russia--resulted from failure (or, at the time, inability) to manage the pressure of the rising oil. As production continues over time, the underground pressure runs down, and the wells need help to keep going, either from surface pumps or from gas reinjected back into the well, known as "gas lift". What comes to the surface is hot crude oil, sometimes accompanied by natural gas.

But as it flows from a well, crude oil itself is a commodity with very few direct uses. Virtually all crude is processed in a refinery to turn it into useful products like gasoline, jet fuel, home heating oil, and industrial fuel oil.

In the early years of the industry, a refinery was little more than a still where the crude was boiled and then the different products were condensed out at various temperatures. The skills required were not all that different from making moonshine, which is why whiskey makers went into oil refining in the nineteenth century. Today, a refinery is often a large, complex, sophisticated, and expensive manufacturing facility.

Crude oil is a mixture of petroleum liquids and gases in various combinations. Each of these compounds has some value, but only as they are isolated in the refining process. So, the first step in refining is to separate the crude into constituent parts. This is accomplished by thermal distillation--heating. The various components vaporize at different temperatures and then can be condensed back into pure "streams".

Some streams can be sold as they are. Others are put through further processes to obtain higher-value products. In simple refineries, these processes are primarily from the removal of unwanted impurities and to make minor changes in chemical properties. In more complex refineries, major restructuring of the molecules is carried out through chemical processes that are known as "cracking" or "conversion". The result is an increase in the quantity of higher-quality products, such as gasoline, and a decrease in the output of such lower-value products as fuel oil and asphalt.

Crude oil and refined products alike are today moved by tankers, pipelines, barges, and trucks. In Europe, oil is often officially measured in metric tons; in Japan, in kiloliters. But in the United States and Canada, and colloquially throughout the world, the basic unit remains in "barrel", though there is hardly an oil man today who has seen an old-fashioned crude oil barrel, except in a museum.

When oil first started flowing out of the wells in western Pennsylvania in the 1860's, desperate oil men ransacked farmhouses, barns, cellars, stores, and trashyards for any kind of barrel--molasses, beer, whiskey, cider, turpentine, sale, fish, and whatever else was handy. But as coopers began to make barrels specially for the oil trade, one standard size emerged, and that size continues to be the norm to the present. It is 42 gallons.

The number was borrowed from England, where a statute in 1482 under King Edward IV established 42 gallons as the standard size barrel for herring in order to end skullduggery and "divers deceits" in the packing of fish. At the time, herring fishing was the biggest business in the North Sea. By 1866, seven years after Colonel Drake drilled his well,

Pennsylvania producers confirmed the 42-gallon barrel as their standard, as opposed to , say, the 31 1/2 gallon wine barrel or the 32 gallon London ale barrel or the 36 gallon London beer barrel.

And that, in a roundabout way, brings us right back to the present day. For the 42 gallon barrel is still used as the standard measurement, even if not as a physical receptacle, in the biggest business in the North Sea--which today of course in not herring, but oil.

Exercise 1. *True or False:*

1. Over hundreds of years, the organic matter, rich in oxygen and nitrogen atoms, was collected beneath successive levels of sediments.
2. What comes to the surface is oil of high quality.
3. As production continues over time, the underground pressure runs up.
4. Crude oil is a commodity with many direct uses.
5. The first step in refining is to separate the crude into constituent parts.
6. In more complex refineries “cracking” is carried out.
7. In Europe oil is usually measured in kilolitres.
8. Oil first started to flow out of the well in England.
9. Coopers began to make 36-gallon barrels specially for oil trade in the 1860’s.
10. 42-gallon barrel is now used as the standard measurement in oil industry.

Exercise 2. *Put words in the right order:*

1. Refineries, the, and, carry, oil, pipelines, crude, tankers, to.
2. Accompanied, to, surface, comes, oil, natural, by, crude, gas, sometimes, the.
3. Value, itself, oil, is, of, crude, little.
4. Often, large, expensive, refinery, a, facility, a, manufacturing, is.
5. Oil, processed, to, products, crude, is, higher-value, obtain.

Exercise 3. *Answer the questions:*

1. Is this text about a brief history of petroleum?
2. Is the entire oil world divided into three?

3. What company is considered to be “integrated”?
4. What is crude oil?
5. What is the organic matter rich in?
6. What happens when a drill bit penetrates the reservoir?
7. What comes to the surface?
8. What is a refinery?
9. Is all crude oil processed in a refinery?
10. What products are obtained from crude oil?
11. What is the first step in refining?
12. What are the ways of transporting oil and gas?
13. What is the basic unit of measurement in oil industry?
14. When did oil first start flowing out of the well?
15. Where did it happen?

Exercise 4. *Translate into English:*

1. Многие страны постоянно повышают цены на нефть.
2. Изменение цен на нефть очень влияет на экономику страны в целом.
3. Цены на нефть значительно возросли.
4. Он возвращается с месторождения завтра.
5. Он уже вернулся из командировки.
6. Вчера они обсудили этот вопрос.
7. Они будут обсуждать этот вопрос в следующий четверг.
8. Они уже обсудили этот вопрос.
9. Они сейчас обсуждают этот вопрос.
10. Существует много способов увеличения добычи нефти.
11. Глубокие скважины бурят в этом районе.
12. Нефть часто транспортируют по трубопроводам.
13. Им читали лекцию по бурению скважин вчера в три часа.
14. Им уже рассказали о различных способах добычи нефти.
15. Завтра им покажут новое нефтяное месторождение.
16. В этом районе бурят глубокие скважины.
17. Вышку установили над скважиной для спуска и подъема инструментов в скважину.
18. Из нефти получают различные виды топлива.
19. С данных нефтяных промыслов нефть перекачали на

нефтеперегонный завод.

20. Некоторые скважины бурят на небольшие глубины.
21. Такое оборудование могут использовать для бурения глубоких скважин.

Exercise 5. *Translate into Russian.*

a) Various fuels are obtained from petroleum.
b) The well has been drilled to produce oil.
c) A derrick was installed on the well site.
d) The development of oil industry was influenced by the increased demand for oil.
e) Horizontal drilling techniques are being discussed now.
f) Oil and gas are transported to different parts of country.
g) A great numbers of engineers are needed for oil industry.
h) Great quantities of oil and gas are being needed for our country.
i) A deep hole drilled through rock is called a well or a bore-hole.
j) This equipment is used in the different oil and gas fields.
k) These methods are being developed at this research Institute.
l) Oil is discovered in the northern part of the Udmurt Republic.
m) Oil fields are developed by means of modern technology.

Exercise 6. *Write down these sentences in Passive Voice:*

a) He is preparing that report.
b) He has suggested a new idea.
c) They find natural gas in separate deposits and sometimes mixed with oil.
d) Scientists indicate the possible presence of oil.
e) An oil company selects a well site.

Text 2:

Vocabulary notes:

to locate	обнаружить, расположить
energy needs	энергетические потребности
to increase	увеличивать, повышать

underground	подземный
to enhance	увеличивать
to abandon	оставлять, покидать, ликвидировать
hollow	пустотелый, пустой, полый
casing	обсадная труба
Christmas Tree	фонтанная арматура; оборудование устья скважины для фонтанной или компрессорной эксплуатации, «елка»
sulfur = sulphur	сера
to yield	давать, выдавать, производить

3-D seismic - A relatively new exploration technique used in the search for oil and gas underground structures. The basic premise behind seismic is the same as ultra sound technology used in the medical field. Sound from a shot hole is recorded from geophones and interpreted to give a picture of the underlying structures within the earth. 3-D has now become a common practice to redefine and identify known as well as unknown structures. Many times these structures contain traps that hold oil and gas yet to be discovered.

4-D Seismic - The newest advances in seismic technology which now takes into consideration a 4th dimension; which is time. With 4-D seismic geologists are now able to monitor the movement and the mobility of oil as it is extracted in the production process.

NATURE OF THE INDUSTRY

Petroleum, or oil as it is more commonly referred to, is a natural fuel formed from the decay of plants and animals buried beneath the ground for millions of years under tremendous heat and pressure. Formed by a similar process, natural gas often is found in separate deposits and sometimes mixed with oil. Because oil and gas are difficult to locate, exploration and drilling are key activities in the oil and gas extraction industry. Oil and natural gas furnish about three-fourths of our energy needs, fueling our homes, workplaces, factories, and transportation systems. In addition, they

provide the raw materials for plastics, chemicals, medicines, fertilizers, and synthetic fibers.

Using a variety of methods, on land and at sea, small crews of specialized workers search for geologic formations that are likely to contain oil and gas. Sophisticated equipment and advances in computer technology have increased the productivity of exploration. Maps of potential deposits are now made using remote sensing satellites. Seismic prospecting—a technique based on measuring the time it takes sound waves to travel through underground formations and return to the surface—has revolutionized oil and gas exploration. Computers and advanced software analyze seismic data to provide 3-dimensional models of subsurface rock formations. This technique lowers the risk involved in exploring by allowing scientists to locate and identify structural oil and gas reservoirs and the best locations to drill. 4-D or "time-lapsed" seismic technology tracks the movement of fluids over time and enhances production performance even further. Another method of searching for oil and gas is based on collecting and analyzing core samples of rock, clay, and sand in the earth’s layers.

After scientific studies indicate the possible presence of oil, an oil company selects a well site and installs a derrick—a tower-like steel structure—to support the drilling equipment. A hole is drilled deep in the earth until oil or gas is found, or the company abandons the effort. Similar techniques are employed in offshore drilling, except the drilling equipment is part of a steel platform that either sits on the ocean floor, or floats on the surface and is anchored to the ocean floor. Although some large oil companies do their own drilling, most land and offshore drilling is done by contractors.

In rotary drilling, a rotating bit attached to a length of hollow drill pipe bores a hole in the ground by chipping and cutting rock. As the bit cuts deeper, more pipe is added. A stream of drilling "mud"—a mixture of clay, chemicals, and water—is continuously pumped through the drill pipe and through holes in the drill bit. Its purpose is to cool the drill bit, plaster the walls of the hole to prevent cave-ins, carry crushed rock to the surface, and prevent "blowouts" by equalizing pressure inside the hole. When a drill bit wears out, all drill pipe must be removed from the hole a section at a time, the bit replaced, and the pipe returned to the hole. New materials and better designs have advanced drill bit technology, enabling faster,

more cost effective drilling, for longer lengths of time.

