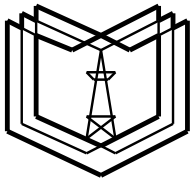

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ
ФЕДЕРАЛЬНОЕ
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«КАЗАНСКИЙ ГОСУДАРСТВЕННЫЙ
ЭНЕРГЕТИЧЕСКИЙ УНИВЕРСИТЕТ»

ENGLISH FOR ENERGY INDUSRTY

Учебное пособие для энергетических специальностей

Казань 2014

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
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А.Т. Галиахметова, Г.Ф. Лутфуллина

ENGLISH FOR ENERGY INDUSTRY

Учебное пособие
по дисциплине
«Иностранный язык»

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Г 15

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Цель данного пособия – выработать у студентов навыки чтения и перевода текстов энергетической тематики. Данное учебное пособие предусматривает представление материала по тематическому принципу на базе современных научно-популярных текстов.

Данное пособие может быть использовано в качестве основного или дополнительного при обучении студентов по энергетическим специальностям.

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ПРЕДИСЛОВИЕ

Целью данного учебного пособия является выработка у студентов навыков чтения и перевода текстов энергетической тематики. Современные тексты научно-популярного характера взяты из тематических изданий современных авторов.

Пособие состоит из 7 уроков. Каждый урок включает тексты, словари к текстам, задания после текстов, позволяющие определить уровень понимания, не прибегая к переводу. Специальные упражнения на перевод терминов обеспечивают адекватность их последующего употребления в речи.

Данное пособие может быть использовано в качестве основного или дополнительного при обучении студентов по энергетическим специальностям.

UNIT 1. POWER ENGINEERING

Text A. What is Engineering?

Read and translate the following text:

Engineering is the discipline, art, skill, profession, and technology of acquiring and applying scientific, mathematical,economic, social and practical knowledge, in order to design and build structures, machines, devices, systems, materials and processes.

The American Engineers' Council for Professional Development (ECPD) has defined ‘’engineering’’ as:

The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation and safety to life and property.

Engineering has existed since ancient times as humans devised fundamental inventions such as the pulley, lever, and wheel. Each of these inventions is consistent with the modern definition of engineering, exploiting basic mechanical principles to develop useful tools and objects.

The term *engineering* itself has a much more recent etymology, deriving from the word *engineer*, which itself dates back to 1325, when an *engine’er* (literally, one who operates an *engine*) originally referred to “a constructor of military engines.”

Active vocabulary

Nouns and noun phrases	
tool	инструмент
engine	двигатель
cognizance	знание
pulley	шкив
lever	рычаг
Verbs and verbal phrases	
to exist	существовать
to construct	построить
to operate	работать
to forecast	прогнозировать
to devise	разработать
to be consistent	быть последовательным
to derive	получить
Adjectives	

Creative	творческий
ancient	древний
useful	полезный
intended	предназначен
Adverbs	
as respect to	по отношению к

Text B. What is energy?

Energy lights our cities, powers our vehicles, and runs machinery in factories. It warms and cools our homes, cooks our food, plays our music, and gives us pictures on television.

Energy is defined as the ability or the capacity to do work. We use energy to do work and make all movements. When we eat, our bodies transform the food into energy to do work. When we run or walk or do some work, we 'burn' energy in our bodies. Cars, planes, trolleys, boats, and machinery also transform energy into work. Work means moving or lifting something, warming or lighting something. There are many sources of energy that help to run the various machines invented by man.

The discovery of fire by man led to the possibility of burning wood for cooking and heating thereby using energy. For several thousand years human energy demands were met only by renewable energy sources - sun, biomass (wood, leaves, twigs), hydel (water) and wind power.

As early as 4000-3500 BC, the first sailing ships and windmills were developed harnessing wind energy. With the use of hydropower through water mills or irrigation systems, things began to move faster. Fuel wood and dung cakes are even today a major source of energy in rural India. Solar energy is used for drying and heating.

With the advent of the Industrial Revolution, the use of energy in the form of fossil fuels began growing as more and more industries were set up. This occurred in stages, from the exploitation of coal deposits to the exploitation of oil and natural gas fields. It has been only half a century since nuclear power began being used as an energy source.

In the past century, it became evident that the consumption of non-renewable sources of energy had caused more environmental damage than any other human activity. Electricity generated from fossil fuels such as coal and crude oil has led to high concentrations of harmful gases in the atmosphere. This has in turn led to problems such as ozone depletion and global warming. Vehicular pollution is also a grave problem.

There has been an enormous increase in the demand for energy since the

middle of the last century as a result of industrial development and population growth. World population grew 3,2 times between 1850 and 1970, per capita use of industrial energy increased about twenty fold, and total world use of industrial and traditional energy forms combined increased more than twelvefold.

Due to the problems associated with the use of fossil fuels, alternative sources of energy have become important and relevant in today's world. These sources, such as the sun and wind, can never he exhausted and are therefore called renewable. Also known as the non-conventional sources of energy, they cause less emission and are available locally. Their use can significantly reduce chemical, radioactive, and thermal pollution. They are viable sources of clean and limitless energy. Most of the renewable sources of energy are fairly non-polluting and considered clean. However, biomass is a major polluter indoors.

Renewable energy sources include the sun, wind, water, agricultural residue, fuelwood, and animal dung. Fossil fuels are non-renewable sources. Energy generated from the sun is known as solar energy. Hydel is the energy derived from water. Biomass – firewood, animal dung, and biodegradable waste from cities and crop residues – is a source of energy when it is burnt. Geothermal energy is derived from hot dry rocks, magma, hot water springs, natural geysers, etc. Ocean thermal is energy derived from waves and also from tidal waves.

Through the method of co-generation a cleaner and less polluting form of energy is being generated. Fuel cells are also being used as cleaner energy source.

Total commercial energy consumption has been growing tremendously since the last decade. Per capita commercial energy consumption in low-income countries have more than doubled. About 15 % of the world's population living in the wealthy industrialized nations consume over half the energy used in the world. The number of motor vehicles in use worldwide has more than doubled since 1970.

In some respects, the global energy system has evolved in a cleaner direction in the last 25 years. The share of world primary energy derived from natural gas the cleanest fossil fuel - has increased by more than 25 %. So has the use and generation of renewable energy sources.

Still, the overall efficiency of energy production remains extremely low: on average, more than 90 % of energy consumed is lost or wasted in the process of conversion from raw materials such as coal to the final energy service such as the light to read a book. The main problem isn't that we use energy, but how we produce and consume energy resources. What we really need are energy sources that will last forever and can be used without polluting the environment.

Conserving energy has become the need of the day be it in the transport, household, or industrial sectors (source: www.howstuffworks.com)

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
fossil fuel	ископаемое топливо
fuel wood	топливная древесина
global warming	глобальное потепление
biomass	биомасса
renewable source	возобновляемый источник
ozone depletion	разрушение озонового слоя
natural gas	природный газ
coal deposit	месторождение угля
consumption	потребление
dung cake	навоз
power	мощность
exploitation	эксплуатация
oil, crude oil	нефть
hydropower	гидроэлектроэнергия
capacity	мощность
solar energy	солнечная энергия
biodegradable waste	биоразлагаемые отходы
conversion	преобразование
emission	эмиссия, выброс
residue	остаток
fuel cell	топливный элемент
co-generation	когенерация
arrigation	ирригация
vehicular	автомобильный
ability	способность
Verbs and verbal phrases	
to define	определить
to occur	происходить
to remain	остаться
to heat	нагревать
to harness	использовать

to generate	генерировать
to derive from	вывести из
to transform	преобразовывать
to exhaust	исчерпать
to reduce	уменьшать
to increase	увеличить
to combine	объединить
to power	обеспечивать энергией
Adjectives	
relevant	уместный
conventional	обычный
geothermal	геотермальный
tidal	приливный
nuclear	ядерный
harmful	вредный
available	доступный
Adverbs	
per capita	на душу населения
significantly	существенно
extremely	чрезвычайно, очень, крайне,
tremendously	чрезвычайно, невероятно

Comprehension check

1. ***Do you know what forms of energy are of the greatest demand currently? Try to guess the energy sources percent of total energy consumed.***

1) wind
2) biomass
3) coal
4) nuclear
5) oil
6) hydropower
7) other renewable
8) natural gas
9) uranium

2. Read the following international words and mind the stressed syllables.

electricity	transformation	geothermal
electrical	biomass	radioactive
nuclear	chemical	thermal
transform	hydropower	concentration
industrialization	potential	vibration
expertise	kinetic	compression
mechanical	gravitational	technology

3. Match the English and Russian equivalents.

a) biodegradable	1) ископаемое топливо
b) vehicular pollution	2) потреблять энергию
c) transverse waves	3) автотранспортные выбросы
d) fossil fuel	4) способствовать распространению
e) to cause emission	5) поперечные волны
f) ozone depletion	6) совместная выработка
g) co-generation	7) поддающийся разложению
h) to consume energy	8) истощение озонового слоя
i) civil engineering	9) в джоулях
j) in joules	10) гражданское строительство
k) to measure energy	11) британская тепловая единица
l) British thermal unit	12) измерять энергию

5. Decide whether the following statements are true or false according to the text.

1) The use of wind energy influenced the speed of moving.
2) Hydropower is a major source of energy in some countries.
3) Nuclear power has been used as an energy source for a century.
4) Vehicular pollution is considered to be a serious problem.
5) The discovery of fire by man was the first step to use energy.
6) The very first energy sources were renewable.
3)Industrial development and population growth results in increasing demand for energy.

7) The sun, wind, water are non-renewable sources.
8) Hydropower is energy derived from waves.
9) The use and generation of renewable energy sources have increased by more than 25 %

6. Complete the following sentences according to the text.

1) Work means … .
2) The consumption of non-renewable sources of energy causes … .
3) Energy is defined as …. .
4) Such sources as the sun and wind, can never be exhausted and therefore called … .
5) Renewable energy sources include … .
6) 15 % of the world's population in developed countries consume … .

7. Answer the following questions and give examples.

1) When did the use of energy in the form of fossil fuels begin growing? Why?
2) Why have alternative sources of energy become important and relevant in today's world?
3) What are non-conventional energy sources?
4) Why do we need energy?
5) When did people begin to use wind energy? Give the reason.
6) Where is geothermal energy derived from?
7) What method was used to generate a cleaner and less polluting form of energy?
8) What sources do we call non-renewable? Why?

8. What parts of the text can you define? Do they correspond to the paragraphs? Name each part.

1. _____ 4._____
2._____ 5._____
3._____ … _____

9. Write a summary of Text B.

The following text is in the jumbled order. Look at the plan of the text, read the paragraphs and number them in the correct order according to the plan.

Plan:

1) What does an engineer do?
2) Some examples of jobs that engineers do.
3) Environmental engineer.
4) Renewable energy engineer.
5) Sounds interesting, so how do I get into it?

Text C. Power engineering

Firstly, you need to consider whether you enjoy science and mathematics subjects, because many engineering and technology roles are based on science and mathematics principles. Depending on what kind of job you would like, you will probably need qualifications in these subjects. Qualifications in ICT and design and technology (D&T) are also extremely useful.

It may also be helpful to know that there are three nationally (and internationally) recognized professional levels that you can work towards. Each of these levels can be achieved by various routes of study - going to university to study an engineering course is just one of the many options available to you.

The word ‘’engineering’’ is likely to make you think of things like shipbuilding, ‘’engineering works’’ on the railway lines, or perhaps the mechanic that services or repairs your washing machine or car. In reality, engineering covers a far wider range of businesses and industries; not only building and transport structures, but also jobs in food, cosmetics, medicine and much more. Engineers work in all kinds of environments. There are still many jobs in traditional engineering sectors, but engineers are just as likely to work in offices, laboratories or studios, or outdoors, in the air and underground. Engineering today is closely linked with technology and many engineering roles now rely heavily on technological devices and the most recent technological advances.

The quality of the land, air and water around us is becoming increasingly important with the onset of climate change. Engineers are on the forefront of preserving our planet and ensuring that modern technology is kind to the world in which we live. Being an environmental engineer might mean that you have a special interest in ecosystems and biology, or other branches of engineering like civil engineering (buildings, roads and structures). People who deal in public health matters may also be environmental engineers, helping to ensure that our world is preserved for humans as well as for plants and animals.

Engineers are concerned with the production of energy through natural

resources such as the sourcing and use of wind, solar and wave power. They are involved in developing and maintaining power stations and the machinery used in alternative energy sourcing and production e.g. biofuel sourced from crops. Energy engineers construct equipment designed by engineering designers, and conduct testing and make modifications prior to installation and running. This involves extensive use of computer technology. They may work for industry, university or government research departments. They may hold senior positions, head up a team of energy engineers or have a key post in the team. Ultimately these engineers are focused on finding efficient, clean and innovative ways to supply energy to millions of households for years to come. Renewable energy is extremely important to the future of our planet and that's something that we'd all like to rely on.

Engineers influence every aspect of modern life and it's likely that today you will have already relied on the expertise of one or more engineers. Perhaps you've listened to an iPod? Or watched television? Did you wash your hair today? Do you use a bus on your way to the University? These have all been designed, developed and manufactured by engineers. Here are some examples of where engineers work to get you started (Большой иллюстрированный энциклопедический словарь, М., 2004).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
engineering	инженерные
range	диапазон
principle	принцип
environment	окружающая среда
option	вариант
technology	технология
branch	филиал
device	устройство
structure	структура
installation	установка
quality	качество
expertise	экспертиза
qualification	квалификация
modification	модификация

advance	продвижение
service	обслуживание
households	домохозяйства
equipment	оборудование
ecosystem	экосистема
research department	исследовательский отдел
forefront	передний край
Verbs and verbal phrases	
to cover	покрыть
to design	проектировать
to maintain	поддерживать
to link with	ссылаться на
to ensure	обеспечить
to conduct	проводить
to influence	влиять
to consider	рассмотреть
to achieve	достичь
to rely on	полагаться на
to preserve	сохранить
to depend on	зависеть от
to construct	построить
to repair	восстановить
to recognize	признать
to involve	привлечь
to focus on	сосредоточиться на
to manufacture	производить
to be concerned with	иметь дело с
Adjectives	
senior	старший
innovative	инновационный
extensive	обширный
Adverbs	
ultimately	в конечном счете
Preposition	
prior to	до

Comprehension check

1. Answer the following questions and give examples.

1) What do energy engineers construct?
2) Is computer technology extensively used in the engineers' work? Give examples.
3) Where do engineers work?
4) Do engineers influence every aspect of life?
5) Environmental engineers have a special interest in ecosystems and biology, don't they? Why? Why not?
6) What are renewable energy engineers concerned with?
7) What are they involved in?
8) What are energy engineers focused on?
9) What principles are engineering and technology roles based on?
10) What are the three recognized professional levels?

2. Find key words and phrases which best express the general meaning of each paragraph.

3.Write a summary of Text C.

4. Match the technical fields with appropriate examples of products.

Technical field	**Products**
1) marine engineering	a) a road surface of a bridge
2) transport engineering	b) flat surface of a skateboard
3) building and construction	c) cement area around a swimming pool
4) civil engineering	d) computer game console
5) sports technology	e) flight deck
6) aerospace	f) a floor of a ship
7) electronics	g) a level of a bus
8) IT, entertainment industry	h) component of music system

Text D. Forms of energy

Energy is found in different forms including light, heat, chemical, and motion. There are many forms of energy, but they can all be put into two categories: potential and kinetic.

Kinetic energy is motion – of waves, molecules, substances, and objects. Forms of kinetic energy include:

Radiant Energy is electromagnetic energy that travels in transverse waves. Radiant energy includes visible light, x-rays, gamma rays and radio waves. Light is one type of radiant energy. Sunshine is radiant energy, which provides the fuel and warmth that make life on the Earth possible.

Thermal Energy, or heat, is the vibration and movement of the atoms and molecules within substances. As an object is heated up, its atoms and molecules move and collide faster. Geothermal energy is the thermal energy in the Earth.

Motion Energy is energy stored in the movement of objects. The faster they move, the more energy is stored. It takes energy to get an object moving and energy is released when an object slows down. Wind is an example of motion energy. A dramatic example of motion is a car crash, when the car comes to a total stop and releases all its motion energy at once in an uncontrolled instant.

Sound is the movement of energy through substances in longitudinal (compression/rarefaction) waves. Sound is produced when a force causes an object or substance to vibrate – the energy is transferred through the substance in a wave. Typically, the energy in sound is far less than other forms of energy.

Potential energy is stored energy and the energy of position – gravitational energy. There are several forms of potential energy:

Chemical Energy is energy stored in the bonds of atoms and molecules. Biomass, petroleum, natural gas, and coal are examples of stored chemical energy. Chemical energy is converted to thermal energy when we burn wood in a fireplace or burn gasoline in a car's engine.

Mechanical Energy is energy stored in objects by tension. Compressed springs and stretched rubber bands are examples of stored mechanical energy.

Nuclear Energy is energy stored in the nucleus of an atom - the energy that holds the nucleus together. Very large amounts of energy can be released when the nuclei are combined or split apart. Nuclear power plants split the nuclei of uranium atoms in a process called fission. The sun combines the nuclei of hydrogen atoms in a process called fusion.

Gravitational Energy is energy stored in an object's height. The higher and heavier the object, the more gravitational energy is stored. When you ride a bicycle down a steep hill and pick up speed, the gravitational energy is being

converted to motion energy. Hydropower is another example of gravitational energy, where the dam ‘’piles’’ up water from a river into a reservoir.

Electrical Energy is what is stored in a battery, and can be used to power a cell phone or start a car. Electrical energy is delivered by tiny charged particles called electrons, typically moving through a wire. Lightning is an example of electrical energy in nature, so powerful that it is not confined to a wire (source: www.eia.doe.gov)

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
substance	вещество
tension	напряженность
nucleus	ядро
fission	расщепление
cell phone	сотовый телефон
motion	движение
fusion	слияние
reservoir	водохранилище
petroleum	нефть
fireplace	камин
particle	частица
rarefaction	разрежение
object	объект
dam	плотина
wire	провод
Verbs and verbal phrases	
to compress	сжимать
to store	хранить
to convert	преобразовывать
to include	включить
to collide	сталкиваться
to transfer	передавать
to split	разделить
to release	освободить

to charge	зарядить
Adjectives	
stretched	растянутый
transverse	поперечный
dramatic	резкий, драматический
tiny	крошечный
longitudinal	продольный
radiant	лучистый

Comprehension check

1. Complete the following sentences according to the text.

1) Sunshine provides ...
2) Geothermal energy is ...
3) The faster objects move, the more energy is ...
4) Energy is found in different forms including ...
5) All forms of energy can be put into two categories: ... and...
6) Kinetic energy is ...
7) ... are forms of kinetic energy.
8) The energy in sound is far less than ...
9) Potential energy is stored energy and ...
10) Forms of potential energy include ...
11) Chemical energy is converted to thermal energy when we ...
12) Nuclear power plants split the nuclei of uranium atoms in a process called ....
13) But the sun combines the nuclei of hydrogen atoms in a process called ...
14) The ... the object, the more gravitational energy is stored.
15) Electrical energy is delivered by ... called electrons.

2. Answer the following questions and give examples.

1) What are the main categories of energy?
2) What is potential energy?
3) What is kinetic energy?
4) When is chemical energy converted to thermal energy?
5) Mission and fusion are synonyms, aren't they? Why? Why not?
6) What physical process happens when you ride a bicycle?
7) What is named ‘’an electron’’?