Advancements in directional or horizontal drilling techniques, which allow increased access to potential reserves, have had a significant impact on drilling capabilities. Drilling begins vertically, but the drill bit can be turned so drilling can continue at an angle of up to 90 degrees. This technique extends the reach, enabling a drill to reach separate pockets of oil or gas. Because constructing new platforms is costly, this technique is commonly employed by offshore drilling operations.

When oil or gas is found, the drill pipe and bit are pulled from the well, and metal pipe (casing) is lowered into the hole and cemented in place. The casing's upper end is fastened to a system of pipes and valves called a wellhead, or "Christmas Tree," through which natural pressure forces the oil or gas into separation and storage tanks. If natural pressure is not great enough to force the oil to the surface, pumps may be used. In some cases, water, steam, or gas may be injected into the oil-producing formation to improve recovery.

Crude oil is transported to refineries by pipeline, ship, barge, truck, or railroad. Natural gas is usually transported to processing plants by pipeline. While oil refineries may be many thousands of miles away from the producing fields, gas processing plants usually are near the fields, so impurities—water, sulfur, and natural gas liquids—can be removed, before the gas is piped to customers. The oil refining industry is considered a separate industry and its activities are not covered here, even though many oil companies both extract and refine oil.

The oil and gas extraction industry has experienced both "boom" and "bust" in recent years. During the 1970s and early 1980s, the price of crude oil rose sharply, stimulating domestic exploration and production. Between 1970 and 1982—the year industry employment peaked—this industry created 438,000 jobs, a percentage increase that was more than four times greater than that of the economy as a whole. Employment rose twice as fast in the oil and gas field services segment than in crude petroleum, natural gas, and natural gas liquids segment, reflecting the fact that most exploration and drilling is done on a contract basis.

Starting in 1982, oil-producing countries around the world began yielding much larger volumes of crude oil, driving prices down, culminating in the collapse of oil prices in the mid-1980s. During this time, the industry experienced a sharp decline in domestic exploration and

production and an extended period of downsizing and restructuring, losing almost 390,000 jobs from 1982 to 1995. As was the case during the boom period, employment in oil and gas field services changed more than employment in crude petroleum and natural gas production.

Exercise 1. *Translate into English:*

Обеспечивая топливом наши дома, рабочие места, фабрики, транспорт; этот метод снижает риск, связанный с разведкой; для поддержания бурового оборудования; долото пробуривает скважину в земле, измельчая и разрезая породу; его предназначение – охладить долото; образовать глинистую корку на стенках скважины; могут быть использованы насосы; подъем и спад, эта промышленность создала 438000 рабочих мест, в четыре раза больше, намного большие объемы сырой нефти, разведка и бурение осуществляется на контрактной основе, промышленность претерпевала резкий спад.

Exercise 2. *Fill the gaps:*

1) They … the raw material for plastics, chemicals, medicines, fertilizers and synthetic fibers.
a) contain b) provide c) make

2) Computers and advanced software … seismic data to provide 3 – dimensional models of subsurface rock formations.
a) classify b) measure c) analyze

3) Another method of … for oil and gas is based on collecting and analyzing core samples of rock, clay and sand in the earth ‘s layers.
a) exploring b) searching c) drilling

4) After … studies indicate the possible presence of oil, an oil company selects a well site and installs a derrick.
a) geologic b) scientific c) seismic

5) Most land and offshore drilling is done by …
a) specialized workers b) scientists c) contractors

6) Drilling mud is … of clay, chemicals, and water.
a) a mixture b) a substance c) a stuff

Exercise 3. *Write down definitions to the words and check yourself (Appendix 3):*

oil; pore; rock; oil field; oil well; sediment; drill; refinery

Exercise 4. *Answer the questions:*

a) How is petroleum formed?
b) Is natural gas often found in separate deposits?
c) What are key activities in the oil and gas extraction industry?
d) What do specialized workers search for?
e) What is seismic prospecting?
f) When does an oil company select a well site?
g) What techniques are used in offshore drilling?
h) What is the purpose of the drilling mud?
i) What has advanced drill bit technology?
j) How does drilling begin?
k) When are pumps used?
l) Is oil refining industry considered a separate industry?
m) What has the oil and gas extraction industry experienced in recent years?

Exercise 5. *Write down the annotation.*

Text 3:

WORKING CONDITIONS

Working conditions in this industry vary significantly by occupation. Jobs as roustabouts and other production workers may involve rugged outdoor work in remote areas in all kinds of weather. For these jobs, physical strength and stamina are necessary. This work involves standing for long periods of time, lifting moderately heavy objects, and climbing

and stooping to work with tools that are often oily and dirty. Executives generally work in office settings, as do most administrators and clerical workers. Geologists, engineers, and managers may split their time between the office and the job sites, particularly while involved in exploration work.

Only 1 employee in 20 works fewer than 35 hours a week, reflecting few opportunities for part-time work. In fact, a higher percentage of workers in this industry work overtime than in all industries combined. The average nonsupervisory worker worked 42.7 hours per week in 1998, compared to 34.6 hours for all workers.

Oil and gas well drilling and servicing can be hazardous. However, in 1997, the rate of work-related injury and illness in the oil and gas extraction industry, as a whole, was 5.9 per 100 full-time workers, somewhat lower than the 7.1 for the entire private sector. The rate for workers in oil and gas field services, 8.7 per 100 full-time workers, was nearly five times higher than for workers in crude petroleum and natural gas, which was only 2.0.

Drilling rigs operate continuously. On land, drilling crews usually work 6 days, 8 hours a day, and then have a few days off. In offshore operations, workers can work 14 days, 12 hours a day, and then have 14 days off. If the offshore rig is located far from the coast, drilling crew members live on ships anchored nearby or in facilities on the platform itself. Workers on offshore rigs are always evacuated in the event of a storm. Most workers in oil and gas well operations and maintenance or in natural gas processing work 8 hours a day, 5 days a week.

Many oil field workers are away from home for weeks or months at a time. Exploration field personnel and drilling workers frequently move from place to place as work at a particular field is completed. In contrast, well operation and maintenance workers and natural gas processing workers usually remain in the same location for extended periods of time.

Exercise 1. *Choose the right variant:*

1) This work involves standing for …periods of time.
a) longer b) the longest c) long

2) Oil and gas well drilling and servicing can be …..
a) hazardous b) more hazardous c) the most hazardous

3) The rate for workers in oil field services was nearly five times … than for workers in crude petroleum.
a) more high b) higher c) highest

4) Workers have to lift moderately … objects.
a) heaviest b) heavier c) heavy

Exercise 2. *Retell the text.*

Watch the video "The largest oil rig in the world"
https://youtu.be/eMX8BEWMtlw

Exercise 1. *Watch the first part of the video (00.00-05.10) once more and fill the gaps:*

On the 1._____ of the Gulf of Mexico engineers are building a technological masterpiece called Perdido - 45,000 tons of steel be transformed into the most advanced 2._____ in the world. This rig will plunge its 3._____ nearly three kilometers down to the sea

floor, a giant in the extreme world of 4._____ engineering. The eighth of August 2008, today is a big day for the builders of Perdido. They are moving the bottom half of their oil rig from the construction dock in Texas out into the ocean. 18,000 tons of metal will travel 300 kilometers into the Gulf of Mexico. Here it will form the base for a state-of-the-art 5._____ oil rig that will tap into three newly 6._____ oil fields. Perdido is expected to produce enough oil every day to fill up a hundred and fifty thousand cars with 7._____. When it comes 8._____, it will reach deeper into the sea than any other oil rig on the planet.

Oil has been the engine of the world economy for over a century but hardly ever without an 9._____ on the 10._____. In eighteen eighty four the great American oil rush profoundly alters the sleepy town of St. Marys' in Ohio. The lure of a quick fortune brings in a flood of would-be Rockefellers. Within a few months they completely transform the 11._____. Oil rigs spread across the plain to extract the black gold from an 12._____ over 300 meters below. But one day their relentless march comes to a grinding halt at the shores of Grand Lake. It is only three meters deep but it becomes a big obstacle for the13. _____. Engineer Ed McCann demonstrates why. "It's curious but drilling in the olden days didn't actually involve drills we imagine spinning around. They used 14._____ techniques, banging and if we have a look at this, you'll see that all they really did 15._____ was they lifted a wire with a point on it and let it fall onto the 16._____. Then they do it again. And if we look closely at this what we can see is that we're making a tiny little chip every time. And the answer is in lore. But once you've got this mechanized you can do up to 10 meters a day like this which was plenty and adequate. Now once they moved this sort of operation out over water and they started looking for stuff that was underneath water, they found themselves in a whole new ballpark. So here we've got a tank of water and we're going to give our percussion drilling another try. I lift up the 17._____ and I drop it and you can see immediately it's not going nearly as fast through the water. The other thing that's happening is it doesn't go down straight, it tends 18._____ and this is essentially because the water provides more 19._____ to the falling pile hammer than air. And frankly I can carry on doing this the rest of time and I wouldn't dig a very big hole.

Fortunately there is a solution and is this. So the way that this works is the sleeve, it’s basically pushed down into the soil so it forms a 20._____ there. And you pump the water out and the pile hammer is then able to act as if it was in dry air. So let's see what happens. I've got my tube here and we can see pretty much straight away that it backs towards the full velocity that we had when it was in open air and what's more it’s here, right on the spot.

Exercise 2. *Fill the gaps with the correct form of the verb, active or passive, or participle. Then watch the next part of the film (05.10-15.17) and check:*

While the base of the Perdido rig is still on its way to the oilfield, an exploratory drilling rig the Clyde Boudreaux 1._____ (prepare) the ground at the site. Perdido 2._____ (tap) into 35 different wells and the men on the Clyde Boudreaux are pre-drilling 22 of them. The Clyde Boudreaux 3._____ (have) a drill with a twist in its tail. As it plows through the rock under the rig there comes a point where it 4._____ (need) to change course. Operators on the surface remotely 5._____ (activate) a motor in the drill pipe which bends its sideways and pushes it out horizontally. This way the Clyde Boudreaux 6._____ (build) a web of oil wells that extends to the farthest reaches of the oil fields 20 kilometers across. The Clyde Boudreaux’s drilling crew can drive through over 300 meters of rock every day. Since the rig started work, its drills 7._____ (turn) 24 hours a day, seven days a week. After three days at sea the base of Perdido arrives at the oil field. Now the crew get ready for the next stage of the operation. Today they will install the bottom half of the rig called the spar. “On Perdido we 8._____ (decide) to build a spar because that would give us the stability that we needed and this part is basically a can. The problem with the can shape is that when it floats it wants the naturally float in this orientation, right, and we needed it to be in this orientation”. The crew 9._____ (face) the mammoth task of appending 18,000 tons of steel. They release the air from the flotation tanks and then pump seawater into the bottom end of the spar. This 10._____ (flip) the whole structure into an upright position and now they must attach it to the ocean floor thousands of meters below. Instead of driving impossibly long steel piles the engineers at Perdido use

ropes and chains to hold the rig in place. They need something to secure the ropes on the seabed. So they attach huge metal cylinders to the end of the ropes. Once these cylinders 11._____ (call) suction anchors reached the seafloor, the engineers used clever physics to drive them into the ground. “This is what's called a spot can or a suction anchor. It 12._____ (use) to secure oil rigs like the Perdido to the ocean floor but obviously it’s about 50 times the size. If I turn this vacuum pump, you see it creates suction. So I do the same in the water. I 13._____ (place) it on the ocean bed, which this represents, initially it only 14._____ (go) into this depth, hundreds of its own weight, so it's hard to getting into the ocean floor at all. But as I pump out the air and the water draws itself down in the ocean bed 15._____ (create) a firm anchorage. There is now secure. And obviously at about 20 feet diameter a group of those provide an extremely firm anchorage which would be almost impossible to pull out”. Suction anchors 16._____ (be) the perfect solution for anchoring deepwater platforms like Perdido. But activating a suction pump at the bone-crushing depths below the rig is impossible for human divers. So the engineers use robotic divers called ROVs to do the job. An operator four kilometers away 17._____ (maneuver) the ROV toward the suction anchor and 18._____ (attach) the pump. This removes the water and creates a vacuum that sucks the anchors down and locks Perdido’s foundations into the seabed. Although the Gulf of Mexico 19._____ (plague) by hurricanes there is a more insidious danger for Perdido 20._____ (lurk) under the surface. “Here in the Gulf we have to all survive that 21._____ (call) Loop current which is a big circular current in the gulf of Mexico where we get very high currents on the order of five or six feet per second and what that causes is it causes the spar in particular but any cylinder to vibrate in the current”. On the scale of Perdido this phenomenon could cause haven. Water seas forming and fast currents could make the rig's weigh nearly a hundred meters sideways and damage it. But Perdido 22._____ (use) a simple device to deal with currents, a thin strip of steel spiraling down its side 23._____ (call) a strake. Without it the swaying motion of the rig would pull on the drill pain. This could rupture the pipe and cause a disastrous oil spill. The strake also 24._____ (stop) the crew from getting seasick. Because Perdido is a floating rig the engineers 25._____ (not need) deep

sea divers to put it together. But today they 26._____ (face) the mother of all assembly jobs. They are about to lift the 9000 ton-platform deck called the topsides on to its base. The crane barge 27._____ (do) the deck lift is the most powerful of its kind in the world. It 28._____ (lift) many top sides in the Gulf but none as big and heavy as the Perdido deck. The engineers are confident that the barge is up to the task. But they can't be entirely sure. “The worst-case scenario is that we drop the top side. It 29._____ (happen) here in the Gulf of Mexico a number of years ago. There 30._____ (be) a heavy lift, topside and it 31._____ (build) after several years of construction and picked it up and it 32._____ (drop) to the sea floor”. With a price tag of several billion dollars dropping the top sides is not an option. So everything 33._____ (check) and (check) again. And then once more for good measure. Then the teams hold their breath as the operation begins. Crane lifts the top sides of its barge. Now it has to place the deck precisely on to the docking points on the platform base. After 10 hours the topsides is finally in place. One of the biggest lifts in history completed without a hitch. Once the bottom half is in the upright position it isn't very stable. As soon as the deck 34._____ (add) the rig gets very top-heavy and could easily flip. The solution is 13,000 tons of pulverized iron ore. This 35._____ (pump) into a tank at the bottom of the spar which gives Perdido an extremely low center of gravity so it 36._____ (become) impossible to flip.” We put that weight in the bottom of spar. It’s inherently stable. It’s not going to flip over or get out of alignment. Other floating structures are weight and stability. It is a real issue so when you put weight on one side of the platform you got to put ballast on the other side platform to make sure it 37._____ (not tip) over. We 38._____ (not have) that problem on the spar”.

Exercise 3. *Watch the last part of the film (05.07-19.43) and answer the questions:*

1. What happened in 1988?
2. How do you understand the phrase “Piper Alpha is a grim eye opener for the oil industry”?
3. What is the biggest danger to a steel structure and why?
4. What was the second can covered by?

5. How does it work?
6. What is crucial when oil platform is far from the coast?
7. Why is production side separated from the living quarters and how?
8. Name all safety precautions mentioned in the film.

Text 4:

Vocabulary notes:

fuel spill	утечка топлива
notify	уведомлять, объявлять, извещать
coast guard	береговая охрана
shoreline	береговая линия
source	источник, первопричина, начало
survey	осмотр, обследование
site	участок, местоположение
dig	копать
trench	котлован, канава
rope mop skimmer	нефтесборник
sop up	подбирать жидкость
sample	проба, образец
tank	бак, резервуар цистерна
mop up	вытирать, осушать
deploy	развертываться
monitor	контролировать, проверять
assess	определять
debris	обломки пород
custody	опека, попечение
leaching	выщелачивание, выщелачивающий

OIL SPILL IN GOODNEWS BAY

KODIAK, Alaska - Coast Guard investigators from Marine Safety Office Anchorage are currently looking for the source of a fuel spill that was discovered in Goodnews Bay, 100 miles west of Dillingham.

The Alaska Department of Environmental Conservation (ADEC)

notified the Coast Guard about the spill May 28. State representatives smelt a heavy odor and found extensive sheening along the shoreline and mud flats of Goodnews Bay, and also found significant amounts of fuel oil beneath the beach surface. The exact amount of fuel and source of the spill is still unknown.

Coast Guard representatives arrived in Goodnews Bay May 30 to begin their investigation. Following a beach survey, and determining that no archeological sites would be damaged, the Coast Guard hired a local contractor to dig a two-foot deep, 60-foot long trench to collect the oil and make clean up easier.

Clean-up workers from ADEC are expected to arrive in Goodnews Bay today with a rope mop skimmer and sorbent pads to begin sopping up the oil. Marine Safety Office investigators will continue to try and find the source of the spill. Oil samples are being collected from various fuel tanks around town. The samples will then be tested to determine if the spill is coming from any of those tanks.

Alaska Department of Environmental Conservation (ADEC) and U.S. Coast Guard personnel continue to mop up oil that was discovered leaching into the mud flats of Goodnews Bay, located about 100 miles west of Dillingham.

To date, two trenches have been dug where No. 1 diesel fuel, seeping in from an unknown source, is being contained. Skimmers, sorbent pads and sorbent boom have been deployed and no oil is reaching the waters of Goodnews Bay.

A rope-mop skimmer arrived Saturday at noon and was set up to collect oil from the first two-foot-deep, 60-foot-long trench. The oil was removed from the first trench Sunday at about 2 p.m. The skimmer has since been moved to the second trench to clean up oil collecting there.

Clean up workers drilled test holes above the area where the oil is leaking and discovered the oil is concentrated in an underground pocket that follows the contour of the ground. The pocket is located three to four feet beneath the surface and is about 20-25 feet wide. It is unknown, however, how long the pocket might be. The origin of the fuel has not been found.

Workers are careful not to disturb any archeological sites that may be in the area. An archeologist was hired to help monitor the clean-up area, but there is no evidence so far of any artifacts found in the spill area.

The ADEC reported the spill to the Coast Guard May 28. Pollution investigators continue to search for its origin.

Unified Command continues to monitor oil spill Federal and State agencies, together with a PEMEX representative. The Unified Command (consisting of 70 people from the U.S. Coast Guard, California Department of Fish & Game, and U.S. Fish & Wildlife) continued assessing the oil spill. PEMEX is Mexico's national oil company. A PEMEX representative arrived today and is working closely with the Unified Command to get a good picture of the situation both in the United States and Mexico. Communication between the Unified Command and PEMEX has been very productive. Shoreline assessment teams recovered one five-gallon bucket of oily debris from Imperial Beach today. The Coast Guard Marine Safety Laboratory in Groton, Conn., will analyze the oil and compare it to samples of oil from the PEMEX facility to determine the origin. SeaWorld activated a bird recovery unit and took custody of four oiled Western Grebes which were found today; three of those birds are stabilized, and one died. The Coast Guard will conduct another overflight over U.S. waters Sunday morning to reassess the situation. Current weather on scene shows winds at 10 knots from the south-southeast and swells from four to five feet. Shoreline assessment teams will be walking along the southern-most beaches early in the morning to take advantage of the low tide.

Exercise 1. *Translate into English:*

I. нефтяной разлив; источник разлива; тяжелый запах; большое количество мазута; образцы нефти; резервуар; персонал береговой охраны; пробные скважины; подземная ловушка; забота о птицах, вымазанных в нефти; ищут источник; прибыли, чтобы начать свое расследование; пробы берутся; ожидается, что они приедут; были выкопаны; был установлен, чтобы собирать нефть; сконцентрирована; неизвестно; тесно работают; проанализирует и сравнит; будут ходить вдоль берегов.

II. Точное количество мазута все еще неизвестно.
Представители береговой охраны прибыли в залив Гудньюз, чтобы начать свое расследование.