8) What makes life on the Earth possible?
9) As an object is heated up, its atoms and molecules move and collide slower, don't they? Why? Why not?
10) What is the least form of energy?

3. Fill in the table using the information from Text D.

Energy	Forms	Definitions	Examples
kineti c	radiant energy	…	visible light, x-rays, gamma rays, radio waves
	thermal energy	…	…
	…	is stored in the movement of objects	…
	…	…	…
	chemical energy	…	biomass, coal, petroleum, natural gas
	…	is stored in objects by tension	…
	…	…	…
	…	…	hydropower, ...
	electrical	…	…

3. Choose the best abstract for Text D.

a) The text under consideration is about energy. It dwells on the usage and examples of different energy forms in nature.
b) The text deals with two categories of energy such as potential and kinetic. The author gives the definitions of various forms of energy and points out their examples.
c) The examples of several energy forms are commented in the text. The author also touches upon the difference between kinetic and potential energies.

5. Find key words and phrases which best express the general meaning of each paragraph.

6. Write a summary of Text D.

7. Discuss with your groupmates or in pairs the examples of potential and kinetic forms of energy from every day life.

8. Read the texts of unit 1 again and make the notes under the following headings. Then use your notes to talk about Energy and Energy Engineering.

1. The definition of energy.
2. Sources of energy.
3. Potential and kinetic energies.
4. The work of an energy engineer.

Grammar section

Nouns

Существительные в английском языке.

Существительными принято называть слова, обозначающие названия предметов, людей, животных, растений, веществ и понятий, например: a book – книга, a woman – женщина, a student – студент, a dog – собака, a flower – цветок, bread – хлеб, snow – снег, problem – проблема, love - любовь. Все существительные делятся на имена собственные (имена людей, клички животных, названия городов, улиц и т.д.), которые всегда пишутся с большой буквы: Tom, London, America, и имена нарицательные, которые подразделяются на исчисляемые и неисчисляемые существительные. К исчисляемым существительным относят названия конкретных предметов и абстрактных понятий, которые поддаются счёту, например: a pen – ручка, a horse – лошадь, a question – вопрос, an effort – усилие. К неисчисляемым существительным относят названия веществ и отвлечённых (абстрактных) понятий, которые счету не поддаются, например: sand – песок, sugar – сахар, oil – масло, time – время, progress – прогресс.

1. Образованит множественного числа имён существительных

Основным способом образования множественного числа имён существительных является прибавление окончания – s:

a bag – bags

a cat – cats

a rose – roses

Но надо помнить о том, что если существительное заканчивается на:

-s, - o, - ch, - sh, -ss или - x, множественное число образуется путем добавления окончания - es.

Example: tomato (помидор) – tomatoes, church (церковь) – churches, bush (куст) – bushes, kiss (поцелуй) – kisses, box (коробка) – boxes.

Только обратите внимание на то, что, если слово иностранного происхождения оканчивается на – o, мы добавляем просто "s":

Example: kilo (килограмм) – kilos, photo (фотография) – photos, piano (рояль) – pianos, soprano (сопрано) – sopranos.

Имена существительные, оканчивающиеся на -y с предшествующей согласной, образуют множественное число путём прибавления окончания -es, причём -y меняется на -i. Например, a dictionary – dictionaries.

Но: a boy – boys, a day – days (перед -y стоит гласная).

Некоторые имена существительные, оканчивающиеся на -f, -fe, образуют множественное число путём изменения -f на -v и прибавлением окончания – es.

a half – halves

a wolf – wolves

a wife – wives

Но: roof – roofs, safe – safes.

Ряд существительных образуют форму множественного числа особым образом.

ед. ч.	мн. ч.
man	men
woman	women
foot	feet
tooth	teeth
goose	geese
mouse	mice
child	children
sheep	sheep
deer	deer
datum	data
ox	oxen

2. Притяжательный падеж существительных в английском языке

Существительные в английском языке имеют два падежа: общий падеж и родительный или притяжательный падеж. В общем падеже существительные не имеют никаких окончаний и отвечают на вопрос "кто,

что"; притяжательный падеж образуется путём прибавления суффикса "-s" к существительным в единственном числе, а также к тем существительным во множественном числе, которые образуют его не по правилам, например: boy's, girl's, men's, children's, и отвечают на вопрос «чей». Апостроф прибавляется к существительным во множественном числе: soldiers', workers'.

This is the boy's book.

These are the boys' books.

Существительные в родительном падеже обычно выступают в качестве определения к другому существительному и выражают принадлежность в широком смысле слова, например: the children's toys – игрушки (чьи?) детей, the parents' consent – согласие (чьё?) родителей, the girl's story – рассказ (чей?) девочки; или служит описанию предмета, например: sheep's eyes – глаза, как у овцы, soldiers' uniform – солдатская форма, a mile's distance – расстояние в одну милю. Существительные, обозначающие неодушевлённые предметы, вещества и отвлечённые понятия, как правило, в форме родительного падежа не употребляются, а образуют оборот с предлогом «of»:

the windows of the house – окна дома

the handle of the door – ручка двери.

Упражнение 1. Образуйте форму множественного числа.

Church, sheep, restaurant, country, gentleman, leaf, wolf, man, goose, deer, student, potato, cartoon, dress, child, woman, chicken, ox, weather, library, tree, costume, progress, bone, desert, factory, science, dictionary, hair, suburbs, station, pilot, map, city, dolphin, helicopter, fish, souvenir, lorry, ship, watch, scissors, bank, advice, calendar, information, mouse, ink.

Упражнение 2. Дополните предложения, используя следующие слова (в единственном или множественном числе).

Air, country, day, friend, meat, language, letter, patience, people, photograph, queue, space

1. I have my camera, but I don’t take many ..... .
2. There are seven ….. in a week.
3. A vegetarian is a person who doesn’t eat ….. .
4. Outside the cinema there is ….. of people waiting to see the film.
5. I’m not very good at writing ….. .
6. Today I go out with some ….. .
7. There are very few ….. in the shops today. They are almost empty.

8. I’m going out for a walk. I need some fresh ….. .
9. George always wants things quickly. He’s got no ….. .
10. Do you speak any foreign ….. ?
11. Jane travels a lot. She has been to many ….. .
12. Our flat is very small. We haven’t got much ….. .

Упражнение 4. Перефразируйте, употребляя притяжательный падеж.

1. the owner/that car _the owner of that car_ 2. the mother/Ann _Ann's mother_ 3. the jacket/that man --- 4. the top/the page --- 5. the daughter/Charles --- 6. the cause/the problem --- 7. the newspaper/yesterday --- 8. the birthday/my father --- 9. the name/this street --- 10. the toys/the children --- 11. the new manager/the company --- 12. the result/the football match --- 13. the garden/our neighbours --- 14. the ground floor/the building --- 15. the children/Don and Mary --- 16. the economic policy/the government --- 17. the husband/Catherine ---

Упражнение 5. Перепишите предложения, начиная с выделенного слова.

1. The meeting **tomorrow** has been cancelled. - Tomorrow's meeting has been cancelled.
2. The storm **last week** caused a lot of damage.
3. The only cinema in **the town** has closed down.
4. Exports from **Britain** to the United States have fallen recently.
5. Tourism is the main industry in **the region.**

Pronouns
Местоимения. Разряды местоимений

Местоимение – часть речи, которая указывает на лицо, предметы, на их признаки, количество, но не называет их: I – я, who – кто, which – который, this – этот, these – те, some – несколько и другие. Местоимение обычно употребляется в предложении вместо имени существительного или имени прилагательного, иногда – вместо наречия или числительного.

John learns English. He likes it. – Джон учит английский. Он ему нравится.

He is a doctor. Everybody knows him. – Он врач. Каждый знает его.

По своему значению и грамматическим признакам местоимения делятся на следующие разряды:

– личные (I, you, he, she, it, we, you, they);

– притяжательные (my, your, his, her, its, our, your, their; mine, yours, his, hers, its, ours, yours, theirs);

– возвратные (myself, yourself, himself, herself, itself, ourselves, yourselves, themselves);

– указательные (this, these, that, those, such);

– вопросительные (who, what, whose, which);

– неопределенные (some/any, somebody, someone, something, anybody/anyone, anything, one);

– отрицательные (no, none, nobody/no one, nothing, neither);

– обобщающие (all, every, everybody, everything, both, either, other, another, each) и другие.

Характеристики личных, притяжательных, возвратных и указательных местоимений

Личные местоимения в именительном падеже	Личные местоимения в объектном падеже	Притяжательные местоимения	Абсолютная форма притяжательных местоимений	Возвратные местоимения	Указательные местоимения	
					ед. число	Мн. число
I	me	My	Mine	myself	This – этот	These – эти
you	you	your	Yours	yourself	That – тот	Those – те
He	him	His	His	himself		
she	her	Her	Hers	herself		
It	it	Its	Its	itself		
We	us	Our	Ours	ourselves		
you	you	your	Yours	yourselves		
They	them	their	Theirs	themselves		

Местоимения-определители

Much	много – с неисчисляемыми существительными: much time, much money, much water, much snow, much milk, much food.
Many	Много – с исчисляемыми существительными: many books, many students, many houses, many trees, many flowers, many rivers.
Little	мало – с неисчисляемыми существительными: little time, little

	money, little water, little snow, little milk, little food.
Few	мало – с исчисляемыми существительными: few books, few students, few houses, few trees
A little	немного: I have a little time. Wait a little. There is a little water.
A few	несколько: There are a few chairs in the room. I want to tell you a few words.

Some/any — неопределенные местоимения, которые обозначают неизвестное (предположительно небольшое) количество каких-то предметов или некоторое количество вещества, материи, жидкости и т.п. Они обычно ставятся вместо артикля и определяют существительное, стоящее после них.

Some употребляется в утвердительных предложениях с исчисляемыми существительными во множественном числе и обозначает «несколько» или «некоторые»:

- *I know some famous Russian writers. Я знаю несколько знаменитых российских писателей.*

Some используется в утвердительных предложениях с неисчисляемыми существительными и обозначает «немного» или «некоторое количество»:

- *We bought some coffee in the shop. Мы купили немного кофе в магазине.*

Any употребляется в вопросительных предложениях вместе с исчисляемыми существительными в значении «какие-либо», «какие-нибудь» и вместе с неисчисляемыми существительными в значении «сколько-нибудь»:

- *Have you got any interesting English magazines to read? У вас есть какие-нибудь интересные английские журналы (почитать)?*

Упражнение 1. Используйте местоимения me, you, him, us, her, it, them.

1. She gives ... the book and asks to return ... next week.
2. Are you going to invite ... to your party?
3. I don’t like the film, I don’t want to speak about ... .
4. We’ll be very happy if you go on a trip with ... .
5. Don’t ask ... this question. I don’t know how to answer ... .
6. If she doesn’t arrive tomorrow send ... a telegram.
7. I’m sorry to trouble you, but I want ... to do ... a favour.
8. Let’s not wait for ... . They are always late.
9. Do you want ... to do it for ... ? I don’t mind ...

10. My parents are coming to see … on Saturday. I like to spend my weekend with …

Упражнение 2. Используйте личные или притяжательные местоимения в правильной форме.

1. The girls are here, ... came early.
2. When Roger saw Ann ... spoke to ...
3. The boss left an hour ago. I didn't see ... .
4. Sam met Ann at the entrance, ... showed ... the pictures.
5. The Browns moved into a new flat. ... gave ... new address, so I can visit ... .
6. Jane is ... sister, ... is older than ... am.
7. Thank … for the book ... gave ... . is very interesting.
8. ... like to visit ... friends who live not far from ... house.
9. Bill takes ... guitar lesson on Monday. ... is the only day ... is free after college.
10. I am very happy that ... cat found ... kitten.
11. … flat is on the third floor, … windows face the sea.
12. I invite … to a party. … hope … will bring … husband with … .

Упражнение 3. Вставьте much, many, few или little.

1. He isn't very popular. He has _few_ friends.
2. Ann is very busy these days. She has --- free time.
3. Did you take --- photographs when you were on holiday?
4. I'm not very busy today. I haven't got --- to do.
5. The museum was very crowded. There were too --- people.
6. Most of the town is modern. There are --- old buildings.
7. The weather has been very dry recently. We've had --- rain.

Упражнение 4. Вставьте little/a little/few/a few.

1. We must be quick. We have --- time.
2. Listen carefully. I'm going to give you --- advice.
3. Do you mind if I ask you --- questions?
4. This town is not a very interesting place to visit, so --- tourists come

here.

5. I don't think Jill would be a good teacher. She's got --- patience.
6. 'Would you like milk in your coffee?' 'Yes, please ---.'
7. This is a very boring place to live. There's --- to do.
8. 'Have you ever been to Paris?' 'Yes, I've been there --- times.'

Упражнение 5 . Вставьте myself/yourself/ourselves или me/you/us.

1. Julia had a great holiday. She enjoyed --- herself.
2. It's not my fault. You can't blame ---.
3. What I did was very wrong. I'm ashamed of ---.
4. We've got a problem. I hope you can help ---.
5. 'Can I take another biscuit?' 'Of course. Help ---!'
6. Take some money with --- in case you need it.
7. Don't worry about Tom and me. We can look after ---.
8. I gave them a key to our house so that they could let --- in.
9. When they come to visit us, they always bring their dog with ---.

Упражнение 6. Вставьте some или any.

1. We didn't buy _any_ flowers.
2. This evening I'm going out with --- friends of mine.
3. 'Have you seen --- good films recently?' 'No, I haven't been to the cinema for ages.'
4. I didn't have --- money, so I had to borrow ---.
5. Can I have --- milk in my coffee, please?
6. I was too tired to do --- work.
7. You can cash these traveller's cheques at --- bank.
8. Can you give me --- information about places of interest in the town?

Unit 2. FOSSIL FUELS

Text A. Fossil fuels

1. Read the text

Coal, oil and gas are called **‘’fossil fuels’’** because they have been formed from the organic remains of prehistoric plants and animals.

How it works

Coal is crushed to a fine dust and burnt.

Oil and gas can be burnt directly.

The steam that has passed through the power station's turbines has to be cooled, to condense it back into water before it can be pumped round again. This is what happens in the huge "cooling towers" seen at power stations.

Some power stations are built on the coast, so they can use sea water to cool the steam instead. However, this warms the sea and can affect the environment, although the fish seem to like it.

More

Coal provides around 28 % of our energy, and oil provides 40 %. Mind you, this figure is bound to have changed since this page was written, so check the figures if you want to quote them.

Burning coal produces sulphur dioxide, an acidic gas that contributes to the formation of acid rain. This can be largely avoided using "flue gas desulphurisation" to clean up the gases before they are released into the atmosphere. This method uses limestone, and produces gypsum for the building industry as a by-product. However, it uses a lot of limestone.

Crude oil (called "petroleum") is easier to get out of the ground than coal, as it can flow along pipes. This also makes it cheaper to transport.

I ought to point out that some scientists are claiming that oil is not a 'fossil' fuel - that it is not the remains of prehistoric organisms after all. They claim it was made by some other, non-biological process. Currently this is not accepted by the majority of scientists, but you can find out more about the idea at space.com

Natural gas provides around 20 % of the world's consumption of energy, and as well as being burnt in power stations, is used by many people to heat their homes.

It is easy to transport along pipes, and gas power stations produce comparatively little pollution. Video clip: What is crude oil?

Other fossil fuels are being investigated, such as bituminous sands and oil shale. The difficulty is that they need expensive processing before we can use them; however Canada has large reserves of 'tar sands' , which makes it economic for them to produce a great deal of energy this way.

As far as we know, there is still a lot of oil in the ground. But although oil

wells are easy to tap when they're almost full, it's much more difficult to get the oil up later on when there's less oil down there. That's one reason why we're increasingly looking at these other fossil fuels.

Is it renewable?

Fossil fuels are not a renewable energy resource.

Once we've burned them all, there isn't any more, and our consumption of fossil fuels has nearly doubled every 20 years since 1900.

This is a particular problem for oil, because we also use it to make plastics and many other products.

Ok, you could argue that fossil fuels are renewable because more coal seams and oil fields will be formed if we wait long enough.

However that means waiting for many millions of years. That's a long time - we'd have to wait around for longer than the time that humans have existed so far!

As far as we today are concerned, we're using it up very fast and it hardly gets replaced at all - so by any sensible human definition fossil fuels are not renewable (source: http://www.darvill.clara.net/altenerg/fossil.htm).

2. Put the statements into the correct column. Analyze the advantages and disadvantages of fossil fuels.

Advantages	Disadvantages

1. Coal-fired power stations need huge amounts of fuel, which means train-loads of coal almost constantly. In order to cope with changing demands for power, the station needs reserves.
2. This means covering a large area of countryside next to the power station with piles of coal.
3. Gas-fired power stations are very efficient.
4. A fossil-fuelled power station can be built almost anywhere, so long as you can get large quantities of fuel to it.
5. Basically, the main drawback of fossil fuels is pollution.
6. Burning any fossil fuel produces carbon dioxide, which contributes to the "greenhouse effect", warming the Earth.
7. Very large amounts of electricity can be generated in one place using coal, fairly cheaply.

8. Transporting oil and gas to the power stations is easy.
9. Burning coal produces more carbon dioxide than burning oil or gas.
10. It also produces sulphur dioxide, a gas that contributes to acid rain. We can reduce this before releasing the waste gases into the atmosphere.
11. Mining coal can be difficult and dangerous. Strip mining destroys large areas of the landscape.

Answer the following questions and read the text below to check your answers.

1) What do you think was the very first source of energy for people?
2) How long have people been using wood as a fuel?

Text B. Wood fuel

Wood fuel is wood used as fuel. The burning of wood is currently the largest use of energy derived from a solid fuel biomass. Wood fuel can be used for cooking and heating, and occasionally for fueling steam engines and steam turbines that generate electricity. Wood fuel may be available as firewood (e.g. logs, blocks), charcoal, chips, sheets, and sawdust. The particular form used depends upon factors such as source, quantity, quality and application. Wood may be sent into a furnace to be burned, stove, fireplace, or in a campfire, or used for a bonfire. Wood is the most easily available form of fuel, and it is a renewable source of energy.

The use of wood as a fuel source for heating is as old as civilization itself.

Early examples include the use of wood heat in tents. Fires were constructed on the ground, and a smoke hole in the top of the tent allowed the smoke to escape by convection.

In permanent structures and in caves, hearths were constructed – surfaces of stone or another noncombustible material upon which a fire could be built. Smoke escaped through a smoke hole in the roof.

The Greeks, Romans, Celts, Britons, and Gauls all had access to forests suitable for using as fuel.

Total demand for fuel increased considerably with the industrial revolution but most of this increased demand was met by the new fuel source. Coal, which was more compact and more suited to the larger scale of the new industries.

The development of the chimney and the fireplace allowed for more effective exhaustion of the smoke. Masonry heaters or stoves went a step further by capturing much of the heat of the fire and exhaust in a large thermal mass, becoming much more efficient than a fireplace alone.

The metal stove was a technological development concurrent with the

industrial revolution. Stoves were manufactured or constructed pieces of equipment that contained the fire on all sides and provided a means for controlling the draft. Stoves have been made of a variety of materials: cast iron, soapstone, tile, and steel. Metal stoves are often lined with refractory materials such as firebrick, since the hottest part of a woodburning fire will burn away steel over the course of several years' use.