Они наняли местного подрядчика, чтобы выкопать котлован.
Образцы нефти собираются из разных резервуаров вокруг города.
Из первого котлована нефть была убрана около двух часов.
Источник мазута все еще не найден.
Объединенная команда состоит из 70 человек.
Они проанализируют нефть и сравнят ее с образцами нефти с оборудования ПЕМЕКСа.
Сотрудничество Объединенной команды и ПЕМЕКСа было продуктивным.
Все почувствовали тяжелый запах нефти.

Exercise 2. *Translate into Russian:*

extensive sheening; mud flats; archeological sites; a two-foot-deep, 60-foot-long trench; rope mop skimmer, clean-up workers; the origin of the fuel; a good picture of the situation; shoreline assessment teams; bucket of oily debris; a bird recovery unit.

Terminology of hydrocarbon explosions and fires:

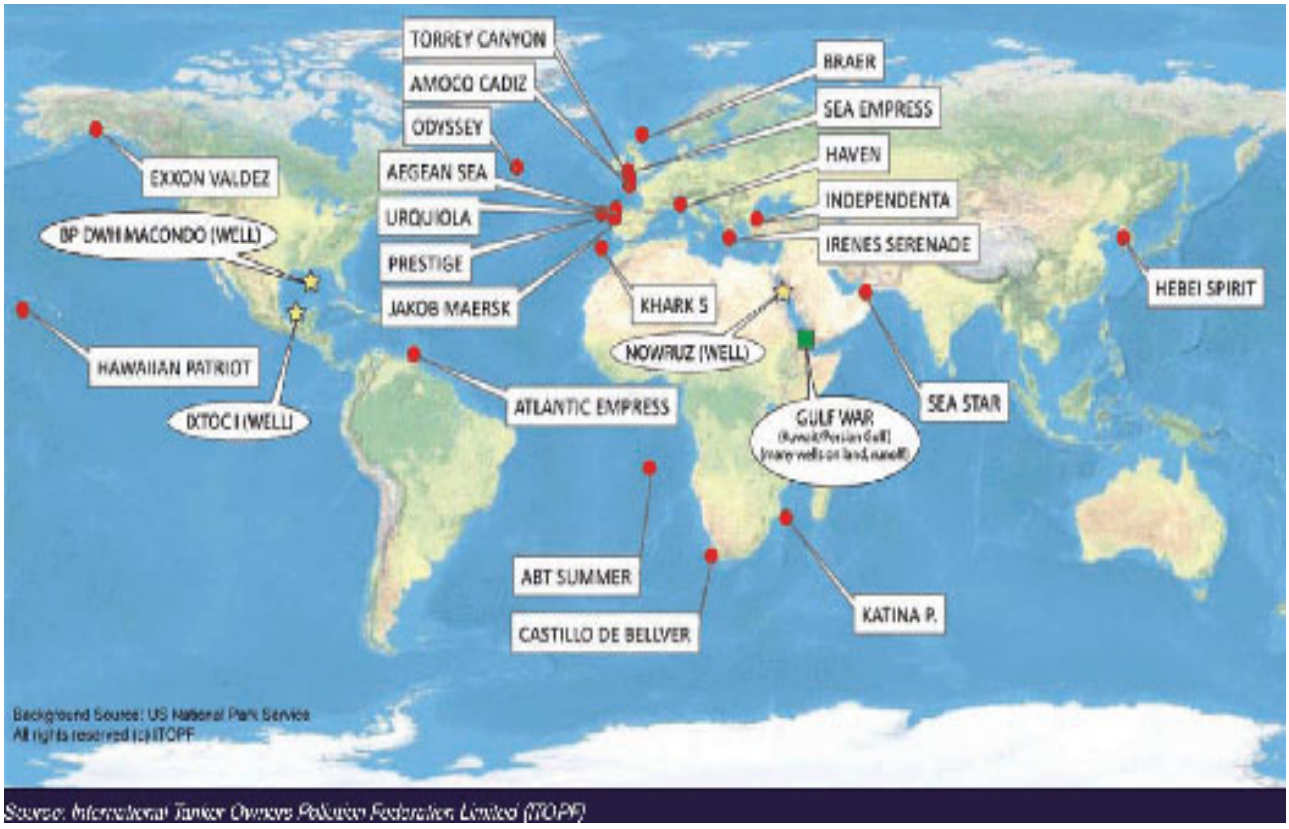
The following terminology is used in the description of the various fires and explosions that can occur at a hydrocarbon facility.
Blast - Is the transient change in gas density, pressure, and velocity of the air surrounding an explosion point.
Blowout - A blowout is a high pressure release of hydrocarbons, which may or may not ignite, that occurs when a high pressure oil or gas accumulation is unexpectedly met while drilling and the mud column fails to contain the formation fluid that is expelled through the wellhead bore.
Boiling Liquid Expanding Vapor Explosion (BLEW) - Is the nearly instantaneous vaporization and corresponding release of energy of a liquid upon its sudden release from a containment under greater than atmospheric pressure and at a temperature above its atmospheric boiling point.
Deflagration - Is a propagating chemical reaction of a substance in which the reaction front advances into the unreacted substance rapidly, but at a less than sonic velocity in the unreacted material.
Detonation - Is a propagating chemical reaction of a substance in which the reaction front advances into the unreacted substance at greater than

sonic velocity in the unreacted material.
Explosion - Is a release of energy that causes a blast.
Fireball - Is a rapid turbulent combustion of a fuel-air cloud whose energy is emitted primarily in the form of radiant heat, usually rising as a ball of flame.
Flash Fires - Is a fire resulting from the ignition of a cloud of flammable vapor, gas or mist in which the flame speed does not accelerate to sufficiently high velocities to produce an overpressure, because there is not sufficient congestion or confinement present to produce a high velocity flame speed.
Implosion - Is an inward rupture normally caused by vacuum conditions in a vessel or tank.
Jet or Spray Fires - Are turbulent diffusion flames resulting from the combustion of a liquid or gas continuously released under pressure in a particular direction.
Overpressure - Is any pressure relative to ambient pressure caused by a blast, both positive and negative, sometimes referred to as "psio".
Running Fire - Is a fire from a burning liquid &el that flows by gravity to lower elevations. The fire characteristics are similar to pool fires except it is moving or draining to a lower level.
Ruptures or Internal Vessel Explosions – are an catastrophic opening of a container (i.e., tank, vessel or pipe), commonly from overpressure or metallurgical failure, resulting in the immediate release of its contents.
Smoke – the gaseous products of the burning of carbonaceous materials made visible by the presence of small particles of carbon, the small particles which are of liquid or solid consistency, are produced as a byproduct of insufficient air supplies to a combustion process.
Spill or Pool Fire - Is a release of a flammable liquid and or condensed gas that accumulates on a surface forming a pool, where flammable vapors burn above the liquid surface of the accumulated liquid.
Vapor Cloud Explosion (VCE) - Is an explosion resulting from the ignition of a cloud of flammable vapor, gas or mist in which the flame speed accelerates to produce an overpressure.

Exercise 1. *Think of different situations in which these accidents may happen. Make up 5 sentences with new vocabulary.*

Exercise 2. *This is the list of accidents connected with oil industry. Choose one and make presentation or report which includes the following information: time, place, reason, damage, losses and environmental impact. What was done to improve the situation?*

The ABT Summer oil spill
The Deepwater Horizon oil spill
The Torrey Canyon Oil Spill
Amoco Cadiz Oil Spill
The Exxon Valdez oil spill
Alexander L. Kielland
Seacrest Drillship disaster
Ocean Ranger oil rig disaster
Glomar Java Sea Drillship disaster
Kaohsiung gas explosions



PART IV. INFORMATION TECHNOLOGIES IN SAFETY

Choose the correct word to fill the spaces.

1. Turn on your computer. It will usually take a few minutes to _____.
   a. boot itself **b.** boot up **c.** get booted

2. Windows XP, Macintosh OSX and Linux are _____.
   a. operating systems **b.** operating tools **c.** operators

3. On my computer, I have a picture of my cat as the _____.
   a. desktop background **b.** desktop picture **c.** desktop scene

4. Microsoft Word, Adobe Acrobat and CorelDraw are programs or _____.
   a. applicators **b.** appliers **c.** applications

5. To open Microsoft Word, click on the _____.
   a. picture **b.** symbol **c.** icon

6. I keep all my digital photos in a _____ called "Photos".
   a. folder **b.** packet **c.** box

7. Is it possible to open Microsoft Excel _____ in Word?
   a. texts **b.** files **c.** pages

8. In Microsoft Word, to start typing a new letter, open a new _____.
   a. document **b.** page **c.** paper

9. When you _____ a document, it's sent to the recycle bin.
   a. destroy **b.** erase **c.** delete

10. Deleted documents stay in the recycle bin until you _____ it.
a. wash **b.** empty **c.** clean

11. In Windows, the icon is just a _____ to the application. If you delete the icon, the application will still be on your computer.
a. connector **b.** shortcut **c.** link

12. If the computer crashes, you can try pressing the _____ button.
a. restart **b.** recommence **c.** replay

13. When I've finished using my computer, I always _____.
a. close it down **b.** shut it down **c.** shut it off

14. If I leave my computer on without using it, after a while it goes into _____ mode.
a. stand down **b.** waiting **c.** standby

Text 1:

HOW TO BECOME A PROGRAMMING EXPERT

Before reading the text fill the first column of the table:

	before reading	after reading
nature of work formal qualifications personal qualities technical skills how to get started how to make progress		

The primary requirements for being a good programmer are nothing more than a good memory, an attention to detail, a logical mind and the ability to work through a problem in a methodical manner breaking tasks down into smaller, more manageable pieces.

However, it's not enough just to turn up for a job interview with a logical mind as your sole qualification. An employer will want to see some

sort of formal qualification and a proven track record. But if you can show someone an impressive piece of software with your name on it, it will count for a lot more than a string of academic qualifications.

So what specific skills are employers looking for? The Windows market is booming and there's a demand for good C, C++, Delphi, Java and Visual the Basic developers. Avoid older languages such as FORTRAN and COBOL unless you want to work as a contract programmer.

For someone starting out, my best advice would be to subscribe to the programming magazines such as Microsoft Systems Journal. Get one or two of the low-cost 'student' editions of C++, Visual Basic and Delphi. Get a decent book on Windows programming. If you decide programming is really for you, spend more money on a training course.

Text 2:

5 FREE PERSONAL SAFETY APPS THAT CAN CALL FOR HELP

I've lived in "the big city" for all my life, and for the most part, I feel safe when I'm out for a night on the town. But traveling alone through certain areas, especially late at night, often makes me nervous. I'd feel a lot safer, generally, if there was someone there making the walk with me.

Thankfully, if you own a mobile device, you're never truly alone. If you have an ongoing concern for your personal safety, there are personal safety services that offer live monitoring, like the **Lively Wearable** ($49 on greatcall.com) with Greatcall's 5Star Urgent Response service that connects you to a 24/7 dispatch service starting at $15 per month. But if you just want a way to warn your contacts if you fail to check-in or otherwise need to send out an SOS, there's no need to pay. Here are 3 great free options for providing a little bit of extra piece of mind.

NOTE: If you believe yourself to be in a real emergency, your first line of defense should always be to contact emergency services at 911. No app is 100% foolproof, and cannot substitute for professional first responders.

bSafe

Personal safety app bSafe, a free download for both Apple iOS and Android devices, contains an incredibly wide set of personal safety features. It can be used to privately alert friends that you've arrived at your

destination, send info about your changing GPS location and even setup fake phone calls to slyly escape uncomfortable dates and similar situations.

When you need real help, bSafe offers an audible alarm and immediately starts broadcasting video captured by your phone and your GPS location. Information is continually collected and recorded, and is sharable with police should it prove necessary to do so. You can activate the alarm manually or you can use the Follow Me Timer mode, which which will automatically send an emergency SOS message if you don't check in before the timer runs out. This is great for late nights or a little extra safety on your morning run when you only want to disturb people in an emergency.

The one drawback is that friends and family you designate as your guardians all have to load the app and create a bSafe profile. The app is available on iTunes and Google Play.

Kitestring

Kitestring is a bit different: It’s a web-based service that checks in with you and sends an alert to pre-selected contacts should you fail to respond. Kitestring works through your inaction.

Kitestring check-ins are sent by SMS text, so the service works even with feature phones – you simply need to visit the free service’s website at kitestring.io. Once you have your phone set up, you can visit the Kitestring site to customize your SOS message and activate an SMS message broadcast that will be sent out in 30 minutes, 2 hours, 5 hours or 12 hours. Or, you can simply text the Kitestring service with the number of minutes in which to active your SMS broadcast. Once the time is up, you get a check in message and if for some reason you’re unable to respond to that text withing 5 minutes, Kitestring will let your contacts know. You can even set a check-in word and duress codes, so Kitestring will keep working even if someone else gains control of your phone.

You can learn more about Kitestring by visiting its website at kitestring.io.

Bugle

Created with input from Search and Rescue professionals, the Bugle app for iPhone is designed primarily for runners, hikers, cyclists and others that don't want to take their phone with them when they're out. Users set how long they're going to be gone and where they are going. If they don't check in within the time limit, their emergency contacts in their phone are

alerted by email and text.

This is not just for people outside exercising. It's perfect if you are going on a blind date, meeting someone from a Craigslist ad, or any activity where you are meeting a stranger and know when you'll be back.

Best of all? It's free. Get it on iTunes.

If you don't have an iPhone, check out HikerAlert.com. For $4.99 per year, this web-based service lets you set timers to alert friends and family via email and text if you don't return by your scheduled return time. Before leaving you can create a trip report from your profile, including planned campsites, your favorite trails, the equipment you carry and more. And mobile phone tracking enables you to leave a digital breadcrumb trail whenever you have cell service.

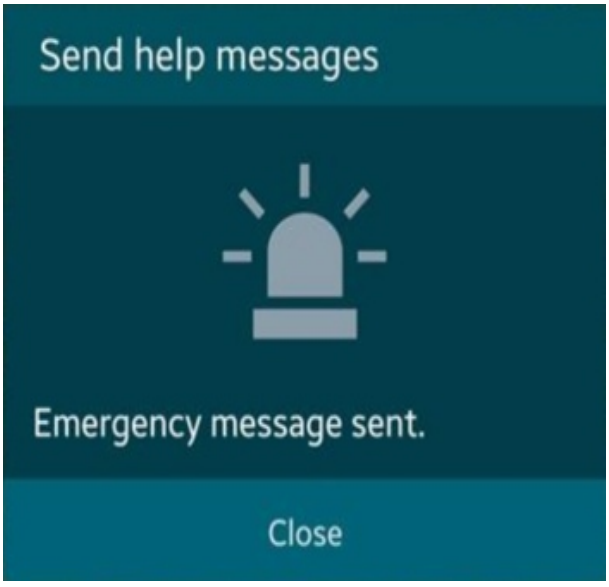
SafeTrek

The SafeTrek app is an emergency app that lets you alert the police when you are in an unsafe situation, but with a failsafe in case you don't need help. When you launch the app you place your thumb on the Safe button. If you release your thumb off the button you are asked to enter a 4-digit code. If you don't enter the code, the police are notified. If you do, nothing happens.

This is a good way to be ready in case the situation is questionable, but you don't know for sure it's time to alert the police. But if the situation gets dangerous, you can send out the call for help without being obvious about it.

The SafeTrek app is free on iTunes and Google Play.

Samsung Galaxy's "Safety Assistance"



The Samsung Galaxy S5, S6 and S7 and Note line of phones have a lot of great features. One of these, called "Safety Assistance," is a built-in emergency tool that lets you quickly notify pre-determined contacts that you may be in immediate trouble.

You can enable and configure Safety Assistance by tapping Settings > Quick Settings > Safety

Assistance > Send Help Messages. Once the feature is turned on, you can send an SOS alert by pressing your phone's lock button three times. Sent information can include a map of your location, photos from your phone's front and rear camera and a brief voice recording.

It's important to note that Samsung's Safety Assistance feature isn't a means of contacting 911 (text-based 911 isn't supported in all areas). You should also be aware that poor network conditions may delay or block these alerts.

Exersice 1: *Compare these Safety Apps, find out advantages and disadvantages.*

Exersice 2: *Write down 10 questions. Pay attention word order in question sentences.*

Watch the video "EmergenSee"
https://www.youtube.com/watch?v=HMNAEVegaLU:

It is the only Real-Time Mobile Security application that allows individuals to stream Live VIDEO, AUDIO, and GPS Locations & Movements to preselected contacts or public safety partners during times of distress. Simply tap the app and let EmergenSee's technology do the

rest. Responders (EmergenSee Partners) then can see, hear and track an incident in Real-Time to effectively reduce or eliminate the undesired situation.

Text 3:

APPLICATION OF AUTOMATION ROBOTICS IN INDUSTRY

Manufacturing is one of the most important applications for automation technology. There are several types of automation in manufacturing. The examples of automated systems used in manufacturing are described below.

Fixed automation, sometimes called "hard automation" refers to automated machines in which the equipment configuration allows fixed sequence of processing operation. These machines are programmed by their design to make only certain processing operations. They are not easily changed over from one product style to another. This form of automation needs high initial investments and high production rates. That is why it is suitable for products that are made in large volumes. Examples of fixed automation are machining transfer lines found in the automobile industry, automatic assembly machines and certain chemical processes.

Programmable automation is a form of automation for products in large quantities, ranging from several dozen to several thousand units at a time. For each new product the production equipment must be reprogrammed and changed over. This preprogramming and changeover take a period of non-productive time. Production rates in programmable automation are generally lower than in fixed automation, because the equipment is designed to facilitate product changeover rather than for product specialization. A numerical control machine-tool is a good example of programmable automation. The program is coded in computer memory for each different product style and the machine-tool is controlled by the computer programme.

Flexible automation is a kind of programmable automation. Programmable automation requires time to reprogram and change over the production equipment for each series of new product. This is lost production time, which is expensive. In flexible automation the number of products is limited so that the changeover of the equipment can be done

very quickly and automatically. The reprogramming of the equipment in flexible automation is done at a computer terminal without using the production equipment itself. Flexible automation allows a mixture of different products to be produced one right after another.

Translate the summary of the text into English:

Текст посвящен применению автоматизации в промышленности. Согласно автору, существует несколько типов автоматизации в производстве, такие как: фиксированная, программируемая и гибкая. Фиксированная автоматизация, как говорится в тексте, позволяет машинам выполнять запрограммированные операции по обработке изделий. Такие машины обычно используются для массового производства изделий. Автор указывает, что отличие программируемой автоматизации в необходимости повторного программирования после изготовления каждого нового вида изделия. В статье описывается применение такого оборудования для управления производством. В заключении характеризуется гибкая автоматизация и приводятся ее преимущества.

Text 4:

Before reading the text give the definition what a smart home is and guess why people want to have all these gimmicks.

WHAT IS A "SMART HOME"?

A smart home, or smart house, is a home that incorporates advanced automation systems to provide the inhabitants with sophisticated monitoring and control over the building's functions. For example a smart home may control lighting, temperature, multi-media, security, window and door operations, as well as many other functions.

In 2003 the UK Department of Trade and Industry (DTI) came up with the following definition for a smart home: "A dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored or accessed."

Smart homes use 'home automation' technologies to provide home owners with 'intelligent' feedback and information by monitoring many aspects of a home. For example, a smart home's refrigerator may be able to catalogue its contents, suggest menus, recommend healthy alternatives, and order replacements as food is used up. A smart home might even take care of feeding the cat and watering the plants.