The Franklin stove was developed in the United Slates by Benjamin Franklin. More a manufactured fireplace than a stove, it had an open front and a heat exchanger in the back that was designed to draw air from the cellar and heal it before releasing it out the sides. So-called ‘’Franklin’’ stoves today are made in a great variety of styles, though none resembles the original design.

The 1800s became the high point of the cast iron stove. Each local foundry would make their own design, and stoves were built for myriads of purposes – parlour stoves, camp stoves, railroad stoves, portable stoves, cooking stoves and so on. Wood or coal would be burnt in the stoves and thus they were popular for over one hundred years. The action of the fire, combined with the causticity of the ash, ensured that the stove would eventually disintegrate or crack over time. Thus a steady supply of stoves was needed. The maintenance of stoves, needing to be blacked, their smokiness, and the need to split wood meant that oil or electric heat found favour.

In the 19th century the airtight stove, originally made of steel, became common. They allowed greater control of combustion, being more tightly fitted than other stoves of the day.

Use of wood heat declined in popularity with the growing availability of other, less labor-intensive fuels. Wood heat was gradually replaced by coal and later by fiel oil, natural gas and propane heating except in rural areas with available forests.

Today in rural, forested pails of the U.S., freestanding boilersare are increasingly common. They are installed outdoors, some distance from the house, and connected to a heat exchanger in the house using underground piping. The mess of wood, bark, smoke and ashes is kept outside and the risk of fire is reduced. The boilers are large enough to hold a fire all night, and can burn larger pieces of wood, so that less cutting and splitting is required. However, outdoor wood boilers emit more wood smoke and associated pollutants than other wood-burning appliances. This is due to design characteristics such as the water-filled jacket surrounding the firebox, which acts to cool the fire and leads to incomplete combustion. An alternative that is increasing in popularity are wood gasification boilers, which burn wood at very high efficiencies (85-91 %) and can be placed indoors or in an outbuilding.

As a sustainable energy source, wood fuel is still used today cooking in many places, either in a stove or air open fire, in many industrial processes, including smoking meat and making maple syrup, it also remains viable for generating electricity in areas with easy access to forest products and by-products. (source: www.energy.alberta.ca).

Active vocabulary

1. Try to memorize the following words and phrases.

Nouns and noun phrases	
charcoal	уголь
campfire	костер
exhaustion	истощение
sawdust	опилки
stove	плита
masonry heater	кирпичная печь
quantity	количество
bonfire	костер
thermal mass	тепловая масса
application	применение
convection	конвекция
draft	проект
furnace	печь
hearth	очаг
ash	зола
soapstone	мыльный камень
heat exchanger	теплообменник
causticity	каустичность
combustion	сгорание
purpose	цель
tile	плитка
Verbs and verbal phrases	
to disintegrate	распадаться
to resemble	напоминать
to escape	избежать
Adjectives	
concurrent	одновременный
portable	портативный

refractory	огнеупорный
incomplete	неполный
freestanding	автономный

2. Read the following international words and mind the stressed syllables.

boiler	factor	material
occasionally	energy	industrial
engine	civilization	revolution
curbines	construct	compact
generate	permanent	effective
popularity	structure	distance

3. Match the English and Russian equivalents.

a) flammability	1) домашний очаг
b) boiling point	2) бетонная промышленность
c) byproduct	3) сжиженный природный газ
d) heart	4) точка кипения
e) rural area	5) побочный продукт
f) conveyer belt	6) воспламеняемость
g) concrete industry	7) сельская местность
h) liquefied natural gas	8) транспортерная лента
i) coal reserves	9) теплотворная способность
j) heating value	10) запасы угля

Comprehension check

1. Decide whether the following statements are true or false according to the text.

1) Stoves have been made of metal materials only.
2) «Franklin» stoves aren't made today.
3) Wood gasification boilers can be placed indoors or in an outbuilding.
4) Early examples include the use of wood heat near tents.
5) Total demand for fuel increased considerably with the industrial

revolution.

6) Wood fuel remains viable in areas with easy access to forest.
7) Wood fuel can be used for cooking and heating, but can not be used for fueling steam engines.
8) This increased demand was met by the new fuel source - oil.

2. Put the following sentences in the correct order according to the text.

1) __ Masonry healers or stoves went a step further becoming much more efficient than a fireplace alone.
2) __ The 1800s became the high point of the cast iron stove.
3) __ The metal stove was a technological development concurrent with the industrial revolution.
4) __ The Greeks, Romans. Celts, Britons, and Gauls all had access to forests suitable for using as fuel.
5) __ In the 19th century the airtight stove, originally made of steel, became common.
6) __ Today in rural, forested parts of the U.S.. freestanding boilers are increasingly common.
7) __ So-called «Franklin» stoves today are made in a great variety of styles.
8) __ Most of total demand for fuel was met by the new fuel source, coal.

3. Answer the following questions.

1) What allowed more effective exhaustion of the smoke?
2) What materials have stoves been made of?
3) Where was the Franklin stove developed? What is its characteristic?
4) What were stoves built in the 1800s for?
5) What does the particular form of wood fuel used depend upon?
6) Is wood a renewable or non-renewable source of energy?
7) What is the earliest example of the use of wood as a fuel source?
8) What type of stoves became popular in the 19th century?
9) Why did the use of wood heat decline in popularity?
10) What is wood fuel?
11) What can wood fuel be used for?
12) Is it still used today? Where?

4. Divide the text into logical parts and make an oral report on the text

according to the plan below.

Plan:

1. **The title**

.. I've read the text (article, story) entitled ...

I'd like to tell you about the text (article, story) entitled ...

2. **The source**

This is an article (story, text) published in the newspaper (magazine, book) ...

3. **The author**

The author of the text is ..., a famous writer (journalist, scientist).

4. **The idea**

The main idea of the text (article, story) is to show (to prove, to underline, to convince) ...

5. **The subject**

The text deals with …

The text describes (gives information about)...

6. **The content**

The text (story, article) starts with the fact (with the description of, with the characteristic of) ...

Then the author describes ...

After that the author touches upon the problem of ...

Next the author deals with the fact (the problem) ...

Besides the author stresses that ...

Finally the author comes to the conclusion that ...

7. **Your attitude**

My attitude to the article (story, text) is contradictory (complicated, simple)

On the one hand I agree that ...

On the other hand I can't agree that ...

I've learned a lot of interesting (important, new) facts (information, things) from the text.

It makes us think of …

It gives us food for thoughts.

It proves the idea (the theory, the point of view, the opinion) ...

It can help us in self-education (in solving our problems).

I'd like to cite the author (to make a quotation).

8. **Your advice**

So in my opinion it is (not) worth reading ...

5. ***Translate the following words and phrases into English using the vocabulary of the text.***

Эффективное вытягивание, кирпичная печь, техническое развитие, способ управления тягой, огнеупорный материал, промышленная топка, разнообразные цели, вырабатывать электричество, капитальные сооружения, общий объем спроса, негорючий материал, промышленная революция, заслужили благосклонность, герметическая печь, трудоемкое горючее, автономный котел (бойлер), теплообменник, водоналивная облицовка, экологически устойчивый источник энергии.

6. ***Discuss with your groupmates or in pairs why coal and wood are considered to be traditional sources of energy.***

Answer the following question and read the text below to check your answer.
Where do we use oil in everyday life?

Text C. Oil

Oil was formed from the remains of animals and plants (diatoms) that lived millions of years ago in a water environment before the dinosaurs. Over millions of years, the remains of these animals and plants were covered by layers of sand and silt. Heat and pressure from these layers helped the remains turn into what we today call crude oil.

Crude oil is a smelly, yellow-to-black liquid and is usually found in underground areas called reservoirs. Scientists and engineers explore a chosen area by studying rock samples from the earth. Measurements are taken, and, if the site seems promising, drilling begins. Above the hole a derrick is built to house the tools and pipes going into the well. When finished, the drilled well will bring a steady flow of oil to the surface.

Crude oil is called ‘’sweet’’ when it contains only a small amount of sulfur and ‘’sour’’ if it contains a lot of sulfur. Crude oil is also classified by the weight of its molecules. ‘’Light’’ crude oil flows freely like water, while ‘’heavy’’ crude oil is thick like tar. Crude oil is measured in barrels (bbls).

The world’s top five crude oil producing countries are Russia, Saudi Arabia, United States, Iran, China.

After crude oil is removed from the ground, it is sent to a refinery by pipeline, ship, or barge. A typical refinery costs billions of dollars to build and millions more to maintain. A refinery runs 24 hours a day, 365 days a year and

requires a large number of employees to run it. A refinery can occupy as much land as several hundred football fields.

At a refinery, different parts of the crude oil are separated into useable petroleum products. Essentially, refining breaks crude oil down into its various components, which then are selectively reconfigured into new products. All refineries perform three basic steps: separation, conversion and treatment.

One barrel of crude oil, when refined, produces about 19 gallons of finished motor gasoline, and 10 gallons of diesel, as well as other petroleum products. Most petroleum products are used to produce energy, to move merchandise and people, help make plastics, and do many other things. For instance, many people across the United States use propane to heat their homes.

Other products made from petroleum include ink, crayons, bubble gum, dishwashing liquids, deodorant, eyeglasses, CDs and DVDs, tires, ammonia, heart valves (source: www.energy.alberta.ca).

Active vocabulary

1. Try to memorize the following words and phrases.

Nouns and noun phrases	
diatom	диатомовый
sample	образец
heart valve	клапан сердца
liquid	жидкость
crayon	цветной карандаш
propane	пропан
measurement	измерение
drilling	бурение
derrick	вышка
tools	инструментарий
pipe	труба
treatment	лечение
ammonia	аммиак
dishwashing liquid	средство для мытья посуды
molecule	молекула
barrel	баррель
refinery	очистительный завод
pipeline	трубопровод
diesel	дизельный

plastics	пластики
tire	шина
silt	ил
Verbs and verbal phrases	
to explore	изучить
to house	размещать
to reconfigure	изменить настройки
to occupy	занимать
Adjectives	
smelly	вонючий
Adverbs	
essentially	по существу
selectively	избирательно
freely	свободно

2. Fill in the table with the derivatives.

Noun	Verb	Adjective
storage		
	to combust	
		dependent

3. Combine the words from the column on the left with the suitable nouns from the column on the right. Translate them into Russian.

1) sedimentary	a) plants
2) nonrenewable	b) rock
3) swampy	c) value
4) dead	d) layer
5) top	e) forests
6) plant	f) energy
7) heat	g) energy source
8) heating	h) rank
9) abundant	i) remains
10) raw	j) materials

11) moisture	k) mining
12) deep	l) machines
13) giant	m) reserves
14) coal	n) content
15) iron	o) furnaces
16) hot	p) ore

Comprehension check

1. Complete the following sentences according to the text.

1) ‘’Light’’ crude oil flows … , while ‘’heavy’’ crude oil is ...
2) After crude oil is removed from the ground, it is sent to ...
3) A refinery runs ...
4) Oil was formed from ...
5) Scientists and engineers explore a chosen area by ...
6) Crude oil is called ‘’sweet’’ when it contains ... Crude oil is also classified by ...
7) One barrel of crude oil, when refined, produces ...

2. Decide whether the following statements are true or false according to the text.

1) Tools and pipes are housed in a derrick.
2) Crude oil is called «sour» if it contains a small quantity of sulfur.
3) A refinery is larger than a football field.
4) At a refinery, various pans of the crude oil are joined into useable petroleum products.
5) Propane is used by many Americans to heat their homes.
6) For years the remains of animals and plants were covered by layers of fine rocks.

3. Answer the following questions and give examples.

1) When does drilling begin?
2) What is crude oil measured in?
3) What are the main crude oil-producing countries?
4) What helped the remains to turn into crude oil?

5) Where is crude oil usually found in?
6) What are the steps performed at all refineries?
7) What are most petroleum products used for?
8) What do products made from petroleum include?

4. ***Find key words and phrases which best express the general meaning of each part.***

5. ***Write a summary of Text C.***

6. ***Make a presentation on the oil processing at a refinery. Find out additional information.***

Answer the following question and read the text below to check your answer.
Why is natural gas the most popular source of energy nowadays?

Text D. Natural gas

Natural gas is a natural mixture of gaseous hydrocarbons found issuing from the ground or obtained from specially driven wells. The composition of natural gas values in different localities. Its chief component, methane, usually makes up from 80 % to 95 %, and the balance is composed of varying amounts of ethane, propane, butane, and other hydrocarbon compounds. Some of the hydrocarbons found in gasoline also occur as vapors in natural gas; by liquefying these hydrocarbons, gasoline can be obtained.

Although commonly associated with petroleum deposits it also occurs separately in sand, sandstone, and limestone deposits. Some geologists theorize that natural gas is a byproduct of decaying vegetable matter in underground strata, while others think it may be primordial gases that rise up from the mantle. Because of its flammability and high calorific value, natural gas is used extensively as an illuminant and a fuel.

Natural gas was known to the ancients but was considered by them to be a supernatural phenomenon because, noticed only when ignited, it appeared as a mysterious fire bursting from the ground. One of the earliest attempts to harness it for economic use occurred in the early 19th cent, in Fredonia, N.Y. Toward the latter part of the 19th cent., large industrial cities began to make use of natural gas, and extensive pipeline systems have been constructed to transport

gas.

Liquefied natural gas, or LNG, is natural gas that has been pressurized and cooled so as to liquefy it for convenience in ship ping and storage. The boiling point of natural gas is extremely low, and only in the 1970s did cryogenic technology advance enough to make the production and transport of LNG commercially feasible. Some of the natural gas moved to and from the United States is carried as LNG in special tankers (source: www.energy.alberta.ca).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
well	хорошо
limestone	известняк
mantle	мантия
vapor	пар
strata	слои
flammability	воспламеняемость
convenience	удобство
by-product	побочный продукт
tanker	танкер
illuminant	источник света
Verbs and verbal phrases	
to theorize	теоретизировать
to issue	выдавать
Adjectives	
liquefying	сжижение
decaying	разлагающийся
primordial	исконный
calorific	теплотворный
ignited	воспламеняемый
extensive	обширный
pressurized	герметичный
feasible	осуществимый
cryogenic	криогенный
Adverbs	
separately	отдельно

Comprehension check

1. Complete the following sentences according to the text.

1) Natural gas is used extensively as an illuminant and a fuel be cause of its ….
2) One of the earliest attempts to harness it for economic use occurred in ….
3) Liquefied natural gas is natural gas that has been ….

4) The composition of natural gas varies ….
5) The chief component of gas is … .
6) Some geologists theorize that natural gas is ….
7) Others think it may be … .

2. Answer the following questions and give examples.

1) What was their idea about its origin?
2) When did the first attempt to harness it for economic use take place?
3) What is LNG?
4) What made the production and transport of LNG commercially feasible?
5) What is natural gas?
6) What is its chief component?
7) Does it occur in petroleum deposits only?
8) What are the main theories of gas origin?
9) What are its main properties?
10) Natural gas wasn't known to the ancients was it? Why? Why not?

3. Fill in the table according to the text.

Components	**Places of**	**Properties**	**Processes to liquefy**
…	…	…	…

4. Discuss with your groupmates or in pairs the advantages and disadvantages of natural gas as a source of energy.

4. Fill in the table with appropriate derivatives.

Flammability, calorific, extensively, illuminant, consider, phenomenon, ignite, harness, specially, different, chief, occur, commonly, petroleum, theorize, byproduct, primordial, industrial, pressurize, convenience, commercially, carry.

Verb	**Adjective**	**Noun**	**Adverb**
…	…	…	…

5. Translate the following texts into English using the active vocabulary.

1) Природный газ – ископаемое топливо. Состоит из углеводородов, содержится в осадочных, водах. Газ – газообразный компонент нефти, добывается из нефтяных скважин. Происхождение нефти и газа одинаково; разложение древних органических остатков. Перед использованием природного газа из него удаляют тяжелые углеводороды – бутан и пропан, которые сжигают и помещают в металлические баллоны. Оставшийся «сухой газ» подается потребителю по трубопроводу. Включает в себя метан и этан.

2) Уголь – твердое топливо чёрного цвета, которое образовалось из остатков ископаемых растений. В каменноугольный и третичный периоды болотистая растительность постепенно образовала торфяники. Накопление новых остатков вызывало проседание осадочных пород. Повышение давления и выделение тепла привело к образованию лигнита (бурого угля), битуминозного угля и при достаточно высокой температуре – антрацита. Уголь залегает в виде пластов, в более глубоких пластах увеличивается содержание углерода и снижается содержание природного газа и влажности. Поэтому лигнит – менее качественное топливо, чем антрацит.

6. Read the texts of Unit 2 again and make notes under the following headings. Then use your notes to talk about Traditional sources of energy.

1. What wood fuel is and where it is used.
2. Coal origin, its properties, classification and harnessing.
3. Oil origin, its properties, refining process and harnessing.
4. What natural gas is, its origin, properties and process of liquefaction.

Text F. Coal

Coal is a combustible black or brownish-black sedimentary rock composed mostly of carbon and hydrocarbons. Coal is a non-renewable energy source because it takes millions of years to create. The energy in coal comes from the energy stored by plants that lived hundreds of millions of years ago, when the Earth was partly covered with swampy forests.

For millions of years, a layer of dead plants at the bottom of the swamps was covered by layers of water and dirt, trapping the energy of the dead plants. The heat and pressure from the top layers helped the plant remains turn into what we today call coal.

Coal is classified into four main types, or ranks (anthracite, bituminuos, subbituminous and lignite), depending on the amounts and types of carbon it contains and on the amount of heat energy it can produce. The rank of a deposit of coal depends on the pressure and heat acting on the plant debris as it sank deeper and deeper over millions of years.

Anthracite contains 86 97 % carbon, and generally has a heating value slightly higher than bituminous coal. It accounts for less than 0,5 % of the coal mined in the United States.

Bituminous coal contains 45 – 86 % carbon. Bituminous coal was formed under high heat and pressure. Bituminous coal in the United States is between 100 to 300 million years old. It is the most abundant rank of coal found in the United States. Bituminous coal is used to generate electricity and is an important fuel and raw material for the steel and iron industries.

Subbituminous coal has a lower heating value than bituminous coal. It typically contains 35 45 % carbon. Most subbituminuos coal in the United States is at least 100 million years old. About 46 % of the coal produced in the United States is subbituminous.

Lignite is the lowest rank of coal with the lowest energy content. Lignite coal deposits tend to be relatively young coal deposits that were not subjected to extreme heat or pressure, containing 25 – 35 % carbon. It is crumbly and has high moisture content.

Coal miners use giant machines to remove coal from the ground. They use two methods: surface or underground mining. Modern mining methods allow us to easily reach most of our coal reserves.

Surface mining is used to produce most of the coal in the US because it is less expensive than underground mining. Surface mining can be used when the coal is buried less than 200 feet underground.

Underground mining, sometimes called deep mining, is used when the

coal is buried several hundred feet below the surface. Some underground mines are 1,000 feet deep.

After coal comes out of the ground, it typically goes on a conveyor belt to a preparation plant that is located at the mining site. The plant cleans and processes coal to remove other rocks and dirt, ash, sulfur, and unwanted materials, increasing the heating value of the coal.

After coal is mined and processed, it is ready to be shipped to market.

Coal is used to create almost half of all electricity generated in the US. Power plants bum coal to make steam. The steam turns turbines that generate electricity.

A variety of industries use coal's heat and by-products. Separated ingredients of coal (such as methanol and ethylene) are used in making plastics, tar, synthetic fibers, fertilizers, and medicines.