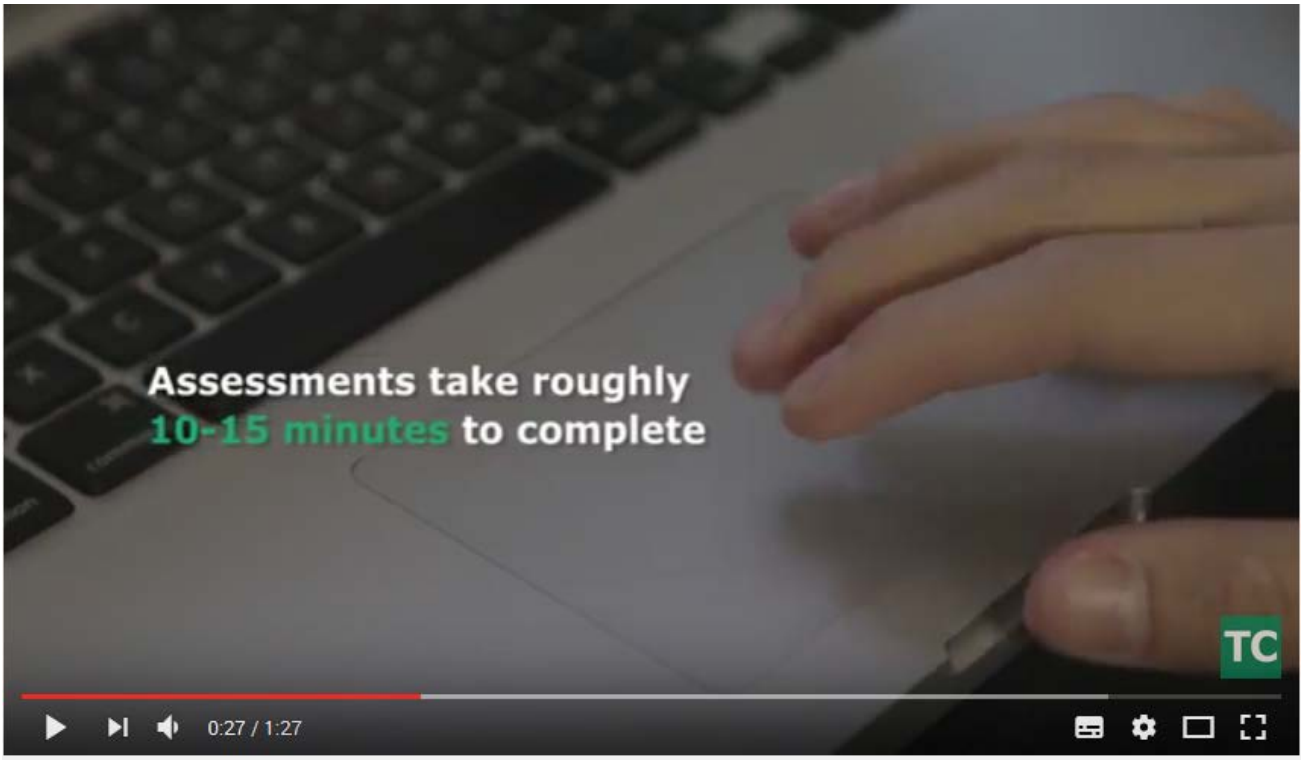
Many new homes are being built with the additional wiring and controls which are required to run advanced home automation systems. Retro-fitting (adding smart home technologies to an existing property) a house to make it a smart home is obviously significantly more costly than adding the required technologies to a new home due to the complications of routing wires and placing sensors in appropriate places.

Smart home devices and standards

The range of different smart home devices and technologies available is expanding rapidly along with developments in computer controls and sensors. This has inevitably led to compatibility issues and there is therefore a drive to standardise home automation technologies and protocols. In Europe, Installation Bus, or Instabus is becoming a recognised smart home technology protocol for digital communication between smart devices. It consists of a two-wire bus line that is installed along with normal electrical wiring. Instabus lines links appliances to a decentralised communication system and functions like a telephone line over which appliances can be controlled. The European Installation Bus Association is part of Konnex, an association that aims to standardise home and building networks in Europe.

Regardless of the technology, smart homes present some very exciting opportunities to change the way we live and work, and to reduce energy consumption at the same time. Imagine being able to check messages, open windows, operate lights and curtains and monitor how much money your house has made you from your renewable energy system, through your smart phone, from anywhere in the world!

Watch the video "Predict your next incident"
https://yandex.ru/video/search?text=predict%20your%20next%20incident%20youtube&path=wizard&noreask=1&filmId=1732608573009033 42:



Make word combinations from words below and fill the gaps. Check yourself (Appendix 4):

incidents, human, error, unsafe, drive, people, caused, 90% of incidents; human, anxiousness, acts, nearly, preventing, error

Research shows that can be……. attributed to some level of ……., with personality risk factors like "Distractibility", ……..., and "Impulsiveness" causing otherwise rational people to cause. …….. Safety Quotient™ helps identify those key "natural default" personality traits that …… to make unsafe decisions while offering actionable recommendations for …… through guided coaching and self-awareness.

PART V. FIRE SAFETY

Text 1:

COMBUSTION

Combustion is the process of oxidation: combining oxygen with another substance. An oxidation process happens very fast, so that light, heat and sound are released.

At the beginning the fire has no source of heat except the heat of ignition. The small number of oxidation reactions that occur at this point do not contribute much to the development of a fire. Therefore, this stage is called smoldering or the incipient stage; it gives off smoke but very little heat. Then the fire breaks into the open flame. Now there is a sufficient amount of heat to accelerate the combustion process and the chain reaction begins. This period is often called the open flame production phase. When the fire breaks into open flame the process changes. The fire will begin to spread and the temperature in the area will rise rapidly. As the ignition temperature of almost all ordinary carbonaceous materials is between 40 and 1400 degrees Fahrenheit we may assume that the fire will be generating enough heat to involve all the fuels unless some extinguishing agent interferes. This period is called the critical period or flashover stage. So there are three stages in the development of a fire.

After a fire goes to a flashover stage fire control is a combination of methods to remove the heat and products of combustion, to channel the direction of spread to the smallest possible area of involvement, and to cool off the atmosphere or fuel so that combustion ceases. This requires keen insight into the combustion process.

Fire or combustion may be defined as a rapid chemical reaction between substances in which heat and light are evolved. It is usual to speak of one of the substances as the combustible and other as the supporter of combustion. In all ordinary fires the supporter of combustion is the oxygen of the atmosphere. In some limited circumstances other gases, e.g. chlorine, may support combustion.

The fire triangle identifies the three needed components of fire: fuel, heat and oxygen. Fuel is something which is capable of combining vigorously with oxygen, or in other words, will burn. Combustion will be fiercer as the more oxygen is supplied. Most materials require the application of heat in one form or another to bring them to the temperature at which they will combine with the oxygen so vigorously that they will ignite (ignition temperature) although some substances, e.g. phosphorous react so at ordinary temperature. All three components must be present to have a fire.

It is not necessary usually to heat all the fuel to its ignition temperature, because as one part of it ignites, the heat of the reaction is sufficient to raise the temperature of the adjoining parts so that they also ignite, and so on until the reaction has spread through the whole fuel.

Fire will burn until one or more of the components are removed. Traditional fire extinguishing methods involve removing the fuel, heat or oxygen. In more recent years a fourth component – the chain reaction has been added to explain fire. Once a fire has started, the resulting chain reaction sustains the fire and allows it to continue until or unless at least one of the elements of the fire is removed. In other words, the chain reaction provides the heat necessary to maintain the fire. The addition of this forth component forms what is called the “fire tetrahedron”.

Exercise 1. *Translate into English:*

Горение; вещество, поддерживающее горение; горючий; развитие; горючее, топливо; выделять; гореть; зажигать, воспламеняться; зажигание, воспламенение; источник зажигания; распространение; распространяться; достаточный; скорость; повышение, подъем; возрастать, повышаться; поднимать, повышать; тлеть; начальный; пламя; вспыхнуть; дым; полный охват помещения огнем, искровой разряд; удалять; цепь; цепная реакция; сильный, бурный, энергичный; тушить; метод тушения огня; охлаждать.

Exercise 2. *Answer the following questions:*

1. What is oxidation?
2. How many stages are there in the development of a fire?

3. What is the first stage of fire development?
4. What sources of heat does the fire have at the beginning?
5. What is the second stage of fire development?
6. How will the temperature in the fire area rise when the fire breaks into open flame?
7. What is the third stage of fire development?
8. What is called combustion?
9. What is evolved during the process of combustion?
10. What is the usual supporter of combustion?
11. What substances are called combustible?
12. What requirements are necessary for combustion?
13. What do most materials require to bring them to their ignition temperature?
14. Is it necessary to heat the whole of the fuel to its ignition temperature to start a fire? Why?
15. What should be done in order to extinguish a fire?
16. What is fire tetrahedron? What elements does it include?

Watch the video "Flashover"
http://www.youtube.com/watch?v=GPweBlXNfxo:

Decide if the following statements are true or false. Correct the false ones:

1. The fire in the video is a planned one.
2. It is possible to survive flashover.
3. The house has neither a smoke alarm nor a fire sprinklers system.
4. The fire started in the living room.
5. If you discover a fire you should call the fire department first and then leave the house.
6. Home fires are typically reported some time after the fire starts.
7. Firefighters usually arrive ten minutes after the fire has been reported
8. There is a fire sprinkler on the wall in the room on the left.
9. The fire didn't do much damage in the left room.
10. The room on the right combusts in flashover in twenty seconds.
11. The purpose of the video is to show lifesaving effectiveness of fire sprinklers.

Text 2:

Vocabulary:

1. to denote	– обозначать, означать
2. liquefiable	– сжижаемый
3. to reach	– достигать
4. suitable	– подходящий, годный
5. extinction	– тушение пожара
6. compound	– соединение, смесь; составной, сложный
7. to take place	– происходить
8. jet	– компактная струя
9. spray	– водяная пыль (распыленная струя)
10. to choose	– выбирать
11. to cool	– охлаждать
cooling	– охлаждающий; охлаждение
12. quantity	– количество
13. sand	– песок

14. foam – пена
15. vaporizing – парообразующий
16. blanketing – покрытие, покров
17. dry powder – сухой порошок
18. live – находящийся под напряжением
19. exception – исключение
20. nozzle – насадок, ствол
21. electrically dead – обесточенный
22. to apply – применять, употреблять, обращаться
23. available – имеющийся в распоряжении
24. flexible – гибкий, податливый
25. to decompose – разлагаться,
26. to liberate – освобождать
27. to aggravate – ухудшать

CLASSES OF FIRES

In firefighting, fires are identified according to one or more fire classes. Each class designates the fuel involved in the fire, and thus the most appropriate extinguishing agent. Multiple classification systems exist in different countries.