Coal is also used to make steel. Coal is baked in hot furnaces to make coke, which is used to smelt iron ore into iron needed for making steel. It is the very high temperatures created from the use of coke that gives steel the strength and flexibility for things like bridges, buildings, and automobiles. The concrete and paper industries also use large amounts of coal (source: www.energy.alberta.ca).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
sedimentary rock	осадочная порода
carbon	углерод
pressure	давление
dead plants	мертвые растения
hydrocarbon	углеводород
remains	остатки
top layer	верхний слой
content	содержание
ethylene	этилен
coke	кокс
anthracite	антрацит
depth	глубина
sulfar	сера
lignite	бурый уголь

heating value	теплотворная способность
methanol	метанол
tar	смола
raw material	сырье
deposit	месторождение
moisture	влага
surface mining	открытый способ добычи
steam	пар
flexibility	гибкость
underground mining	подземные горные работы
synthetic fibers	синтетические волокна
reserves	запасы
conveyer belt	конвейерная лента
preparation plant	обогатительная фабрика
iron ore	железная руда
power plant	электростанция
Verbs and verbal phrases	
to trap	поймать
to create	создать
to sink	тонуть
to compose of	составить из
to contain	содержать
to account	отчитываться
to mine	добывать
to be subjected to	подвергаться
to process	обработать
to ship	отправить
to bake	испечь
to smelt	пахнуть
Adjectives	
swampy	болотистый
bituminous	битумный
abundant	обильный
crumbly	рассыпчатый
subbituminous	суббитуминозный
expensive	дорогой

Comprehension check

1. Finish the following sentences according to the text.

1) The rank of a deposit of coal depends on ...
2) Bituminous coal contains …
3) … is the lowest rank of coal with the lowest energy content.
4) Lignite coal deposits were not subjected to …
5) Coal is composed of…
6) The energy in coal comes from the energy ...
7) A layer of dead plants was covered by ...
8) Coal miners use giant machines ...
9) Surface mining can be used when the coal is buried ..
10) Underground mining is used when the coal is buried ...

2. Decide whether the following statements are true or false.

1) Surface mining is cheaper than underground mining,
2) Rocks and dirt, sulfur and unwanted materials are removed from coal at a preparation plant.
3) Coal is burnt by power plants to make steam.
4) Coke is used for smelting iron ore into iron.
5) Coal is an inflammable black or brown sedimentary rock.
6) The pressure and heat from the top layers helped the plant remains turn into coal.
7) Bituminous coal formed about 100 to 300 million years ago is the least widespread rank of coal in the US.
8) Bituminous coal has a higher heating value than subbituminous coal.
9) Lignite is a relatively young coal deposit.
10) The strength and flexibility are given to steel by the use of coke.

3. Answer the questions and give examples.

1) How much carbon does subbituminous contain?
2) What type of coal is crumbly and has a high moisture content?
3) What are the two methods of mining coal?
4) What is done at the plant?
5) When is coal ready to be shipped to market?

6) Why is coal a nonrenewable energy source?
7) What does the classification of coal depend on?
8) How much carbon does anthracite contain?
9) Do the steel and iron industries use bituminous coal? Why? Why not?
10) How is coke made?

4. Fill in the following table and answer the questions below.

Type of coal	**Quantity of carbon**	**Quantity mined in the US**	**Heating value**	**Pecularities**
Anthracite	…	…	the highest	…
…	…	about 50 %	…	…
…	…	…	…	100 mln years old
…	25 – 35 %	…	…	…

1) What type of coal is the most valuable? Why?
2) What type of coal is the most widespread in the USA?

5. What parts of the text can you define? Do they correspond to the paragraphs? Name each part.

1._____ 4._____
2._____ 5._____
3._____ … _____

6. Find key words and phrases which best express the general meaning of each part.

7. Write a summary of Text F.

8. Discuss with your groupmates or in pairs what ranks of coal are mined in Russia (Find out additional information).

Grammar section

The Verb “to be”
Глагол "to be"

Значение этого глагола - "быть, находиться". В отличие от других английских глаголов, глагол "to be" спрягается (т.е. изменяется по лицам и числам):

I am	я есть (нахожусь, существую)
He is	он есть (находится, существует)
She is	она есть (находится, существует)
It is	он, она, оно, это (о неодушевленных предметах) есть
We are	мы есть (находимся, существуем)
You are	ты, вы есть (находитесь, существуете)
They are	они есть (находятся, существуют)

I am in the room. Я нахожусь в комнате.

The book is on the table. Книга лежит на столе.

В данных примерах глагол "to be" является полнозначным глаголом. Так же, как и в русском языке, глагол "to be" может быть глаголом-связкой в именном сказуемом (в значении "есть). В отличие от русского языка, в английском языке глагол-связка никогда не опускается, поскольку английское предложение имеет строго фиксированный порядок слов: подлежащее (subject) + сказуемое (verb) + дополнение (object).

I am a doctor.
Я врач. (Я есть врач.)

The weather is bad.
Погода плохая.

Итак, глагол-связка "to be" в английском предложении никогда не опускается, т.к. он входит в именное сказуемое и его место после подлежащего. На русский же язык глагол "to be" в данных случаях не переводится. И, конечно же, вы переведете такие предложения, как "Я счастлив", "Книга интересная", "Он наш учитель", употребив глагол "to be" в правильной форме: "I am happy", "The book is interesting", "He is our teacher".

Глагол "to be" не требует вспомогательного глагола для образования вопросительной или отрицательной формы. Чтобы задать вопрос, нужно поставить глагол "to be" перед подлежащим: "Am I happy?", "Is the book interesting?", "Is he our teacher?". А для образования отрицательной формы

достаточно поставить отрицательную частицу "not" после глагола "to be": "I am not happy", "The book is not interesting", "He is not our teacher". В разговорной речи отрицательная частица "not" часто сливается с глаголом "to be", образуя сокращения: "isn't / aren't"; или глагол "to be" сливается с личным местоимением: "I'm / we're / you're / he's / she's / it's / they're."

В прошедшем времени глагол to be имеет форму was для местоимений I, he, she, it и were для you, we, they.

В будущем времени – shall be или will be.

The Verb «to have» («to have got»).
Глагол "to have"

Как самостоятельный глагол to have в настоящем времени (Simple Present) имеет 2 формы: have для всех лиц, кроме 3-го лица единственного числа, и has для 3-го лица единственного числа, в прошедшем времени (Simple Past) – had, в будущем (Simple Future) – shall have, will have.

Значение этого глагола - "иметь, владеть, обладать". Часто в разговорной речи вместо have, has употребляется сочетание have got, has got (краткие формы 've got и 's got) с тем же значением, особенно когда речь идёт о временном владении или только что приобретённом предмете или предметах:

We've got a nice flat.
У нас хорошая квартира.

Have you got any pets?
У вас есть домашние животные?

Yes, a dog and a cat.
Да, собака и кошка.

Вопросительная и отрицательная формы всегда образуются с помощью вспомогательного глагола do.

Do you have a car?

Упражнение 1. Используйте глаголы “to be” или “to have” Present, Past, Future Indefinite.

1. You ... welcome. 2. The metro station ... far from house. 3. Mary and Nelly ... friends. 4. She ... out. 5. It ... 5 o’clock now. 6. She ... a nice flat. 7. We ... a little child. She … four. 8. They ... a big car. 9. How ... you? 10. How many little children .... they? 11. We ... a small cottage. 12. He ... bad habits. 13. How old … Mary? 14. What country … she from? 15. We … well. 16. She … at home. 17. He … no time. 18. How far … it from here? 19. It … easy to ask him about it. 20. It … not good of her to say so. 21. She … two mistakes in the test. Her mistakes … bad. 22. They … glad to see her. 23. It … a rainy day, … he an umbrella with him? 24. My parents … proud of me.

Упражнение 2. Поставьте данные предложения в отрицательную и вопросительную форму. Затем перепишите их в прошедшем и будущем времени.

1. Her name is Lucy. 2. Ted is nine. 3. Her face is round. 4. He is nice. 5. It is a good film. 6. My flat is fine. 7. I am happy. 8. They are clever. 9. Her baby is in bed. 10. She has a white dress. 11. They have a four – year – old son. 12. You have a big car. 13. We have many English books. 14. The house has five floors. 15. He has many uncles and aunts. 16. His cat is black. 17. We are at the university. 18. You are pale. 19. It is a nice day. 20. They are late. 21. She is from Russia. 22. It is time to go to bed. 23. You’re a first-year student. 24. It’s cold today. 25. We are glad to see them.

Упражнение 3. Составьте предложения из данных групп слов. Поставьте данные предложения в вопросительную и отрицательную формы.

1) A computer, machine, is, a very specific, really.

2) Can, remember, a computer, information.

3) The information, a computer, stores, in, its “memory”.

4) Problems, solve, the most difficult, the science, computers, of, can.

5) Computers, questions, rockets and planes, answer about, bridges and ships.

6) Replace, routine tasks, a computer, people, can, in, dull.

Упражнение 4. Переведите на английский язык.

1. Ане восемнадцать лет. Она – студентка. 2. У наших родственников будет новая квартира. 3. У меня нет автомобиля. 4. У моего дяди большая семья. 5. Мамы нет, она на работе. 6. Семь часов. Пора вставать. 7. Холодно. У вас есть камин? 8. Дом моих родителей недалеко от Москвы. 9. По вечерам они всегда бывают дома. 10. Студенты в аудитории, у них сейчас лекция. 11. Эта книга была у нас в библиотеке. 12. Фильм неинтересный. 13. Она говорит, что у нее нет времени. 14. Ты сейчас занята? 15. Сколько вам лет? 16. Интересно, дома ли он сейчас? 17. В это время они обычно обедают. 18. Летом здесь очень жарко, но у нас есть бассейн. 19. Спроси его, почему он сердится. 20. Джон сейчас на Средиземном море. Я полагаю, он там хорошо проводит время.

Adjectives. Degrees of comparison
Прилагательные. Степени сравнения прилагательных

Прилагательными называют слова, обозначающие свойства или качество предметов, например: large – большой, blue – голубой, simple – простой. В предложении они обычно выполняют функцию определения к существительному или именной части составного сказуемого, например:

It was early spring.
Была ранняя весна.

The weather is cold.
Погода холодная.

Прилагательные в английском языке не изменяются ни по родам, ни по падежам, ни по числам. Сравните: a long street – длинная улица, a long table – длинный стол, long tables – длинные столы.

Как и в русском языке, в английском языке различают три степени сравнения прилагательных: положительную, сравнительную и превосходную. Положительная указывает на качество предмета и соответствует словарной форме, т.е. прилагательные в положительной степени не имеют никаких окончаний: difficult – трудный, green – зелёный. Часто, когда говорят о равной степени качества разных предметов, употребляют союз "as ... as – такой же ... , как" или его отрицательный вариант "not so ... as – не такой ... , как".

The line AB is as long as the line CD.
Линия AB такая же длинная, как и линия CD.

Если нужно указать, что один предмет обладает более выраженным признаком по сравнению с другим предметом, то употребляют прилагательное в сравнительной степени, которое образуется путём прибавления суффикса "-er" к основе прилагательного, состоящего из одного или двух слогов, например:

short – shorter

короткий – короче

Обратите внимание, что на письме конечный согласный удваивается, чтобы сохранить закрытый слог:

hot – hotter

горячий – горячее

А если основа прилагательного оканчивается на букву "-y" с предшествующим согласным, то при прибавлении суффикса "-er" буква "-y" переходит в "-i":

dry – drier

сухой – более сухой

При сравнении разной степени качества употребляется союз "than" – чем.

The line AB is longer than the line CD.

Линия AB длиннее, чем линия CD.

Сравнительная степень прилагательных, состоящих из более, чем двух слогов, образуется при помощи слова "more – более":

useful – more useful

полезный – более полезный

The Russian language is more difficult than the English one.

Русский язык сложнее английского.

Превосходная степень указывает на высшую степень качества предмета и образуется при помощи суффикса "-est" от односложных и двусложных прилагательных или слова "most – самый" от некоторых двусложных и более длинных прилагательных. Причём при прибавлении суффикса "-est" сохраняются те же правила, что и для суффикса "-er". Поскольку данный предмет выделяется из всех прочих подобных ему предметов по своему качеству, то перед прилагательными в превосходной степени обычно употребляют определённый артикль "the":

large – the largest
большой – самый большой

hot – the hottest
горячий – самый горячий

dry – the driest
сухой – самый сухой

useful – the most useful
полезный – самый полезный.

It's the most difficult rule of all.
Это самое трудное правило из всех.

В английском языке существует ряд прилагательных, которые образуют степени сравнения не по общим правилам. Некоторые из них приводятся ниже в таблице.

Положительная степень	Сравнительная степень	Превосходная степень
good – *хороший* bad – *плохой, плохо* much, many –*много* little – *маленький, мало* well – *хорошо* far – *далеко*	better – *лучше* worse – *хуже* more – *больше* less – *меньше* better –*лучше* farther, further– *дальше*	(the) best – *самый лучший* (the) worst – *самый плохой* (the) most – *больше всего* (the) least – *меньше всего* (the) best – *лучше всего* (the) farthest, furthest *дальше всего*

Многие наречия (в основном наречия образа действия) имеют степени сравнения: положительную, сравнительную и превосходную, которые образуются также? как и степени сравнения прилагательных.

Положительная степень	**Сравнительная степень**	**Превосходная степень**
1. Односложные наречия и наречия **early**		
fast – быстро **soon** – скоро **early** – рано	**faster** – быстрее **sooner** – скорее **earlier** – раньше	**(the) fastest** – быстрее всего **(the) soonest** – скорее всего **(the) earliest** – раньше всего
2. Наречия, образованные от прилагательных при помощи суффикса – **ly**		
clearly – ясно	***more* clearly** – яснее ***less* clearly** – менее ясно	**(the) *most* clearly** – яснее всего **(the) *least* clearly** – наименее ясно
3. Наречия **well** – хорошо, **badly** – плохо, **much** – много, **little** – мало, **far** – далеко образуют степени сравнения от других корней		
well – хорошо **badly** – плохо **much** – много **little** – мало **far** – далеко	**better** – лучше **worse** – хуже **more** – больше **less** – меньше **farther** – дальше **further** – дальше	**(the) best** – лучше всего **(the) worst** – хуже всего **(the) most** – больше всего **(the) least** – меньше всего **(the) farthest** – дальше всего **(the) furthest** – дальше всего

Упражнение 1. Дополните предложения, используя сравнительную степень.

1. It's too noisy here. Can we go somewhere _quieter?_
2. This coffee is very weak. I like it a bit – – – .
3. The hotel was surprisingly big. I expected it to be – – – .
4. The hotel was surprisingly cheap. I expected it to be – – – .
5. The weather is too cold in this country. I'd like to live somewhere – – – .
6. My job is a bit boring sometimes. I'd like to do something – – – .
7. 1 was surprised how easy it was to use the computer. I thought it would be – – – .
8. Your work isn't very good. I'm sure you can do – – – .
9. Don't worry. The situation isn't so bad. It could be – – – .
10. 1 was surprised we got here so quickly. I expected the journey to take – – – .

11. You're talking very loudly. Can you speak a bit – – – .
12. You hardly ever phone me. Why don't you phone me – – –

Упражнение 2. Дополните предложения, используя сравнительную степень данных слов. Где необходимо, используйте «than».

big crowded early easily high important interested peaceful reliable serious simple thin

1. I was feeling tired last night, so I went to bed _earlier than_ usual.
2. I'd like to have a _more reliable_ car. The one I've got keeps breaking down.
3. Unfortunately her illness was – – – we thought at first.
4. You look – – – Have you lost weight?
5. I want a – – – flat. We don't have enough space here.
6. He doesn't study very hard. He's – – – in having a good time.
7. Health and happiness are – – – money.
8. The instructions were very complicated. They could have been – – – .
9. There were a lot of people on the bus. It was – – – usual.
10. I like living in the countryside. It's – – – living in a town.

Упражнение 3. Дополните предложения, используя превосходную степень + предлог.

1 It's a very nice room. It _is the nicest room in_ the hotel.
2. It's a very cheap restaurant. It's – – – the town.
3. It was a very happy day. It was – – – my life.
4. She's a very intelligent student. She – – – the class.
5. It's a very valuable painting. It – – – the gallery.
6. Spring is a very busy time for me. It – – – the year.

In the following sentences use one of + a superlative + a preposition.

7 It's a very nice room. It _is one of the nicest rooms in_ the hotel.
8. He's a very rich man. He's one – – – the world.
9. It's a very old castle. It – – – Britain.
10. She's a very good player. She – – – the team.

Упражнение 4. Раскройте скобки, употребляя much/a bit и сравнительную степень данных слов. Где необходимо используйте «than».

1. Her illness was – – – much more serious than – – – we thought at first. (much/serious)
2. This bag is too small. I need something – – – . (much/big)
3. I'm afraid the problem is – – – it seems. (much/complicated)
4. You looked depressed this morning but you look – – – now. (a bit/happy)
5. I enjoyed our visit to the museum. It was – – – I expected. (far/Interesting)
6. You're driving too fast. Could you drive – – – ? (a bit/slowly)
7. It's – – – to learn a foreign language in the country where it is spoken. (a lot/easy)
8. I thought she was younger than me but in fact she's – – – (slightly/old)

Упражнение 5. Переведите предложения.

1. Сегодня гораздо холоднее, чем было вчера.
2. Теперь у меня уходит больше времени на дорогу, чем раньше.
3. Во время спортивного кросса Дейв пробежал больше, чем остальные участники.
4. В этом году я сдам экзамены успешнее, чем в прошлом.
5. Автобус едет дольше, чем поезд.
6. Наш университет значительно больше вашего.
7. Эта книга гораздо интереснее, чем предыдущая.
8. Путешествовать пароходом комфортнее, чем поездом.
9. Эти задания значительно сложнее.
10. Вы себя лучше чувствуете?
11. Этот костюм красивее, но гораздо дороже.
12. Говорят, что английский язык изучать легче, чем остальные.
13. Наша новая квартира просторнее предыдущей.

Unit 3. NATURAL GAS
Text A. Natural gas distribution system

Natural gas is a fossil fuel. It is a gaseous molecule that's made up of two atoms – one carbon atom combined with four hydrogen atom. It's chemical formula is CH4. The picture on the right is a model of what the molecule could look like.

Don't confuse natural gas with "gasoline," which we call ‘’gas’’ for short. Like oil, natural gas is found under ground and under the ocean floor. Wells are drilled to tap into natural gas reservoirs just like drilling for oil. Once a drill has hit an area that contains natural gas, it can be brought to the surface through pipes.

The natural gas has to get from the wells to us. To do that, there is a huge network of pipelines that brings natural gas from the gas fields to us. Some of these pipes are two feet wide.

Natural gas is sent in larger pipelines to power plants to make electricity or to factories because they use lots of gas. Bakeries use natural gas to heat ovens to bake bread, pies, pastries and cookies. Other businesses use natural gas for heating their buildings or heating water.

From larger pipelines, the gas goes through smaller and smaller pipes to your neighborhood.

In businesses and in your home, the natural gas must first pass through a meter, which measures the amount of fuel going into the building. A gas company worker reads the meter and the company will charge you for the amount of natural gas you used.

Energy can be found in a number of different forms. It can be chemical energy, electrical energy, heat (thermal energy), light (radiant energy), mechanical energy, and nuclear energy.

In some homes natural gas is used for cooking, heating water and heating the house in a furnace.

In rural areas, where there are no natural gas pipelines, propane (another form of gas that's often made when oil is refined) or bottled gas is used instead of natural gas. Propane is also called LPG, or liquefied petroleum gas, is made up of methane and a mixture with other gases like butane.

Propane turns to a liquid when it is placed under slight pressure. For regular natural gas to turn into a liquid, it has to be made very, very cold.

Cars and trucks can also use natural gas as a transportation fuel, but they must carry special cylinder– like tanks to hold the fuel.

When natural gas is burned to make heat or burned in a car's engine, it burns very cleanly. When you combine natural gas with oxygen (the process of

combustion), you produce carbon dioxide and water vapor; plus the energy that's released in heat and light.

Some impurities are contained in all natural gas. These include sulphur and butane and other chemicals. When burned, those impurities can create air pollution. The amount of pollution from natural gas is less than burning a more "complex" fuel like gasoline. Natural gas-powered cars are more than 90 percent cleaner than a gasoline-powered car.

That's why many people feel natural gas would be a good fuel for cars because it burns cleanly (source: http://www.energyquest.ca).

What is natural gas used for in homes?

Text B. Residential use

Natural gas is one of the cheapest forms of energy available to the residential consumer. In fact, natural gas has historically been much cheaper than electricity as a source of energy. According to the Department of Energy (DOE) natural gas costs less than 30 percent of the cost of electricity, per Btu.

Not only is natural gas cheap for the residential consumer, it also has a number of varied uses. The best known uses for natural gas around the home are natural gas heating and cooking. Cooking with a natural gas range or oven can provide many benefits, including easy temperature control, self ignition and self cleaning, as well as being approximately one– half the cost of cooking with an electric range.

Natural gas is one of the most popular fuels for residential heating. This popularity is also shown through the high proportion of new homes built with natural gas heating.

Despite his increase in the proportion of homes using natural gas the actual volume of natural gas consumed has not increased to the same degree due to increased efficiency of natural gas appliances. Modern top of the line gas furnaces can achieve efficiencies of over 90 percent (meaning that only 10 percent of the energy contained in the natural gas is lost as waste heat).

In addition to healing homes, natural gas can also be used to help cool houses, through natural gas powered air conditioning. Natural gas air conditioning is nothing new; in fact, it provided most of the air conditioning requirements of the 1940's and 50's. However, due to new advancements in technology and efficiency, natural gas air conditioning is experiencing resurgence in popularity. Although natural gas air conditioner units are initially more expensive than a comparable electric unit, they are considerably more

efficient and require less maintenance.

Natural gas appliances are also rising in popularity due to their efficiency and cost effectiveness. Although many gas powered appliances are initially more expensive than their electric counterparts, they are commonly much cheaper to operate, have a longer expected life, and require relatively low maintenance. Some examples of other natural gas appliances include space heaters, clothes dryers, pool and jacuzzi heaters, fireplaces, barbecues, garage heaters, and outdoor lights. All of these appliances offer a safe, efficient, and economical alternative to electricity or other fuel sources.

Although natural gas has many uses, and can supply energy to a vast number of residential appliances, there are some energy requirements around the house which cannot be satisfied by natural gas. A television, or blender, or microwave, for instance, will likely never be powered directly by natural gas, but will instead require electricity. However, natural gas can still provide energy for these appliances at home, by what is known as 'distributed generation'.

Distributed generation refers to using natural gas to generate electricity right on the doorstep. Natural gas fuel cells and microturbines both offer the residential consumer the capacity to disconnect from their local electric distributor, and generate just enough electricity to meet their needs. Although this technology is still in its infancy, it is very promising in being able to offer independent, reliable, efficient, environmentally friendly electricity for residential needs.

The very first natural gas fuel cell was installed in a house in Latham, New York, in July 1998. The system was plugged into the home's natural gas line as the fuel supply, and is now completely independent of any outside electricity. Because a significant amount of electricity is wasted when it is distributed through power lines from a central power plant to the home, on– site electric generation could lead to significantly higher energy efficiency, which translates to cost savings for the residential consumer (source: www.energyquest.ca).

Active vocabulary

1. Try to memorize the following words and phrases.

Nouns and noun phrases	
resurgence	возрождение
consumer	потребитель
self ignition	самовоспламенение
advancement	продвижение
counterparts	коллеги

requirement	требование
infancy	младенчество
appliance	прибор
Verbs and verbal phrases	
to disconnect	отключить
to plug	подключить
to offer	предложить
to provide	обеспечить
Adjectives	
residential	жилой
versatile	разносторонний
comparable	сопоставимый
distributed	распределенный
reliable	надежный
Adverbs	
initially	первоначально
approximately	приблизительно
consider	по соображениям

2. Choose the right word.

For hundreds of years, natural gas has been known as a very *(useful / useless)* substance. The Chinese *(discovered/invented)* a very long time ago that the energy in natural gas could be harnessed, and used to *(heat / cool)* water. In the early days of the natural gas industry, the gas was mainly used to *(light / heal)* street– lamps, and the occasional *(house /place).*

There are so many *(different /special)* applications for this fossil fuel: commercially, in your home, in industry, and even in the transportation sector!

For example, energy from *(natural / man– made)* gas accounts *(for / at)* 24 percent of total energy consumed in the United States, making it a vital component of the nation's energy *(supply /demand).*

Comprehension check

1. Decide whether the following statements are true or false according to the text.

1) Natural gas is widely used in air conditioning systems.
2) Natural gas air conditioner units are initially more expensive than a comparable electric unit.
3) Gas powered appliances require relatively low maintenance.
4) Electricity has historically been much cheaper than natural gas as a source of energy.
5) Natural gas is used around the home for heating as well as cooling.
6) No energy contained in the natural gas is lost as waste heat.
7) Such devices as a TV set or microwave will unlikely be powered directly by natural gas.
8) Natural gas fuel cells offer the residential consumer the capacity to disconnect from their local electric distributor.
9) The very first natural gas fuel cell was installed m a house in Latham, New York, in June 1998.
10) No electricity is wasted when it is distributed through power lines from a central power plant to the home.

2. Answer the following questions and give examples.

1) Can natural gas be used to cool houses? Why? Why not?
2) Why are natural gas appliances rising in popularity?
3) What are they?
4) Are electric or gas powered appliances cheaper to install? Why? Why not?
5) What energy requirements around the house cannot be satisfied by natural gas?
6) What is the lowest cost conventional energy source available for residential use?
7) What are the best known uses for natural gas around the home?
8) What are the benefits provided with cooking by natural gas?
9) What efficiency can modern top of line gas furnaces achieve?
10) Is natural gas air conditioning experiencing decline in popularity?

3. Choose the best abstract for the text.

1. Natural gas is a cheap, efficient source of energy for the residential consumer and has a variety of uses around the house.
2. Natural gas has been harnessed in residential use for a long time and it is more efficient than electricity.
3. Natural gas can be used not only for heating and cooling but for a number of varied residential uses.

4. Discuss with your groupmates or in pairs what is more ecologically friendly: electricity or natural gas.

5. Translate the following words and phrases into English using the vocabulary of the text.

Распределительное производство, топливный элемент, быть на начальной стадии развития, быть многообещающим, безвредный к окружающей среде, доступная форма, потребитель, обеспечивать выгоду, отопление жилого помещения, возрождение популярности, предполагаемый срок службы, комнатный обогреватель, требовать меньше текущего обслуживания, дешевый в эксплуатации, значительное количество, экономия в расходах.

Answer the following question and read the text below to check your answer.
What is natural gas used for in commercial sector?

Text C. Commercial uses

Commercial uses of natural gas are very similar to residential uses. The commercial sector includes public and private enterprises, like office buildings, schools, churches, hotels, restaurants and government buildings. The main uses of natural gas in this sector include space heating, water heating, and cooling. For restaurants and other establishments that require cooking facilities, natural gas is a popular choice to fulfill these needs.

Natural gas currently accounts for 13 percent of energy used in commercial cooling, but this percentage is expected to increase due to technological innovations in commercial natural gas cooling techniques. There are three types of natural gas driven cooling processes. Engine driven chillers use a natural gas engine, instead of an electric motor, to drive a compressor. With these systems,

waste heat from the gas engine can be used for healing applications, increasing energy efficiency. The second category of natural gas cooling devices consist of what are called absorption chillers, which provide cool air by evaporating a refrigerant like water or ammonia. These absorption chillers are best suited to cooling large commercial buildings, like office towers and shopping malls. The third type of commercial cooling system consists of gas-based desiccant systems. These systems cool by reducing humidity in the air. Cooling this dry air requires much less energy than it would to cool humid air.

Another area of growth in commercial natural gas use is in the food service industry as it is a flexible energy source in being able to supply the food service industry with appliances that can cook food in many different ways. New developments such as Nontraditional Restaurant Systems, which provide compact, multifunctional natural gas appliances for smaller sized food outlets such as those found in shopping malls and airports, are expanding the commercial use of natural gas. These types of systems can integrate a gas-fired fryer, griddle, oven, hot and cold storage areas, and multiple venting options in a relatively small space – providing the ease and efficiency of natural gas cooking while being compact enough to serve small kiosk type establishments.

In addition to traditional uses of natural gas, a number of technological advancements have allowed natural gas to be used to increase energy efficiency in commercial settings. Many buildings, because of their high electricity needs, have on-site generators that produce their own electricity. Natural gas powered reciprocating engines, turbines, and fuel cells are all used in commercial settings to generate electricity. These types of "distributed generation" units offer commercial environments more independence from power disruption, high-quality consistent electricity, and control over their own energy supply.

Another technological innovation brought about is combined heating and power (CHP) and combined cooling, heating and power (CCHP) systems, which are used in commercial settings to increase energy efficiency. These are integrated systems that are able to use energy that is normally lost as heat. For example, heat that is released from natural gas powered electricity generators can be harnessed to run space or water heaters, or commercial boilers. Using this normally wasted energy can dramatically improve energy efficiency (source: www.howstuffworks.com).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
private enterprise	частное предприятие
absorption	поглощение
refrigerant	холодильный
establishment	создание
chiller	холодильник
desiccant	осушитель
humidity	влажность
appliance	прибор
outlet	выход
fryer	фритюрница
griddle	жарить на сковородке
venting options	варианты вентиляции
disruption	нарушение
commercial settings	коммерческие условия
consistent electricity	последовательное электричество
Verbs and verbal phrases	
to fulfill	выполнить
to integrate	интегрировать
to absorb	поглощать
to evaporate	испаряться
to expand	расширить

Comprehension check

1. Complete the following sentences according to the text.

1) Natural gas currently ...
2) Engine driven chillers use ...
3) The second category consist of...
4) The third type of commercial cooling system consists . .
5) Another area of growth in commercial natural gas use is ...
6) The commercial sector includes ...
7) The main uses of natural gas in this sector include ...
8) For restaurants natural gas is ...

9) In addition to traditional uses ...
10) Another technological innovation is ...

2. Answer the following questions and give examples.

1) How is natural gas used in buildings with high electricity needs?
2) What technological innovation to increase energy efficiency do you know?
3) According to the given graph, which commercial sector has the least natural gas harnessing?
4) What does the commercial sector include?
5) What are the main uses of natural gas in this sector?
6) How many types of natural gas driven cooling processes do you know? What are they?
7) Why is natural gas broadly harnessed in the food service industry?

3. Divide the text into logical parts and make an oral report on the text.

4. Fill in the table with appropriate derivatives.

Generation, currently, commercial, improve, dramatically, on– site, expand, technique, normally, desiccant, account, choice, relatively, public, require, refrigerant, high– quality, chiller, harness.

Adverb	Verb	Adjective	Noun

6. Combine the words from the column on the left with the suitable nouns from the column on the right. Translate them into Russian.

1) to require	a) cell
2) to fulfill	b) heating
3) desiccant	c) efficiency
4) fuel	d) facilities
5) distributed	e) innovations
6) space	f) system
7) technological	g) generation
8) energy	h) needs

7. Match the opposites.

1) heating	a) slightly
2) natural	b) humidifier
3) to improve	c) to decrease
4) to increase	d) to deteriorate
5) desiccant	e) extended
6) flexible	f) similar
7) compact	g) cooling
8) different	h) fixed
9) disruption	i) artificial
10) dramatically	j) combination

Answer the following question and read the text below to check your answer.
What is the natural gas used for in industry?

Text D. Uses in industry

Natural gas has a multitude of industrial uses, including providing the base ingredients for such varied products as plastic, fertilizer, antifreeze, and fabrics. In fact, industry is the largest consumer of natural gas, accounting for 43 % of natural gas us across all sectors. Natural gas is the second most used energy source in industry, trailing only electricity.

Industrial applications for natural gas are many, including the same uses found in residential and commercial settings – healing, cooling, and cooking. Natural gas is also used for waste treatment and incineration, metals preheating (particularly for iron and steel), drying and dehumidification, glass melting, food processing, and, fueling industrial boilers. Gases such as butane, ethane, and propane may be extracted from natural gas to be used as a feedstock for such products as fertilizers and pharmaceutical products.

Natural gas is converted to what is known as synthesis gas, which is a mixture of hydrogen and carbon oxides formed through a process known as steam reforming. In this process, natural gas is exposed to a catalyst that causes oxidization of the natural gas when brought into contact with steam. This synthesis gas, once formed, may be used to produce methanol (or Methyl Alcohol), which in turn is used to produce such substances as formaldehyde, acetic acid, and MTBE (methyl tertiary butyl ether) that is used as an additive for cleaner burning gasoline. Methanol may also be used as a

fuel source in fuel cells.

In addition to these uses, there are a number of innovative and industry specific uses of natural gas. Natural gas desiccant systems, which are used for dehumidification, are increasingly popular in the plastics, pharmaceutical, candy, and even recycling industries. Adding a natural gas desiccant system to the manufacturing or diving environment allows industrial users to regulate more closely the amount of moisture in the air, leading to a more consistent and high– quality product.

Natural gas absorption systems are also being used extensively in industry to heat and cool water in an efficient, economical, and environmentally sound way. These industrial absorption systems are very similar to those used in commercial settings (source: www.howstuffworks.com).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
waste treatment	обработка отходов
steam reforming	паровой риформинг
incineration	сжигание
multitude	множество
ethane	этан
feedstock	сырье
catalyst	катализатор
recycling industry	перерабатывающая промышленность
formaldehyde	формальдегид
butane	бутан
dehumidification	обезвоживание
acetic acid	уксусная кислота
additive	добавка
fueling	заправка топливом
natural gas absorption system	естественная система поглощения газов
natural gas desiccant system	естественная система осушителя газа
Verbs and verbal phrases	
to extract	извлечения
to trail	плестись

Comprehension check

1. Complete the following sentences according to the text.

1) Synthesis gas is a mixture of...
2) ... is used as an additive for cleaner burning gasoline.
3) Natural gas desiccant systems are increasingly popular in ...
4) Natural gas has a multitude of industrial uses, including...
5) Butane, ethane and propane are used as a feedstock for ...
6) Adding a natural gas desiccant system to the manufacturing or drying environment allows industrial users to …

2. Correct the following statements.

1) There are a few innovative and industry specific uses of natural gas.
2) The regulation of the amount of gas in the air leads to a more consistent and high– quality product.
3) Natural gas is the largest most used energy source in industry.
4) Synthesis gas may be used to produce formaldehyde, acetic acid and MTBE.
5) The industrial absorption systems differ from those used in commercial settings.

3. Answer the following questions and give examples.

1) What are the industrial applications of natural gas?
2) What gases may be extracted from natural gas?
3) What is steam reforming?
4) Is industry the largest consumer of natural gas? Why? Why not?
5) Where may methanol be used as a fuel source?
6) What are natural gas desiccant systems used for?
7) Why are natural gas absorption systems being widely used in industry?

3. Find key words and phrases which best express the general meaning of each paragraph.

4. Write a summary of Text D.

5. Combine the words from the column on the left with the suitable nouns from the column on the right. Translate them into Russian.

1) glass	a) application
2) base	b) treatment
3) industrial	c) reforming
4) pharmaceutical	d) ingredients
5) high– quality	e) system
6) waste	f) products
7) steam	g) melting
8) desiccant	h) products
9) absorption	i) systems
10) commercial	j) settings

Grammar section

The article. Артикль

Артикль служит определителем имени существительного, он передает значение определенности и неопределенности в существительном и при этом собственного, отдельного вещественного значения не имеет.

Неопределённый артикль **a** (**an** – перед словами, начинающимися с гласной) может сочетаться только с существительными в единственном числе. Определенный артикль происходит от числительного **one** и употребляется:

– в значении *один.*

Wait a minute! We walked a mile or two.

– означает *один из многих, какой– то, любой.*

Have you a sister or a brother? A cow gives milk. A ball is round.

– употребляется с существительными, обозначающими время, скорость, вес, расстояние

a minute, a pound, a hundred, a million.

Определённый артикль **the** происходит от указательного местоимения **that.** Употребляется перед существительными как в единственном, так и во множественном числе.

Определённый артикль употребляется, когда:

– из ситуации или контекста ясно, какое именно лицо или предмет имеется ввиду.

They went to the station. Close the window and turn on the light.

– после существительного имеется определение, выделяющее лицо или предмет из ряда им подобных.

The book that (which) I gave you yesterday is very interesting.

– перед существительным стоит определение, выраженное: порядковым числительным *January is the first month of the year.*

– прилагательным в превосходной степени This is the biggest building in our town.

– словами same, right, very, only и др. *Are we on the right road? Do you eat the same food every day?*

– существительное обозначает предмет, единственный в своем роде или в определенной ситуации.

The moon moves round the Earth. The sun shines by day in the sky.

– существительное обобщает весь класс подобных лиц (предметов).

The clown first appeared in the English circus.

The horse is a useful domestic animal.

Артикли не употребляются:

– перед неисчисляемыми существительными.

I like milk. The socks are made of thick grey wool.

– перед существительными в значении обращения.

Good morning, sweet child!

– перед названиями времен года.

Summer is my favourite season. When winter comes, the weather gets cold.

– перед названиями приемов пищи.

We have breakfast and supper at home, but we don't have dinner at home.

– перед существительными, обозначающими общественные учреждения.

School, hospital, prison.

Употребление / неупотребление артикля с именами собственными

Определенный артикль the	
географические названия и части света	the North Pole, the east, the west и др.
названия рек	the Volga, the Thames, the Nile
названия озер (без слова lake)	the Ontario
названия морей и океанов	the Black sea, the Pacific Ocean
названия горных цепей	the Urals, the Alps, the Caucasus
названия пустынь	the Sahara, the Karakum
названия каналов	the Panama Canal, the English Channel
названия некоторых государств и республик (со словами republic, Kingdom, state, federation)	the USA, the Russian Federation, the United Kingdom
названия большинства газет	the Times, the Washington Post
фамилии, называющие всю семью	the Browns, the Forsytes
названия достопримечательностей	the Kremlin, the Hermitage
Артикли не употребляются	
названия городов и стран	Moscow, New York, London
названия гор	Everest, Kilimanjaro
названия улиц и площадей	Downing Street, Red Square
имена	Tomas Smith, Ivan Petrov
дни недели, месяцы	Monday, Sunday, February, June
виды спорта, научные области знаний	basketball, hockey; sociology, physics

Упражнение 1. Вставьте артикль, где необходимо.