The United States uses the NFPA (National Fire Protection Organisation) system. The NFPA defines five classifications of fire, including classes A, B, C, D and K according to the nature of the combustible materials, the size and intensity of the fire and the substances which are the most suitable for their extinction.

Class A is the most common type of fire involving ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics. This type of fire leaves an ash behind after burning and has an ember flame. The most common and the most effective extinguishing agent for them is generally water in the form of a jet or a spray. Water is used in a cooling or quenching effect to reduce the temperature of the burning material below its ignition temperature.

Class B fires are the ones involving liquids or liquefiable solids. A

flammable liquid must be burning at room temperature in order to be a Class B fire, and a combustible liquid must be heated to its flammable point to be classified as Class B. Some flammable and combustible liquids included in this classification are petroleum, tars, oil-based paints, oil, alcohols, lacquers, solvents and flammable gases. For the purpose of choosing effective extinguishing agents, flammable liquids may be divided into two groups:

– those that are extinguished with water;

– those that are not extinguished with water.

Depending on a liquid, the extinguishing agents include water spray, foam, vaporizing liquids, carbon dioxide and dry powder. Blanketing is the most suitable method of extinguishment of this class of fires.

A Class C fire is a fire that can be classified as an A or B fire, but that involves electrical equipment as well. Extinguishing agents should not be conductors of electricity. Water and foam are both conductors of electricity and should not be used on live electrical equipment, but in some circumstances an exception may be made in favour of a spray from specially designed nozzles. It is not always possible to extinguish a fire without using the cooling effect of a large quantity of water. In such cases equipment must be made electrically dead before jets of water are applied in order to avoid the danger of shock.

Class D fires are ones involving combustible metals such as magnesium, titanium, lithium, zirconium, sodium, and potassium. Extinguishing agents containing water are ineffective and even dangerous. A Class D fire burns at an exceptionally high temperature, and when water is used on these types of fires it can decompose into hydrogen and oxygen aggravating the fire. Special extinguishing agents such as sodium chloride, carbon dioxide, dry sand or salt are available for the fire control specifically for each metal.

Class K is the newest NFPA classification of fire. This classification includes cooking appliances that involve a combustible medium such as cooking oil, other fats and alcohols. Though such fires are technically a subclass of class B, the special characteristics of these types of fires are considered important enough to recognize separately. Saponification can be used to extinguish such fires.

Exercise 1. *Substitute the underlined words with the synonyms from the text:*

1. In fire extinction fires are usually classified by the type of fuel that ignites and the appropriate extinguishing ingredient.
2. There are various classifications of fires, for example the NFPA classification is applied in the US.
3. Water is used in firefighting as a jet or spray to decrease the temperature of burning substances.
4. Some flammable liquids belonging to this class involve petroleum, tars, oil-based paints, oil, etc.
5. All flammable liquids may be put into two groups.
6. According to a liquid a particular extinguishing media may be used.
7. Before extinguishing a class C fire make sure the equipment is de-energized.
8. A class D fire burns at a very high temperature.
9. Water may break down into hydrogen and oxygen intensifying the fire.
10. Special features of class K fires let us consider them as a separate group.

Exercise 2. *Answer the following questions:*

1. What classification of fires is used in the United States of America?
2. According to what principle are fires classified?
3. How many classes of fires are there in the NFPA classification at present?
4. What combustible materials does class A fire involve?
5. What is the most effective extinguishing agent for class A fires?
6. What is the most common type of fire?
7. What are class B fires?
8. What combustibles do class B fires include?
9. What extinguishing agents are used to put out class B fires?
10. What are class C fires?
11. What combustible do class C fires include?
12. Why is it dangerous to use water for the extinction of class C fires?
13. What should be done before starting the extinction of class C fires?
14. What combustible materials do class D fires involve?

15. Why water is not used for the extinction of class D fires?
16. What is the most suitable extinguishing agent for class D fires?
17. What are class K fires? Why are they singled out in a separate class?
18. What methods of extinction are used for fires of different classes?
19. Is the classification of fires the same in different countries? What classes of fires are identified in Russia?

Watch the video "Flammables and Explosives in the Laboratory" http://www.youtube.com/watch?v=6693BvJoKQI). After watching to complete the parts:

Fill the gaps:

Part 1
A flammable can be simply described as a (1) ___ that will readily catch fire and (2) ___. Silane is a commonly used flammable substance. There can be two identical amounts sitting side by side in identical dishes, yet one will (3) ___, the other one won't. The reason is the silane that (4)___ was (5) ___ by dry ice, the other one was (6) ___ to just over 81° F, the flashpoint of silane.
Flashpoint is the lowest temperature at which a substance (7) ___ __ a vapour that will burn. One of the first things you need to(8) ___ when you're dealing with (9) ___ and (10) ___ is that it's the vapour that the

substance gives off that burns not the substance itself. Flammables and explosives are two classes of materials that can always be (11) ___: well, flammables can ignite and burn, explosives are a subject of a very rapid (12) ___ reaction or (13) ____ and can (14) ___ gas and heat with potentially violent results. Flammables and explosives are both (15) ___ that you ought to be very careful with.

Part 2
Let's look at another (1) ___ flammable material – gasoline. Its (2) ___ ignite easily at temperatures as low as negative 45° F and even when it's at its (3) ____ and a (4) ___ is created gasoline may not (5) ____ (6) ____. Whether it does, will depend on a gasoline's fuel – air mixture and limits of flammability. Materials have both lower and upper limits of flammability. A substances' (7) ___ flammability limit is the minimum percentage of vapour to air that required for ignition to (8) ____ ___ . The (9) ____ flammable limit is the percentage of the vapour to air beyond which ignition is no longer (10) _____.

Text 3:

Vocabulary:

1. to attempt	– пытаться;
an attempt	– попытка
2. removal	– изъятие, удаление, отвод
starvation	– удаление горючего материала
withdrawal	из зоны горения
3. to cause	– заставлять, причинять
a cause	– причина
4. to go out	– затухать, гаснуть
5. smothering	– изоляция
6. to deprive	– лишать
7. to eliminate	– устранять, исключать
8. effort	– усилие
9. a means (pl. means)	– средство
10. to rely on (upon)	– полагаться на
11. to expose	– подвергать

12. cooling – охлаждение
13. damage – потеря, ущерб
14. to surround – окружать
15. spill – разлив
16. to wrap – обертывать, заворачивать
17. to dissipate – рассеиваться, разгонять
18. to displace – вытеснять, заменять, замещать
19. propagation – распространение
20. to reduce – уменьшать
21. blanket – теплоизоляционное покрытие
22. oxidizer – окислитель
23. to sustain – поддерживать
24. to suspend – исключать, временно отстранять
25. heat exchanger – теплообменник
26. to supply – доставлять, поступать
a supply – поступление
27. to prevent – предотвращать

FIRE EXTINGUISHMENT

As such factors as heat, fuel, oxygen, and chain reaction are necessary for fire, it follows that the withdrawal of any of them will cause the fire to go out. So the theory of fire extinguishment is based on removing any one or more of the four elements in the fire tetrahedron to suppress the fire. Before attempting to extinguish a fire, the fireman must decide which of the factors he will try to remove. Efforts directed at removing the fuel are sometimes called starvation; depriving the fire of oxygen is known as smothering or blanketing and reducing the temperature is known as cooling.

It is often possible to use more than one method at the same time, in fact most means of extinguishment do so, although they are classified under the method on which they principally rely.

Removal of Fuel. This method is applied by removing from the neighbourhood of the fire such combustible materials which can be

removed. It is often possible to transfer stock or other contents from the parts of a burning building to a safe place. When dealing with flammable liquid fires, valves can be shut off and storage vessels pumped to safe areas to help eliminate the supply of fuel to the fire. Flammable gas fires are completely extinguished by shutting off the fuel supply. These and similar actions may be of great value in reducing the potential damage, but they do not generally provide positive action against fire. Moreover, under many circumstances, it is not practical to attempt to remove the fuel from the fire. Smothering or cooling is usually more useful.

Smothering or blanketing. This is an attempt to reduce the supply of oxygen necessary for the fire. A reduction of the proportion of oxygen in the atmosphere from the normal 21% to less than 15% will extinguish most fires, but in some cases the percentage of oxygen must be reduces as low as 0%. When the burning material, e.g. celluloid, includes in its chemical composition sufficient oxygen for its combustion, smothering is, of course, ineffective. Examples of smothering include the use of sand to cover small fires of spilled oil and wrapping a blanket around a person whose clothing is burning. Inert gases or vapours may be used to displace the air surrounding a fire or to reduce the oxygen content of the atmosphere below the level required for combustion to continue. Such a "blanket" is, of course, a temporary one because the gases tend to be dissipated by the convection currents set up by the heat of the fire or in the open air by droughts. Carbon dioxide, carbon tetrachloride, methyl bromide and chlorobromomethane are the extinguishing agents usually used in this case.

Cooling. In order to remove the heat, something must be applied to the fire to absorb the heat or act as a heat exchanger. Water is not the only agent used to accomplish this, but it is the most common. This is possible through water's ability to absorb massive amounts of heat by converting water to water vapor.

Interruption of Chain Reaction. Modern extinguishing agents, such as dry chemical and halons, have proven to be effective on various fires even though these agents do not remove heat, fuel, or oxygen. Dry chemical and halogenated agents are thought to suspend "free radicals" that are created in the combustion process and thus prevent them from continuing the chain reaction.