1. “What do you do?” – “I’m a student. I am ... first-year student”. 2. They are ... first-year students. 3. “Is Helen ... student or ... teacher?” – “She is ... student”. 4. This ... young man is ... student of ... group 3. 5. This is ... good room. 6. What room is this?” – “ This is ... room 25”. 7. Is Mary from ... Manchester or from ... Glasgow? 8. ... Thames is ... long river. 9. His ... room is good. 10. Read ... first sentence, please. 11. Are ... Thompsons in ... Middle East now? – Yes, they are. 12. My … father is … economist. He is at … home now. 13. I gave … magazine to my … friend. 14. I usually wear … cap. 15. Give me … pen. This … pen is bad. Give me another … pen. 15. Nick will show … book to … teacher.

Упражнение 2. Вставьте артикль, где необходимо.

1. After … work I usually go home. 2. He often comes to … work late. 3. I begin my work at … half past eight. 4. Close … window, please. It is cold in … room. 5. She is eating … apple. 6. He made … mistake in his dictation. 7. … lion is … wild animal. 8. I need … pencil. Give me … pencil, please. 9. Yesterday our team won … match. 10. He is not … man I am looking for. 11. I don't go to … school on … Sunday. 12. Are there any … flowers in … vase? 13. She lives on … fifth floor. 14. This … young woman is … engineer. 15. That man has two children. … first child was born 5 years ago and … second was born … last year. 16. Do you like … city? – It is one of … most beautiful cities in … world.

Упражнение 3. Вставьте артикль, где необходимо.

1. … London is … capital of … Great Britain, … full name of which is … United Kingdom of … Great Britain and … Northern Ireland.
2. … Volga is fabulous river. It is one of … most beautiful … rivers in … Russia.
3. They used to spend their summer holidays on … Black Sea coast in … Crimea.
4. Many European adventurers crossed … Atlantic Ocean in … search of … riches on … American continent prior to … Columbus.
5. … Gorki Street was renamed into … Tverskaya Street.
6. … Red Square and … Kremlin are … heart of … capital.
7. … St. Petersburg was founded on … banks of … Neva by Peter … Great.
8. … Johnsons are our next– door neighbors.
9. … Canada is situated in … northern part of … North America.
10. We left for … East on … following morning.
11. They passed many coal mines on … way.
12. He arrived in … New York on … very rainy day.
13. She spent several hours at … Bronx Zoo on … Monday.
14. They took … wonderful boat ride around … Manhattan on … last day of their visit.

Упражнение 4. Вставьте артикль, где необходимо.

1. I don't usually like staying at … hotels, but last summer we spent a few days at … very nice hotel by … sea.

2. … tennis is my favourite sport. I play once or twice … week if I can, but I'm not … very good player.

3. I won't be home for … dinner this evening. I'm meeting some friends after … work and we're going to … cinema.

4. … unemployment is very high at the moment and it's very difficult for … people to find … work.

5. There was … accident as I was going … home last night. Two people were taken to … hospital. I think … most accidents are caused by … people driving too fast.

6. Carol is … economist. She used to work in … investment department of … Lloyds Bank. Now she works for … American bank in … United States.

7. A: What's … name of … hotel where you're staying?

B: … Imperial. It's in … Queen Street in … city centre. It's near … station.

8. I have two brothers. … older one is training to be … pilot with … British Airways. … younger one is still at … school. When he leaves … school, he hopes to go to … university to study … law.

The verb
Глагол

Глагол – часть речи, которая обозначает действие или состояние лица или предмета. Глагол в английском языке обладает гораздо более сложной, чем в русском, системой видовременных форм. Эта система охватывает личные формы (**finite forms**) и неличные формы (**non-finite forms**).

Личные формы глагола выражают следующие категории: лицо, число, время, вид, залог, наклонение. Личная форма, как и в русском языке, в предложении всегда употребляется в функции сказуемого.

We live in Russia. – *Мы живём в России.*

They write letters every day. – *Они пишут письма каждый день.*

Do you hear what he is saying? – *Вы слышите, что он говорит?*

Основные глагольные формы

I	II	III	IV
Инфинитив	Прошедшее неопределённое время	причастие II	причастие I
Infinitive	**Past Indefinite**	**Participle II**	**Participle I (-ing** форма)
to write	***wrote***	***written***	***writing***
to develop	***developed***	***developed***	***developing***

Инфинитив представляет собой неличную форму глагола, которая только называет действие. Он не имеет ни лица, ни числа и соответствует неопределённой форме глагола в русском языке. В словаре глагол даётся обычно в форме инфинитива. Формальным признаком инфинитива является частица **to**.

По способу образования II u III формы все глаголы английского языка делятся на правильные (стандартные) и неправильные (нестандартные).

I	II	III	IV
to ask	**asked**	**asked**	**asking**
to write	**wrote**	**written**	**writing**

Времена английского глагола. Действительный залог

Употребление		Образование
Indefinite показывает действие как факт (обычное, повторяемое)	**Present** **Past** **Future**	глагол в личной форме
Continuous показывает действие как процесс	**Present** **Past** **Future**	**to be + ing**
Perfect показывает действие, законченное до определённого момента в настоящем, прошедшем и будущем	**Present** **Past** **Future**	**to have** + причастие II
Perfect Continuous показывает действие, начатое некоторое время назад и все ещё продолжающееся или только что закончившееся	**Present** **Past** **Future**	**to have been** + ing

The Present Indefinite (Simple) Tense (настоящее неопределенное время) обозначает постоянное, повторяющееся, обычное действие, какой–либо факт или общеизвестную истину. *We live in St. Petersburg. The Earth rotates round its axis. I leave home at 8 every day.*

Present Indefinite по форме совпадает с инфинитивом глагола (без частицы **to**) во всех лицах, кроме 3– го лица ед. ч., принимающего окончание –**s** (– **es**).

Утвердительная форма	Отрицательная форма	Вопросительная форма
I play	I do not play	Do I play?
He plays	he does not play	Does he play?
She plays	she does not play	Does she play?
It plays	it does not play	Does it play?
We play	we do not play	Do we play?
You play	you do not play	Do you play?
They play	they do not play	Do they play?

do not = don't; does not = doesn't

Present Indefinite часто употребляется с наречиями, выражающими частотность: *always* – всегда, *often* – часто, *seldom* – редко, *sometimes* – иногда, *never* – никогда, *hardly ever* – почти никогда, *nearly always* – почти всегда, *usually* – обычно, *generally* – как правило, *every day* – каждый день (*week, month, year* – неделю, месяц, год).

Упражнение 1. Поставьте данные предложения в отрицательную и вопросительную форму.

A. Model: I like bananas. – I do not like bananas. Do you like bananas?

1. I write letters regularly. I ... not ... letters regularly. ... you ... letters regularly? 2. I drive a car. I ... not ... a car. ... you ... a car? 3. You sing well. You ... not ... well. … you … well? 4. They live in London. They ... not ... in London. ... they ... in London?

B. Model: He likes coffee. – He does not like coffee. Does he like coffee?

1. She watches TV every day. She ... not ... TV every day. ... she ... TV every day? 2. He often gives her flowers. He ... not ... her flowers. ... he often ... her flowers? 3. She helps her mother about the house. She ... not ... about the house. ... she ... her mother about the house? 4. He likes classical music. He ... not ... classical music. ... he ... classical music?

Упражнение 2. Раскройте скобки, употребляя глаголы в Present Indefinite. Поставьте данные предложения в отрицательную и вопросительную форму.

1. Her brothers always (to tell) the truth, she sometimes (to lie). 2. They (to laugh) a lot, she (to cry) a lot. 3. We (to eat) much, she (to eat) little. 4. I (to like) meat, she (to like) fish. 5. We (to go) to the disco three time a week, he never (to go) there. 6. They (to ask) questions, my little sister (to ask) many questions too. 7. My brother and I always (to help) our mother with the housework, but our sister never (to help) her. 8. I always (to give) her good advice, she (to follow) it. 9. You (to like) ballet, she (to like) opera. 10. My friends often (to visit) me, my girlfriend never (to visit) me. 11. We always (to get) up early, she always (to get) up late. 12. We (to be) from Moscow, she (to be) from Canada. 13. They (to make) friends easily, she hardly (to make) friends. 14. They (to look) very happy, she (to look) unhappy. 15. My friends (to go) to the Crimea every summer, she (to go) to the Caucasus every summer. 16. We (to drive) slowly, he (to drive) fast. 17. They (to speak) Spanish and Italian, she (to speak) English.

Упражнение 3. Дополните предложения, используя следующие глаголы.

believe, eat, flow, grow, make, rise, tell, translate, speak, drink, cause, live

1.Ann ….. German very well. 2. Rice ….. in Britain. 3. I never ….. coffee. 4. The sun ….. in the east. 5. Bees ….. honey. 6. Vegetarians ….. meat. 7. An atheist …. in God. 8. Bad driving ….. many accidents. 9. An interpreter ….. from one language into another. 10. My parents ….. in a very small flat. 11. A liar is someone who ….. the truth. 12. The River Amazon …. into the Atlantic Ocean.

Unit 4. RENEWABLE SOURCES OF ENERGY

Answer the following questions and read the text below to check your answer.

1) What is the difference between renewable and non– renewable energy sources?
2) Why is it so important to develop alternative energy sources?

Text A. The pros and cons of alternative energy

Oil and oil products make the world go round, some would say. Just about every piece of equipment or type of machinery uses oil to run. Oil, however, is a «non-replenishable» resource, and when it runs out, how will we run our equipment and machinery? In response to this question, many are trying to develop alternative sources of energy. Hopefully, these alternative sources will make the world less dependent on the limited supply of oil.

There are a number of types of alternative energy sources which have already been developed. They include:

Energy from the sun. Known as solar energy, this powerful and unlimited source of energy would offer us a very efficient alternative to oil, and it is a free resource.

If solar power were properly developed, it could easily become our primary power source. The use of solar power is especially attractive in areas that have long days and not much cloud cover. It is therefore ideal for less developed areas which may be far from the more traditional power sources.

The problem is that capitalizing on this powerful resource is not as simple as it seems. Locations with limited daylight hours or consistently overcast skies do not receive the amount of light required to store the energy, in addition, locations that do not have wide expanses of land available will not be able to tap this resource, since the photocells necessary to collect and store the sunlight require large tracts of land.

Wind. The power of the wind was harnessed hundreds of years ago to run windmills, which directly ran mills on farmlands. The same principle can now be used, with the addition of storage capacity, to supply as much as 20 % of our energy needs. In locations with strong winds, such as along the seashore, or in the mountains, wind can easily be harnessed to run generators to create electricity. This is an energy alternative that is safe and clean: no harmful carbon dioxide or other gases are produced in the creation of electricity through wind power. However, there are many areas that don't receive enough wind to make it a reliable source.

Hydroelectric energy. A powerful surge of water sluicing over a cliff creates a tremendous source of energy. This is the concept behind the construction of the many dams in the world today. Hydroelectric energy is another clean alternative to oil, since it does not produce waste or pollution. Energy produced by a dam is cheap and adaptable, but the cost of building a dam is very high and, without destroying entire potentially habitable areas, it is difficult to find locations for dams. Tidal energy – the power of water can also be harnessed on a smaller scale by the use of tidal flow. This alternative is very limited, however, since not every area has bodies of water with strong tidal flows, and the concern over the effect on fish and birds in the area raise many concerns. It is also not a steady source of energy, since tides move in twice daily movements. For this reason there are only nine workable sites for this type of power and only two being used.

Biomass. Biomass can be considered a nice way of speaking of waste. Animal waste, rotten crops and grains, residues from wood mills and aquatic waste can all be fermented to form an alcohol that is comparable to coal in its energy producing powers. It also produces greenhouse gases, making it one of the less attractive alternative energy sources. In addition to these more «natural» sources of energy production, fusion, fuel cells, nuclear, geothermal and hydrogen energies can be used for our future needs for power. These have negative environmental effects and so are questioned as alternative sources, but doesn't oil have as many, if not more negative effects? (source: www.ecoenerfysc.com)

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
photocell	фотоэлемент
surge of water	всплеск воды
concern	беспокойство
Verbs and verbal phrases	
to run out	выбежать
to capitalize	извлечь выгоду
to tap a resource	задействовать ресурс
to sluice	промывать
Adjectives	
overcast	облачный

non– replenishable	невосполнимый
adaptable	приспосабливающийся
habitable	обитаемый
Adverbs	
properly	правильно

1. Choose the right option.

Renewable energy sources

1) I am heat energy from inside the Earth. I heat underground rocks and water. Sometimes I am buried too deep to use. I am clean energy.

a) Biomass

b) Geothermal

c) Wind

2) I am the energy in things that used to be alive. My energy is stored in trees, plants, and garbage. You can burn me to make heat and electricity. I can pollute the air when I am burned.

a) Petroleum

b) Biomass

c) Wind

3) I am the energy in moving water. Dams can harness my energy. My power can make electricity. I am clean, cheap energy.

a) Wind

b) Hydropower

c) Natural gas

4) I am the energy in moving air. Some places have a lot of me, others only a little. Machines with blades capture my energy, turning it into electricity. I don't pollute the air, but cause noise pollution.

a) Nuclear power

b) Wind

c) Solar Energy

5) I make plants grow and I give you light. I make the wind blow and the rain fall. Today, it costs a lot to harness my energy. Photovoltaic cells can turn my energy into electricity.

a) Solar Energy

b) Water

c) Geothermal

Nonrenewable energy sources

1) I look like a shiny black rock. I am a fossil fuel that is buried underground. I am often transported by river barges. I can pollute the air when I am burned to make electricity.
a) Coal
b) Solar Energy
c) Biomass
2) I am a gas with no color, no taste and no smell. Companies give me a funny smell so that you can tell if I escape. Companies drill wells to pump me from the ground. I am the cleanest fossil fuel.
a) Petroleum
b) Oxygen
c) Natural gas
3) People drill wells to pump me from the ground and under the ocean. I am made into lots of things, like gasoline and plastics. I make more energy than any other energy source. I am a fossil fuel that pollutes the air when I am burned.
a) Petroleum
b) Geothermal
c) Coal
4) My energy is used to make electricity. I am used to make nuclear power. My energy does not pollute the air. My waste is radioactive and can be dangerous.
a) Uranium
b) Wind
c) Solar energy
5) I am used in farms and in backyard grills. I am portable and can be shipped in tanks and bottles. I am a fossil fuel that is buried underground. I am clean burning.
a) Biomass
b) Coal
c) Propane

2. Translate the following sentences from Russian into English.

1) Соответственно, необходимо более пристально рассмотреть возможность использования альтернативных источников энергии, таких как солнце, ветер, вода и т.д.
2) Все источники энергии могут подразделяться на возобновляемые и невозобновляемые.
3) Основным недостатком ископаемых видов топлива являются вредное

воздействие на окружающую среду и то, что они быстрее иссякают, чем возобновляются.

Comprehension check

1. ***Decide whether the following statements are true or false according to the text.***

1) The use of solar power is especially attractive in areas with limited daylight hours or consistently overcast skies.
2) The power of the wind has been developed recently.
3) Carbon dioxide or other gases can be produced in the creation of electricity through wind power.
4) Almost every piece of equipment or type of machinery uses gas to run.
6) There are few types of alternative energy sources which have already been developed.
7) Solar energy is a powerful and unlimited source of energy and it is a free resource.
8) Hydroelectric energy doesn't generate waste or pollution.
9) Energy produced by a dam is expensive and adaptable, but the cost of dam construction is very cheap.
10) There are only nine workable sites for tidal power and only two are in use.
11) Because of greenhouse gases, biomass is one of the less attractive alternative energy sources.

2. ***Answer the following questions.***

1) What is the concept behind the construction of the many dams in the world today?
2) What are the pros and cons of tidal energy?
3) What wastes can be fermented to form an alcohol?
4) What are the pros and cons of biomass?
5) What types of alternative energy sources have been developed yet?
6) Where is solar power especially attractive?
3) What is the main problem with capitalizing on solar power?
7) Where was the power of wind harnessed for the first time?
8) What types of landscape have strong winds?
9) Wind energy is safe and clean, isn't it? Prove it.
10) Why isn't wind power reliable in some areas?

3. ***What parts of the text can you define? Do they correspond to the paragraphs? Name each part.***

1. _____ 4._____
2._____ 5._____
3._____ … _____

4. ***Find key words and phrases which best express the general meaning of each part.***

5. ***Make an oral report on Text A.***

6. ***Discuss with your groupmates or in pairs:***

1) What are the advantages and disadvantages of alternative energy sources?
2) What are the prospects of alternative energy sources harnessing in different countries? (Find out additional information).

7. ***Read the following text and translate the words in brackets. Make an abstract of the text in 2– 3 sentences.***

In 2009 substantial investments were made to improve Belarus' *(возобновляемые источники)* capacity, with proposals including three hydroelectric plants, several *(биомасса)* and combined heat and power plants, plus the *(строительство)* of over 2.400 *(ветряки)*. Of all renewables, *(биотопливо)* is most *(привлекательны)* to Belarus because of the vast *(площадь)* of forest and farmland across the republic.

Biofuel facilities are being constructed in the southern towns of Mozyr and Bobruisk to *(производить)* 650 million litres of bio– ethanol a year, and *(химический)* company Azot is experimenting with the production of methyl ether from rape oil.

Biomass also offers ways to *(восстанавливать)* land *(загрязненный)* by the Chernobyl disaster as the growing and harvesting process helps *(очистка)* the land.

Read the text below.

Text B. How solar energy works

Solar energy – power from the sun – is free and inexhaustible. This vast, clean energy resource represents a viable alternative to the fossil fuels that currently pollute our air and water, threaten our public health, and contribute to global warming. Failing to take advantage of such a widely available and low-impact resource would be a grave injustice to our children and all future generations.

In the broadest sense, solar energy supports all life on Earth and is the basis for almost every form of energy we use. The sun makes plants grow, which can be burned as «biomass» fuel or, if left to rot in swamps and compressed underground for millions of years, in the form of coal and oil. Heat from the sun causes temperature differences between areas, producing wind that can power turbines. Water evaporates because of the sun, falls on high elevations, and rushes down to the sea, spinning hydroelectric turbines as it passes. But solar energy usually refers to ways the sun's energy can be used to directly generate heat, lighting, and electricity

The solar resource. The amount of energy from the sun that falls on Earth's surface is enormous. All the energy stored in Earth's reserves of coal, oil, and natural gas is matched by the energy from just 20 days of sunshine. Outside Earth's atmosphere, the sun's energy contains about 1,300 watts per square meter. About one third of this light is reflected back into space, and some is absorbed by the atmosphere (in part causing winds to blow).

By the time it reaches Earth's surface, the energy in sunlight has fallen to about 1,000 watts per square meter at noon on a cloudless day. Averaged over the entire surface of the planet, 24 hours per day for a year, each square meter collects the approximate energy equivalent of almost a barrel of oil each year, or 4,2 kilowatt hours of energy every day.

This figure varies by location and weather patterns. Deserts, with very dry air and little cloud cover, receive the most sun more than six kilowatt hours per day per square meter. Northern climes get closer lo 3.6 kilowatt hours.

Passive solar design for buildings. One simple, obvious use of sunlight is to light our buildings. If properly designed, buildings can capture the sun's heat in the winter and minimize it in the summer, while using daylight year round. Buildings designed in such a way are utilizing passive solar energy a resource that can be tapped without mechanical means to help heat, cool, or light a building. South facing windows, skylights, awnings, and shade trees with the sun in mind can be

comfortable and beautiful places to live and work.

Solar heat collectors. Besides using design features to maximize their use of the sun, some buildings have systems that actively gather and store solar energy. Solar collectors, for example, sit on the rooftops of buildings to collect solar energy for space heating, water heating, and space cooling. Most are large, flat boxes painted black on the inside and covered with glass. In the most common design, pipes in the box carry liquids that transfer the heat from the box into the building. This heated liquid usually a water alcohol mixture to prevent freezing is used to heat water in a tank or is passed through radiators that heat the air. Oddly enough, solar heat can also power a cooling system. Today, about 1,5 million U.S. homes and businesses use solar water heaters. In other countries, solar collectors are much more common; Israel requires all new homes and apartments to use solar water heating, and 92 percent of the existing homes in Cyprus already have solar water heaters. With natural gas prices at historically high levels, solar water and space heaters have become much more economic.

The future of solar energy. Solar energy technologies poised for significant growth in the 21st century. More and more architects and contractors are recognizing the value of passive solar and learning how to effectively incorporate it into building designs. Solar hot water systems can compete economically conventional systems in some areas. And as the cost of solar PV continues to decline, these systems will penetrate increasingly larger markets. In fact, the solar PV industry aims to provide all new U.S. electricity generation by 2025.

Aggressive financial incentives in Germany and Japan have made these countries global leaders in solar deployment for years (source: www.ecoenergysc.com)

Active vocabulary

1. Try to memorize the following words and phrases.

Nouns and noun phrases	
elevation	высота
injustice	несправедливость
Verbs and verbal phrases	
to evaporate	испаряться
to capture	захватить
to spin	вращаться
to absorb	поглощать
to rot	гнить

to penetrate	проникать
Adjectives	
inexhaustible	неисчерпаемый
viable	жизнеспособный
low– impact	с низкой отдачей

2. Read the following international words.

basis	atmosphere	to minimize
turbine	meter	radiator
hydroelectric	to absorb	percent
to generate	equivalent	financial

Comprehension check

1. Decide whether the sentences are true or false according to the text.

1) The sun's energy contains about 1,500 watts per square meter outside Earth's atmosphere.
2) The sun's energy reduces to about 1,000 watts per square meter at noon on a cloudy day.
3) Each square meter collects the energy equivalent of 5,2 kilowatt– hours of energy every day.
4) Skylights, south– facing windows are the examples of passive solar energy.
5) Solar collectors are installed on the roofs of buildings to accumulate solar energy for heating.
6) Energy from the sun is the basis for almost every form of energy we use.
7) Solar energy occurs as a result of temperature differences between areas.
8) Solar energy is considered to be the ways the sun energy is used to directly generate heat.
9) Solar collectors use a water– alcohol mixture to prevent drying up.
10) About 1,5 million German homes and enterprises use solar water heaters currently.
11) Solar hot water systems have become a good alternative to conventional systems in some areas.
12) The purpose of the solar PV industry is to provide half of all new U.S. electricity generation by 2035.

2. Answer the following questions and give examples.

1) How many watts per square meter does the sun's energy contain?
2) How much energy on average does square meter collect for a year?
3) How does this figure vary?
4) What are the main advantages of solar energy?
5) What does solar energy contribute to?
6) What is an obvious use of sunlight for buildings?
7) What are the systems that gather and store solar energy?
8) What countries with active harnessing of solar power for buildings do you know?
9) What are the prospects of solar energy technologies in the nearest future?
10) What countries are leaders in solar deployment?

3. Find key words and phrases which best express the general meaning of each paragraph.

4. Write a summary of Text B.

5. Discuss with your groupmates or in pairs:

1) What is the main problem with solar panels usage in Russia?
2) Is it possible to use energy from the sun for industrial purposes in our Republic? Why? Why not?

3. Match the appropriate derivatives and translate them into Russian.

1)	to exhaust	a) injustice
2)	current	b) vapor
3)	to justify	c) south– facing
4)	to evaporate	d) to affect
5)	cloudy	e) currently
6)	sunlight	f) inexhaustible
7)	equivalent	g) atmosphere
8)	sphere	h) cloudless
9)	to localize	i) requirement
10)	to face	j) sunny
11)	to require	k) equal
12)	effectively	l) location

4. Translate the following words and phrases into English using the vocabulary of the text.

При надлежащем проектировании, активно накапливать и сохранять, нагретая жидкость, водно– спиртовой раствор, предотвращать замораживание, значительный рост, энергия солнца, жизнеспособная альтернатива, широко доступный, воспользоваться преимуществом, большое упущение (несправедливость), в наиболее широком смысле, разница в температурном режиме, производить непосредственно, поверхность Земли, расположение и синоптическая ситуация, осознавать ценность, традиционные системы.

5. Read and translate into Russian the manual for the solar panel battery.

How does the solar power system work? The panel converts the Sun's energy into a direct current (DC) electric current. The current flows to the controller. Then it can flow from the controller to the lamps. Or it can flow from the controller into the battery. The battery stores the electricity. The current can flow from the battery into the lamps through the controller.

If the Sun shines, the DC current can flow from the panel, through the controller and into the lamps. If the Sun doesn't shine, the current can flow from the battery, through the controller and into the lamps. If the lamps are off, the current can flow from the panel, through the controller, and into the battery.

The controller controls the flow of the current. If the battery is full, the controller stops the flow from the panel into the battery. If the battery is empty, the controller stops the flow from the battery into the lamps.

6. Identify the equipment from the description. There are two extra words.

a) controller c) cable e) electrical current
b) solar panel d) battery f) radiator

1) It converts energy from the Sun into electricity.
2) It stores the electricity.
3) It controls the flow of the current.
4) It flows from the panel, through the controller and into the lamps.

Text C. Solar cells

In a sunny climate, you can get enough power to run a 100W light bulb from just one square meter of solar panel. This was originally developed in order to provide electricity for satellites, but these days many of us own calculators powered by solar cells. People are increasingly installing PV panels on their roofs. This costs thousands of pounds, but if you have a south– facing roof it can help with your electricity bills quite a bit, and the government pays you for any extra energy you produce and feed back into the National Grid (called the "feed in tariff").

1. But what do solar panels cost?
2. How much might they generate for you?
3. What's the "payback time" until the money you've saved on bills is more than the cost of installation?

Solar water heating, where heat from the Sun is used to heat water in glass panels on your roof. This means you don't need to use so much gas or electricity to heat your water at home. Water is pumped through pipes in the panel. The pipes are painted black, so they get hotter when the Sun shines on them. The water is pumped in at the bottom so that convection helps the flow of hot water out of the top. This helps out your central heating system, and cuts your fuel bills. However, with the basic type of panel shown in the diagram you must drain the water out to stop the panels freezing in the winter. Some manufacturers have systems that do this automatically. Solar water heating is easily worthwhile in places like California and Australia, where you get lots of sunshine. Mind you, as technology improves it's becoming worthwhile in the UK.

This "Thermomax" panel is made of a set of glass tubes. Each contains a metal plate with a blue ash coating to help it absorb solar energy from IR to UV, so that even in diffuse sunlight you get a decent output. The air has been removed from the glass tubes to reduce heat loss, rather like a thermos flask.

Up the back of the metal plate is a "heat pipe", which looks like a copper rod but contains a liquid that transfers heat very quickly to the top of the glass tube. A water pipe runs across the top of the whole thing and picks up the heat from the tubes.

Solar boilers

The main way that a conventional gas "combination boiler" continually wastes energy is by replenishing stored water as soon as the volume or temperature decreases. With solar powered boilers, this is instead fuelled by the solar power collected through panels on the roof of your home. The power collected through the solar tiles is used to fuel and therefore heat a separate water cylinder, thus

saving energy throughout the course of every day. Another smaller tank, still powered by gas, is provided with most solar boiler installations as a backup.

Solar furnaces use a huge array of mirrors to concentrate the Sun's energy into a small space and produce very high temperatures.

What is the principle of harnessing wind power?

Text D. Energy from wind

Wind is simple air in motion. It is caused by the uneven heating of the earth's surface by the sun. Since the earth's surface is made of very different types of land and water, it absorbs the sun's heat at different rates.

During the day, the air above the land heats up more quickly than the air over water. The warm air over the land expands and rises, and the heavier, cooler air rushes in to take its place, creating winds. At night, the windy are reversed because the air cools more rapidly over land than over water In the same way the large atmospheric winds that circle the earth are created because the land near the earth's equator is heated more by the sun than the land near the North and South Poles.

Today, wind energy is mainly used to generate elecricity. Wind is called a renewable energy source because the wind will blow as long as the sun shines.

Since ancient times, people have harnessed the winds energy. Over 5,000 years ago, the ancient Egyptians used wind to sail ships on the Nile River. Later, people built windmills to grind wheat and other grains. The earliest known windmills were in Persia (Iran). These early windmills looked like large paddle wheels. Centuries later, the people of Holland improved the basic design of the windmill. They gave it propeller type blades, still made with sails. Holland is famous for its windmills.

American colonists used windmills to grind wheat and corn, to pump water, and to cut wood at sawmills. The oil shortages of the 1970s changed the energy picture for the country and the world. It created an interest in alternative energy sources, paving the way for the reentry of the windmill to generate electricity.

Like old fashioned windmills, today's wind machines use blades to collect the wind's kinetic energy. Windmills work because they slow down the speed of the wind. The wind flows over the airfoil shaped blades causing lift, like the effect on airplane wings, causing them to turn. The blades are connected to a drive shaft that turns an electric generator to produce electricity.

With the new wind machines, there is still the problem of what to do when the wind isn't blowing. At those times, other types of power plants must be used to make electricity.

There are two types of wind machines (turbines) used today based on the direction of the rotating shaft (axis): horizontal axis wind machines and vertical axis wind machines. The size of wind machines varies widely. Small turbines used to power a single home or business may have a capacity of less than 100 kilowatts. Some large commercial sized turbines may have a capacity of 5 million watts, or 5 megawatts. Larger turbines are often grouped together into wind farms that provide power to the electrical grid.

Horizontal axis. Most wind machines being used today are horizontal axis type. Horizontal axis wind machines have blades like airplane propellers. A typical horizontal wind machine stands as tall as a 20 story building and has three blades that span 200 feet across. The largest wind machines in the world have blades longer than a football field! Wind machines stand tall and wide to capture more wind.

Vertical axis. Vertical axis wind machines have blades that go from top to bottom and the most common type looks like giant two– bladed egg beaters. The type of vertical wind machine typically stands 100 feet tall and 50 feel wide. Vertical axis wind machines make up only a very small percent of the wind machines used today.

Wind power plants, or wind farms as they are sometimes called, are clusters of wind machines used to produce electricity. A wind farm usually has dozens of wind machines scattered over large area. The world's largest wind farm, the Horse Hollow Wind Energy Center in Texas, has 421 wind turbines that generate enough electricity to power 220,000 homes per year.

Unlike power plants, many wind plants are not owned by public utility companies. Instead they are owned and operated by business people who sell the electricity produced on the wind farm to electric utilities. These private companies are known as Independent Power Producers.

Operating a wind power plant is not as simple as just building a windmill in a windy place. Wind plant owners must carefully plan where to locate their machines. One important thing to consider is how fast and how much the wind blows.

As a rule, wind speed increases with altitude and over open areas with no windbreaks. Good sites for wind plants are the tops of smooth, rounded hills, open plains or shorelines, and mountain gaps that produce wind tunneling.

Wind speed varies throughout the country. It also varies from season to season.

New technologies have decreased the cost of producing electricity from wind, and growth in wind power has been encouraged by tax breaks for renewable energy and green pricing programs. Many utilities around the country offer green pricing options that allow customers the choice to pay more for electricity that comes from renewable sources.

Most of the wind power plants in the world are located in Europe and in the United States where government programs have helped support wind power development. The United States ranks second in the world in wind power capacity, behind Germany and ahead of Spain and India. Denmark ranks number six in the world in wind power capacity but generates 20 percent of its electricity from wind.

In the 1970s, oil shortages pushed the development of alternative energy sources. In the 1990s, the push came from a renewed concern for the environment in response to scientific studies indicating potential changes to the global climate if the use of fossil fuels continues to increase. Wind energy is an economical power resource in many areas of the country. Wind is a clean fuel; wind farms produce no air or water pollution because no fuel is burned. Growing concern about emissions from fossil fuel generation, increased government support, and higher costs for fossil fuels (especially natural gas and coal) have helped wind power capacity grow substantially over the last 10 years.

The most serious environmental drawbacks to wind machines may be their negative effect on wild bird populations and the visual impact on the landscape. To some, the glistening blades of windmills on the horizon are an eyesore; to others, they're a beautiful alternative to conventional power plants (source: www.ecoenergysc.com).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
windmill	ветряная мельница
paddle wheel	лопастное колесо
shaft	вал
sawmill	лесопилка
airfoil	аэродинамический
cluster	кластер
altitude	высота

tax break	налоговая льгота
propeller– type blades	лопасти крыльчатой формы
sail	плыть
axis	ось
wind tunneling	ветер туннелирования
wind farm	ветровая электростанция
electrical grid	электросеть
public utility company	коммунальное предприятие
green pricing program	программа экологичного ценообразования
Verbs and verbal phrases	
to rush	спешить
to cause	вызывать
to reverse	отменить
to scatter	разбрасывать
to rotate	вращаться
to capture	захватить
to span	охватить, крутить

Comprehension check

1. Put the following sentences in the correct order according to the text.

1) ____The large atmospheric winds that circle the earth are created because the land near the earth's equator is heated more by the sun than the land near the North and South Poles.
2) ___ There are horizontal– axis and vertical– axis wind machines.
3) ___Wind power plants are clusters of wind machines used to produce electricity.
4) ___Wind is caused by the uneven heating of the earth's face by the sun.
5) ___Like old fashioned windmills, today's wind machines use blades to collect the wind's kinetic energy.
6) ____ A typical horizontal wind machine stands as tall as a 20-story building and has three blades that span 200 feet across.
7) ____Over 5,000 years ago, the ancient Egyptians used wind to sail ships on the Nile River.
8) ____ Government programs adopted in Europe and in the US support wind power development.
9) ___Vertical– axis wind machines have blades that go from top to bottom and usually look like a giant two– bladed egg beaters.
10) ___Wind plants may be owned by public utility companies or business people.

11) ___New technologies have decreased the cost of producing electricity from wind, and growth in wind power has been encouraged by tax breaks for renewable energy and green pricing programs.

12) ____ Potential changes to the global climate pushed the development of alternative energy sources in the 1990s.

3. Make the following statements true according to the text.

1) The blades are joined to a drive shaft that turns a windmill to produce electricity.
2) Small turbines may have a capacity of more than 100 kilowatts and some large turbines may have a capability of 5 megawatts.
3) The most popular wind machines are vertical axis.
4) Many wind plants as well as power plants are not owned by public utility companies.
5) Operating a wind power plant is easier than just building a windmill in a windy place.
6) The air above the water heats up more quickly than the air over land during the day.
7) Contrary the air cools more slowly over land than over water and the winds are reversed at night.
8) The earliest known windmills were in Holland.
9) American colonists created an interest in alternative energy sources.
10) Wind speed remains constant throughout the country but it varies from season to season.
11) The cost of producing electricity from wind has been increased by new technologies.
12) The negative effect on wild bird populations and the visual impact on the landscape are the most serious environmental advantages of wind machines.

4. Answer the following questions and give examples.

1) What changed the energy picture for the world in the 1970s?
2) How do windmills work?
3) Why does the earth's surface absorb the sun's heat at different rates?
4) What is the problem with the new wind machines? What is the solution?
5) What are wind machines based on?
6) What are wind farms?

7) How did the early windmills look like?
8) Who improved the basic design of the windmill later?
9) What is the difference between the horizontal– axis and vertical– axis wind machines?
10) The world's largest wind farm is located in Texas, isn't it?
11) Who owns wind plants?
12) What sites are suitable for wind plants?
13) What has helped wind power capacity grow substantially over the last 10 years?
14) What are the advantages of wind energy?
15) What are the disadvantages of wind machines?

5. Write a summary of Text D.

6. Discuss with your groupmates or in pairs:

What are the main problems with wind power usage in Russia? Is it possible to use energy from the wind for industrial purposes in our country? Why? Why not? What European countries actively utilize wind energy? Give examples. (Find out additional information).

7. Fill in the gaps with the words from the text.

1) Wind farms are considered to be ... of wind machines used to produce ...
2) The types of wind machines are based on the direction of rotating ...
3) Many power plants are ... by business people who sell the electricity from the wind farm to ...
4) Good sites for wind plants are the tops of... hills and mountain…
5) Wind speed increases with ...
6) Many utilities around the U.S. offer ... to the customer to support alternative ...
7) Germany ... first in the world in wind power ...
8) The most serious environmental ... to the wind machines are their negative effect on ...

8. Find the defined words in the text.

1) The height of an object or structure above a reference level, usually above sea level or the Earth's surface.

2) A fence or a line of trees that gives protection from the wind by breaking its force.
3) A company that performs a public service; subject to government regulation.
4) Energy or a substance given out by something.
5) A tax deduction that is granted in order to encourage a particular type of commercial activity.

Grammar section

Types of questions in English

Типы вопросов в английском языке

Основные типы вопросов, используемые в английском языке:

- общий (general)
- специальный (special)
- альтернативный (alternative)
- разделительный (tag)

1. Общий вопрос относится ко всему предложению в целом, и ответом на него будут слова «yes» или «no»:

- *Do you like cheese? – Yes, I do.*
- *Are you a schoolboy? – No, I am not.*
- *Have you seen this film? – Yes, I have.*

Порядок слов в общем вопросе:

1) вспомогательный (модальный, глагол-связка) глагол;
2) подлежащее (существительное или местоимение);
3) смысловой глагол (или дополнение).

2. Специальный вопрос относится к какому-нибудь члену предложения или их группе и требует конкретного ответа:

- *What is your name? – My name is Jim.*
- *Where do you live? – I live in London.*

Порядок слов в специальном вопросе:

1) вопросительное слово (what, where, who, when, how и т.д.);
2) вспомогательный (модальный, глагол-связка) глагол;
3) подлежащее;
4) смысловой глагол;
5) дополнения, обстоятельства.

Обратите внимание: в специальных вопросах, обращенных к подлежащему в Present u Past Indefinite, не употребляется вспомогательный

глагол to do (did) и сохраняется прямой порядок слов:

Who wants to live forever?

3. Альтернативный вопрос предполагает выбор из двух возможностей:

Do you like coffee or tea? – Вы любите кофе или чай?

Альтернативный вопрос начинается как общий вопрос, затем следует разделительный союз or и вторая часть вопроса.

4. Разделительный вопрос (Tail or Tag Question) состоит из двух частей. Первая часть представляет собой повествовательное предложение, вторая, отделенная от первой запятой, – краткий вопрос (tail – «хвостик»):

You like tea with sugar, don't you? – Вы любите чай с сахаром, не так ли?

Обратите внимание: глагол во второй части разделительного вопроса должен, как правило, соответствовать глаголу в первой его части:

You are a student, aren't you?

You have a brother, haven't you?

You like cheese (play football, drink water и т. д.), don't you?

(В последнем случае глагол *to do* будет использоваться со всеми глаголами, по отношению к которым он будет вспомогательным).

Если в повествовательной части разделительного вопроса содержится утверждение, то во второй – отрицание. Если в повествовательной части – отрицание, то во второй части – утверждение:

You don't like fish and chips, do you?

Упражнение 1. Поставьте общие вопросы к предложениям.