Exercise 1. *Match the words with similar meanings:*

1) withdrawal	A) possible
2) to keep from	B) fireman
3) firefighter	C) to try
4) because	D) to continue
5) potential	E) removal
6) to suspend	F) to prevent
7) to go on	G) blanketing
8) to take in	H) to bond with
9) smothering	I) as
10) to attempt	J) to absorb

Exercise 2. *Match the words with opposite meanings:*

1) to interrupt	A) less
2) possible	B to rise
3) to remove	C) useless
4) sufficient	D) temporary
5) permanent	E) to prevent
6) to reduce	F) impossible
7) to sustain	G) negative
8) useful	H) to supply
9) more	I) not enough
10) positive	j) to continue

Exercise 3. *Match the words to the definitions:*

1) a means 2) starvation 3) smothering 4) fire blanket 5) halon 6) free radical 7) heat exchanger 8) damage 9) cooling 10) temporary	A) a sheet of fire retardant material which is placed over a fire in order to smother it B) lasting only a while C) a gas that is made of carbon and one more halogens, used especially to put out fires D) a fire extinguishment method, depriving the fire of fuel E) the way by which something is done or obtained F) physical harm caused to something G) a fire extinguishment method, depriving the

	fire of oxygen H) a fire extinguishment method, depriving the fire of heat I) a piece of equipment built for efficient heat transfer from one medium to another J) a molecule with an unpaired electron that seeks another electron to pair and thus initiates a chain reaction

Exercise 4. *Answer the following questions:*

1. What factors are all attempts to extinguish a fire based upon?
2. What must a firefighter decide before attempting to extinguish a fire?
3. Is it possible to use more than one method of fire extinguishment at the same time?
4. What is called “starvation”?
5. What kind of fires can be completely put out by the removal of fuel?
6. Why is smothering more effective than starvation?
7. What is called “smothering” or “blanketing”?
8. How much should the proportion of oxygen in the atmosphere be reduced to stop the fire?
9. When is blanketing ineffective?
10. Can you give any examples of smothering?
11. What substances are used to smother the fire?
12. What is called “cooling”?
13. What is the most common substance used to cool off the fire?
14. How does water cool the fire?
15. What does it mean “to interrupt the chain reaction”?
16. What agents are used to break the chain reaction?

Text 4:

FIRE INVESTIGATION

Since Roman times, civil authorities have recognized the threat that fire represents. In the days of wooden walls and roofs and straw-covered floors, any fire could *ravage* an *entire* city. So, it was in the interest of all

concerned to investigate fires and establish how they began. Civil authorities attempted to control the fire risk by assessing penalties if an accidental fire was allowed to get out of control. The same *rationale* applies today. Fires of accidental cause need to be identified, so that dangerous practices can be *eliminated* by public education, or so that defective or dangerous products can be taken off the market. Fires of *incendiary* cause must be detected, so that the firesetter can be *intercepted* before doing more harm and punished. While fire investigation may appear to be a solution to the problem of fires and arsons, a number of major complications in this sphere exist.

A fire can be a complex event whose origin and cause are not obvious. The training and preparation of qualified investigators are often *costly* and *time-consuming*, requiring dedication to the profession over many years. In some fires, sufficient data to establish the origin and cause do not survive no matter how diligent the search or well prepared the searcher. The destructive power of the fire itself compromises evidence from the outset. The larger a fire becomes and the longer it burns, the less evidence of causation will remain. In case of major fires, representatives from law enforcement, fire, rescue, and emergency medical services; utility company other public agency personnel may conduct some obligatory official duties. The presence of so many people, in addition to members of the press and the public offers yet more chances for scene security to be *compromised* and critical evidence to be contaminated, moved, or destroyed.

Responsibility for the investigation of fires is *split*. While the fire service has the primary civil responsibility to establish a fire's cause, if the cause is accidental, the scene is released to the owner or the owner's insurance company for further examination. If the conclusion is that the fire was purposely set, a crime has been committed and law enforcement authority is needed to investigate the crime. Any such transfer may cause complications in establishing lines of authority.

A lack of *commitment* to conduct fire investigations exists on the part of some law enforcement and fire agencies. Because of the demand for rescue, emergency medical assistance, in addition to their traditional duties of fire suppression, fire departments often find themselves with fewer resources to stretch *to cover* all obligations. As a result, the less visible responsibilities of fire investigation and fire prevention are often *scaled*

back. Law enforcement agencies, facing similar overwhelming demands for their time, might prefer not to become involved.

Exercise 1. *Choose the correct meaning of the italicized words:*
1. The word "*ravage*" means (kill / destroy / put out).
2. The word "*entire*" means (whole / wooden / half).
3. The word "*concerned*" means (suffered / detected / interested).
4. The word "*rationale*" means (penalty / principle / law).
5. The word "*eliminated*" means (studied / explained / removed).
6. The word "*incendiary*" means (accidental / obvious / deliberate).
7. The word "*intercepted*" means (arrested / identified / fined).
8. The word "*costly*" means (cheap / expensive / difficult).
9. The word "*time-consuming*" means (long / fast / difficult).
10. The word "*compromised*" means (endangered / protected / moved).
11. The word "*split*" means (unidentified / shared / personal).
12. The word "*commitment*" means (willingness / agreement / duty).
13. The word "*cover*" means (report / ignore / do).
14. The word "*scaled back*" means (reduced / ignored / performed).

Exercise2. *Decide if the following statements true or false. Correct the false sentences:*
1. In ancient times fires could destroy the whole city because there was no professional fire service.
2. No punishment is imposed for accidental fire.
3. Firesetter is a person who accidentally starts the fire.
4. Accidental fires are caused by dangerous practices and defective equipment.
5. It is always easy to identify the origin and cause of any fire.
6. The training of a qualified fire investigator is very expensive and long.
7. The longer the fire burns the more data survive to establish the origin and the cause of it.
8. In case of a fire only firefighters usually arrive at the scene.
9. Too many people may damage the fire scene.
10. Only fire service is responsible for the investigation of fires.
11. Insurance companies investigate incendiary fires.
12. Some enforcement and fire agencies are not very eager to investigate fire because they are very busy with their primary duties.

Watch the video "Types of Fire Extinguishers"
http://www.youtube.com/watch?v=gjsoxjf3rd4):

After watching to complete the table:

Type of Fire Extinguisher	**Colour Code**	**Burning Material**
Water or Water with additive	_____	– flammable solids: _____, _____, _____, _____
_____ or ___	black	– _____: _____, oils, _____ – _____ and ____ equipment
Foam	_____	– flammable ____ and _____
_____	blue	– _____:_____,____ ,____ – _____:_____,____ ,____
Wet chemicals	_____	– – _____ liquids: cooking ___ and ___

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ПРИЛОЖЕНИЕ

APPENDIX 1

ELECTRONICS
Electronics is a new branch of physics, and one that plays an increasingly important part in our lives. It is concerned with the use of electricity to produce signals that carry information and control devices such as computers. These devices contain electric circuits through which electric current flows. The controlling parts in a circuit are called components, and these include diodes and transistors. Components can amplify currents, switch them on and off, or change their direction.

APPENDIX 2

An electric circuit is an unbroken conducting path from, and back to, a power supply. It has three main parts: the power supply, the conductor, and the load. The power is provided by a generator or battery, the conductor carries the current, and the load is an electric device such as a lamp.

APPENDIX 3

a hole that is dug in the ground to obtain oil;
solid matter that settles at the bottom of a liquid;
an area of land or sea under which there is oil;
stone or a type of stone that forms part of the Earth’s surface;
the thick, dark liquid from under the ground from which oil and petrol are produced;
a factory where oil is refined;
a small hole in the rock;
to make a hole in something using a drill bit

APPENDIX 4

Research shows that nearly 90% of incidents can be attributed to some level of human error, with personality risk factors like "Distractibility",

"Anxiousness", and "Impulsiveness" causing otherwise rational people to cause unsafe acts. Safety Quotient™ helps identify those key "natural default" personality traits that drive people to make unsafe decisions while offering actionable recommendations for preventing human error-caused incidents through guided coaching and self-awareness.

APPENDIX 5

Аннотация - краткая характеристика научной статьи с точки зрения ее назначения, содержания, вида, формы и других особенностей.
Аннотация выполняет следующие функции:

- дает возможность установить основное содержание научной статьи, определить ее релевантность и решить, следует ли обращаться к полному тексту статьи;
- используется в информационных, в том числе автоматизированных системах для поиска информации.

Аннотация должна включать характеристику основной темы, проблемы научной статьи, цели работы и ее результаты. В аннотации указывают, что нового несет в себе данная статья в сравнении с другими, родственными по тематике и целевому назначению.
Рекомендуемый средний объем аннотации 500 печатных знаков

Клише для аннотации на английском языке:
The article deals with …
As the title implies the article describes ...
The paper is concerned with…
It is known that…
It should be noted about…
The fact that … is stressed.
A mention should be made about …
It is spoken in detail about…
It is reported that …
The text gives valuable information on…
Much attention is given to…
The following conclusions are drawn…
The paper looks at recent research dealing with…
The main idea of the article is…

It gives a detailed analysis of…
It draws our attention to…
It is stressed that…
The article is of great help to …
The article is of interest to …
….. is/are noted, examined, discussed in detail, stressed, reported, considered …..

APPENDIX 6

Вступительная часть

- Good morning/afternoon/evening ladies and gentlemen
- My name is… I am ….
- Today I would like to talk with you about…. My aim for today's presentation is to give you information about…
- Please feel free to interrupt me if there are any questions. Or If you have any questions, please feel free to ask me at the end of the presentation.

Основная часть презентации

После вступительной части принято сообщить аудитории о том, как долго продлится презентация и обозначить ее основные пункты.

- First I would like to talk about….
- Then I would like to take a look at…
- Following that we should talk about…
- Lastly we are going to discuss…
- My presentation will last for ___minutes. Or We should be finished here by____o'clock.

Управление аудиторией

Крайне важно по ходу выступления акцентировать внимание аудитории на очередном пункте Вашего доклада. Это позволит Вам управлять вниманием слушателей, а также поможет им следовать логике Вашего рассказа.

- I'd like now to discuss…
- Let's move on to…
- Let's now turn to…

- Now we will look at….
- Let's move on to our next point…
- Firstly…/Secondly…/Thirdly…/Lastly…

Подведение итогов

В заключение прежде чем вам начнут задавать вопросы, вкратце подведите итоги своего выступления и обозначьте основные моменты. Такой шаг избавит Вас от лишних вопросов, и Вы еще раз сможете акцентировать внимание слушателей на ключевых моментах.

- I would like to sum up the main points again…
- I'd like to summarize our main points before your questions. So, in conclusion…
- Finally let me just sum up today's main topics…

Ниже приведены фразы, которые Вы можете использовать, если не уловили сути вопроса, заданного слушателем:

- I'm sorry could you clarify your question for me?
- If I've understood you correctly you are asking about…

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ENGLISH FOR SAFETY

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