1. There is a tea-pot on the table. 2. I work from nine to ten. 3. We are leaving for Hamburg next Saturday. 4. I have been busy the whole evening. 5. My friend studied in Sorbonne when he was young. 6. It is winter. 7. I can swim in cold water. 8. I had to go there in the daytime. 9. I will show you how to do it. 10. You must work hard. 11. She didn 't play well that evening. 12. I can't read English authors in the original. 13. I wasn't prepared to this sort of questions.

Упражнение 2. Поставьте специальные вопросы:

1) к подлежащему;
2) к сказуемому;

3) к дополнениям, обстоятельствам.

(Обратите внимание: в ряде случаев, чтобы поставить вопрос, приходится значительно видоизменять исходное предложение – мы задаем вопросы не к конкретным словам, а к заложенным в них значениям. Например, если требуется поставить вопрос к сказуемому в предложении с пассивной конструкцией, такой как:

The man was run over by a car, то лучше, осмыслив, «что произошло» с подлежащим, так и спросить: *What happened to the man?*

1. John visited me in the hospital yesterday. 2. A yellow bird fell on the roof of his "pontiac". 3. I was taken by surprise. 4. Despite the stormy weather he was able to swim to the shore. 5. He couldn't reach the hammer which lay on the shelf. 6. Our bus was broken into. 7. I have been cheated by the best friend. 8. A girl from Barbados wrote a letter to the BBC. 9. The clock stopped an hour ago. 10. You have to stop near the traffic lights.

Упражнение 3. Поставьте альтернативные и разделительные вопросы.

1. I like my tea with cream. 2. He decided to go to the theatre. 3. John had to walk to the village. 4. Although the weather was fine they decided to stay at home. 5. Last winter our class visited Rome. 6. I'm used to drinking a glass of milk before going to bed. 7. We were invited to stay at the castle for a fortnight. 8. I'm fond of opera. 9. We are going to Moscow with my brother today. 10. If I don't pass the exams I'll try to do it again next time.

Past Indefinite (Simple)
Прошедшее неопределенное время

The Past Indefinite (Simple) Tense (прошедшее неопределенное время) обозначает действие, совершившееся или совершавшееся в прошлом, не связанное с настоящим; описывает ряд последовательных действий в прошлом, описывает обычные, повторяющиеся действия в прошлом.

Форма Past Indefinite правильных глаголов образуется путем прибавления к основе инфинитива окончания –ed. Форме Past Indefinite неправильных глаголов соответствует II форма глагола в соответствующих глагольных рядах, приводимых в специальных таблицах (см. таблицы неправильных глаголов).

We went to the cinema yesterday. He arrived in London last year.

Утвердительная форма		Отрицательная форма		Вопросительная форма	
I He, she, we, you, they	worked (wrote)	I did not work	did not = didn't (write)	Did I	work (write) ?

Past Indefinite употребляется с наречиями ago – тому назад, (month ago – месяц тому назад, three days ago – три дня тому назад), long ago – давно, the other day – на днях (в прошлом), yesterday – вчера, the day before yesterday – позавчера, last – прошлый (last week на прошлой неделе, last month в прошлом месяце, last year в прошлом году); с указанием даты или периода времени в прошлом (in July в июле, in 1990 в 1990 году и т.д.).

Упражнение 1. Раскройте скобки, употребляя глаголы в Past Indefinite. Поставьте данные предложения в вопросительную и отрицательную форму.

1. He (to lose) his balance and (to fall). 2. Ann’s grandfather (to found) his firm in 1901. 3. Queen Elizabeth II (to be) born in 1926. She (to become) Queen of England in 1952. 4. We (to meet) last summer. 5. Yesterday she (to find) the key in its usual place. 6. Sunday (to pass) peacefully. 7. Who (to ring) you up an hour ago? 8. It (to take) you long to find his house yesterday? 9. On of her brothers (to make) a tour of Europe last summer. 10. We (not to rest) last week. 11. Last night we (to go) to a football match. 12. Paul and I (to play) tennis yesterday.

Упражнение 2. Перепишите текст в прошедшем времени.

He gets up at seven o'clock. He washes his face, cleans his teeth and combs. He goes to the kitchen and has his breakfast. For breakfast he has a cup of coffee and cheese. When the breakfast is over, he goes to the office. He takes a bus to get to his work. At the office he works till two o'clock. At two o'clock he has dinner. He finishes his work at seven o'clock in the evening. He decides to walk a little after his working day. He returns home at nine. He doesn't want to have supper, he only drinks tea. Suddenly he remembers that he has to phone to his friend. He dials the number but nobody answers. His friend is not at home. He goes to his room and decides to watch TV. When the TV program is over, he sleeps.

Упражнение 3. Раскройте скобки, употребляя глаголы в Past Indefinite (утвердительной или отрицательной форме).

1. It was warm, so I (to take) off my coat. 2. The film wasn't very good. I (to enjoy) it very much. 3. I knew Sarah was very busy, so I (to disturb) her. 4. I was very tired, so I (to go) to bed early. 5. The bed was very uncomfortable. So I (to sleep) very well. 6. Sue wasn't hungry, so she (to eat) anything. 7. We went to Kate's house but she (to be) at home. 8. It was a funny situation but nobody (to laugh). 9. The hotel wasn't very expensive. It (to cost) very much. 10. I was in a hurry, so I (to have) time to phone you. 11. It was hard work carrying the bags. They (to be) very heavy.

Упражнение 4. Раскройте скобки, употребляя глаголы в форме Present Indefinite или Past Indefinite.

1. They (to be) in London last month.
2. Who of your friend (to speak) English?
3. How many lessons you (to have) every day?
4. I (not to be) at home yesterday, I (to go) for a walk.
5. He usually (to sleep) well. But last night he (to sleep) bad.
6. Your sister (to be) a doctor? – Yes, she (to become) a doctor two years ago.
7. He (not to shave) today because he (not to have) time.
8. You (to get) up early on Sunday? – Yes. But last Sunday I (to sleep) till ten.
9. When you (to leave) the meeting yesterday?

The Future Indefinite (Simple)

Будущее неопределенное время

The Future Indefinite (Simple) Tense (будущее неопределенное время) употребляется для выражения однократного или повторяющегося обычного действия или ряда последовательных действий в будущем.

I will go to the theatre with you. In winter Nick will walk in the country every Sunday.

Future Indefinite образуется при помощи вспомогательного глагола shall для 1– го лица единственного и множественного числа и will для всех остальных лиц и инфинитива без частицы to знаменательного глагола (shall/will + ask).

Утвердительная форма		Отрицательная форма		Вопросительная форма
I, we he, she, it, you, they	shall will go	I, we he, she, it, you, they	shall will not go shall not = shan't; will not = won't	Shall (will) I (we) go? Will he (she, it, you, they) go?

Примечание. В современном английском языке существует устойчивая тенденция употреблять will для всех лиц, а в разговорной речи употребляется, как правило, только сокращённая форма вспомогательного глагола с личным местоимением.

I will come (I'll come) to see you tomorrow. – Я навещу вас завтра.

На будущее время в предложении могут указывать обстоятельства времени: tomorrow – завтра, next week – на следующей неделе, next year – в будущем году, in a week – через неделю, in a few days – через несколько дней, one of these days – на днях.

В придаточных предложениях условия и времени вместо будущего времени употребляется настоящее. Придаточные предложения условия и времени вводятся союзами:

If – если after – после
when – когда till (untill) – до сих пор
before – до, перед as soon as – как только

Упражнение 1. Раскройте скобки, употребляя глаголы в форме Future Indefinite.

1. I (to see) them next Saturday. 2. They (to be) here tomorrow. 3. We (to have) the test in a week. 4. She (to spend) holidays in the country. 5. The journey (to take) three hours. 6. I (to open) the door for you. 7. I (to go) to school tomorrow? 8. They (to come) back next week? 9. We (to leave) Moscow this evening? 10. You (to wait) for me? 11. Nick (to finish) the University next year? 12. She (to agree) with you? 13. I (not to swim) tomorrow. 14. He (not to play) in the garden. 15. The weather (not to be) fine on Saturday. 16. We (not to be) busy in the evening. 17. Sheila (not to get) passport next year. 18. Why your father (to help) you? 19. How many people (to arrive) today? 20. When you (to go) to the cinema?

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Present Indefinite или Future Indefinite (Все действия совершатся в будущем времени).

1. If the weather (to be fine), the plane (to leave) in time.
2. They (to visit) their parents next month if they (to get) letter from them.
3. Jack (to miss) the train if he (not to hurry).
4. When he (to feel) better, he (to invite) us.
5. She (to finish) her work when she (to be) at the office.
6. What she (to do) when she (to return) home?
7. I (to take) my child to the ZOO if I (to have) time.
8. They (not to swim) if the water (to be) cold.
9. Dan (to send) us a postcard when he (to get) to St. Petersburg.
10. I (not to go) for a walk before my parents (to come) home.

Упражнение 3. Раскройте скобки, употребляя глаголы в форме Present Indefinite или Future Indefinite.

1. If you (to take) a taxi, you (to be) there in time.
2. He says that he (to stay) at home, until I (to ring) him up.
3. I (to give) you my answer when I (to be) sure of my feelings.
4. I (to be) very thankful if you (to help) me.
5. I (not to give) you my opinion before I (to study) the matter thoroughly.
6. They say that they (not to go) skiing if the weather (to be) nasty.

7. When you (to learn) all the truth you (not to like) him any more.
8. If he (not to like) your plan, he (to refuse) to take part in the work.
9. He says that as soon as the film (to be) on, we (to see) it together.
10. If you (to follow) my advice, everything (to be) all right.
11. You (to understand) me when you (to know) my life story.
12. He says that he (to wait) till I (to finish) my work.
13. If I (to have) an opportunity, I (to talk) to her about you.
14. I (to begin) the work as soon as I (to find) all necessary books.
15. He says that he (to help) me if I (to ask) him for his help.

Упражнение 4. Переведите на английский язык следующие предложения.

1. Если ты приедешь в наш город, ты остановишься у нас. 2. Когда он осознает свои ошибки, он извинится перед родителями. 3. Я обещаю, что как только вернусь домой, позвоню тебе. 4. Я обязательно сообщу тебе, как только узнаю что-нибудь новое. 5. Он говорит, что купит эту книгу, когда у него будут деньги. 6. Друзья спрашивают нас о том, где мы остановимся, когда приедем на побережье. 7. Он говорит, что никогда не простит меня, если узнает, что я говорю неправду. 8. Когда мы закончим работу, обязательно отдохнем.

Unit 5. HYDROELECTRIC POWER

Text A. Energy resources: hydroelectric power

How it works

A dam is built to trap water, usually in a valley where there is an existing lake.

Water is allowed to flow through tunnels in the dam, to turn turbines and thus drive generators.

Notice that the dam is much thicker at the bottom than at the top, because the pressure of the water increases with depth.

Hydroelectric power stations can produce a great deal of power very cheaply.

When it was first built, the huge "Hoover Dam", on the Colorado river, supplied much of the electricity for the city of Las Vegas; however now Las Vegas has grown so much, the city gets most of its energy from other sources.

Although there are many suitable sites around the world, hydroelectric dams are very expensive to build. However, once the station is built, the water comes free of charge, and there is no waste or pollution.

The Sun evaporates water from the sea and lakes, which forms clouds and falls as rain in the mountains, keeping the dam supplied with water.

More

Gravitational potential energy is stored in the water above the dam.

Because of the great height of the water, it will arrive at the turbines at high pressure, which means that we can extract a great deal of energy from it. The water then flows away downriver as normal.

In mountainous countries such as Switzerland and New Zealand, hydroelectric power provides more than half of the country's energy needs.

An alternative is to build the station next to a fast– flowing river. However with this arrangement the flow of the water cannot be controlled, and water cannot be stored for later use (source: http://www.darvill.clara.net/altenerg/hydro.htm).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
dam	плотина
pressure	давление

valley	долина
tunnel	туннель
reservoir	водохранилище
height	высота
turbine	турбина
Verbs and verbal phrases	
to supply	поставлять
to control	контролировать
to store	хранить
Adjectives	
gravitational	гравитационный
fast– flowing	быстротекущий

Comprehension check

1. Answer the following questions and give examples.

a) Why is a dam built?
b) Why is the dam much thicker at the bottom than at the top?
c) How much power can hydroelectric power stations produce?
d) Are hydroelectric dams very expensive to build?
e) Is there any waste or pollution?

2. Find key words and phrases which best express the general meaning of each paragraph.

3. Write a summary of Text A.

4. Put the statements into the correct column. Analyze the advantages and disadvantages of hydroelectric power.

Advantages	Disadvantages

a) Once the dam is built, the energy is virtually free.
b) No waste or pollution produced.

c) Much more reliable than wind, solar or wave power.
d) Water can be stored above the dam ready to cope with peaks in demand.
e) Hydro– electric power stations can increase to full power very quickly, unlike other power stations.
f) Electricity can be generated constantly.
g) The dams are very expensive to build.
h) However, many dams are also used for flood control or irrigation, so building costs can be shared.
i) Building a large dam will flood a very large area upstream, causing problems for animals that used to live there.
j) Finding a suitable site can be difficult – the impact on residents and the environment may be unacceptable.
k) Water quality and quantity downstream can be affected, which can have an impact on plant life.

Text B. Hydro power

When it rains in hills and mountains, the water becomes streams and rivers that run down to the ocean. The moving or falling water can be used to do work. Energy, you'll remember is the ability to do work. So moving water, which has kinetic energy, can be used to make electricity.

For hundreds of years, moving water was used to turn wooden wheels that were attached to grinding wheels to grind (or mill) flour or corn. These were called grist mills or water mills.

In the year 1086, the Domesday Book was written. The multivolume books are very large. Hand-written on the pages of the books are lists of all properties, homes, stores and other things in England. The Domesday Book listed 5,624 water wheel-driven mills in England south of the Trent River. That was about one mill for each 400 people.

Water can go over the top of the wheel or the wheel can be placed in the moving river. The flow of the river then turns the wheel at the bottom.

Today, moving water can also be used to make electricity.

Hydro means water. Hydroelectric means making electricity from water power.

Hydroelectric power uses the kinetic energy of moving water to make electricity. Dams can be built to stop the flow of a river. Water behind a dam often forms a reservoir. Dams are also built across larger rivers but no reservoir is made. The river is simply sent through a hydroelectric power plant or powerhouse.

Hydro is one of the largest producers of electricity in the United States. Water power supplies about 10 percent of the entire electricity that we use. In states with high mountains and lots of rivers, even more electricity if made by hydro power. In California, for example, about 15 percent of all the electricity comes from hydroelectric.

The state of Washington leads the nation in hydroelectricity. The Grand Coulee, Chief Joseph and John Day dams are three of six major dams on the Columbia River. About 87 percent of the electricity made in Washington state is produced by hydroelectric facilities. Some of that electricity is exported from the state and used in other states (source: http://www.energyquest.ca.gov/story/chapter12.html).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
grinding	шлифовка
wheel	колесо
facility	объект
producer	производитель
Verbs and verbal phrases	
to convert	преобразовать
to turn	повернуть
to export	экспортировать
Adjectives	
kinetic	кинетический
potenial	потенциальный

Comprehension check

1. Answer the following questions and give examples.

1. Does the water become streams and rivers that run down to the ocean.
2. Can the moving or falling water be used to do work?
3. Does moving water have kinetic energy?
4. Which kind of energy can be used to make electricity from water?
5. How was moving water used for hundreds of years?
6. What was the Domesday Book written about?

2. Make the following statements true according to the text.

a) The multi– volume books are very small.
b) The Domesday Book listed 8 000 waterwheel– driven mills in England south of the Trent River.
c) That was about one mill for each 4 people.
d) Today, moving water can not also be used to make electricity.
e) Hydro means wind.
f) Hydro– electric means making electricity from solar power.
g) Hydroelectric power uses the potential energy of moving water to make electricity.
h) Dams can be built to stop the flow of a river.
i) Water behind a dam often forms a reservoir.
j) Dams are also built across larger rivers and reservoir is made.
k) Hydro is one of the largest producers of electricity in the United States.

3. Find key words and phrases which best express the general meaning of each paragraph.

4. Write a summary of Text B.

Grammar section

The Present Continuous (Progressive) Tense
Настоящее продолженное время

The Present Continuous Tense (настоящее продолженное время) обозначает действие, происходящее в момент речи или в настоящий период времени; выражает будущее действие, когда налицо намерение совершить действие или уверенность в его совершении.

He is watching TV now. They are leaving Moscow next week. They are going to the south.

Сочетание Present Continuous глагола to go с инфинитивом часто употребляется для выражения намерения совершить действие.

They are going to spend next winter in Spain. He is going to take part in the competition.

Некоторые глаголы не употребляются в Present Continuous. Это глаголы, обозначающие чувственное восприятие (to see, to hear), умственную деятельность (to know, to believe, to remember, to understand, to forget); желания, чувства (to want, to wish, to like, to love, to dislike, to hate), принадлежности (to belong, to possess).

Present Continuous образуется при помощи Present Indefinite вспомогательного глагола to be и Participle I знаменательного глагола (окончание –ing) (am/is/are + sitting).

Утвердительная форма	Отрицательная форма	Вопросительная форма
I am working He, she, it is working We, you, they are work–ing	I am not working He, she, it is not working We, you, they are not work–ing	Am I working ? Is he (she, it) working? Are we (you, they) working ?

I am = I'm; He is = He's; We are = We're; is not = isn't; are not = aren't

На длительный характер действия в Present Continuous могут указывать обстоятельства времени: now – сейчас, right now – прямо сейчас, at this moment – сейчас, в данный момент, today – сегодня, this week (month, year) – на этой неделе (в этом месяце, году).

Упражнение 1. Образуйте отрицательную и вопросительную форму предложений.

1. She is watching television at the moment. 2. They are playing football together now. 3. My sister is writing a letter. 4. They are talking to my friend. 5. Mary is sleeping. 6. You are listening to the radio. 7. He is at home now. He is having breakfast at the moment. 8. They are working now. 9. We are drinking a coffee right now. 10. Michael is holding a book in his hand. 11. His friend is playing volley– ball. 12. I am planting trees now.

Упражнение 2. Раскройте скобки, используя Present Indefinite или Present Continuous.

1. They (to go) out of town at weekends. 2. We (to leave) for York tomorrow morning. 3. He usually (to drive) to his office. 4. They (to change) guard every day at 11.00. 5. Sometimes he (to walk) to his work instead of driving. 6. They (to stay) with us at that moment. 7. She never (to stay) out late. 8. They often (to go) to the sea in summer. 9. She (to write) now about her visit to London. 10. He (to study) French this year at college. 11. Our mother (to cook) lunch now. 12. I'm tired. I (to go) to bed now. 13. Ann (to speak) German very well. 14. The swimming pool (to open) at 9 o'clock and (to close) at 18.30 every day. 15. Listen to those people. What language they (to speak)? 16. Bad driving (to cause) many accidents. 17. My friends (to live) in a very small flat. 18. The Olympic Games (to take place) every four years. 19. Let's go out. It (not to rain) now.

Упражнение 3. Переведите на английский язык, употребляя глаголы в Present Indefinite или в Present Continuous.

1. Что ты делаешь? – Я готовлю доклад. 2. Ты мне веришь? – Да, я тебе верю. 3. Он знает, что ты ошибаешься. 4. Я ненавижу холодную погоду. 5. Как вы себя чувствуете? – Неплохо. 6. Сейчас она мне нравится. 7. Мой муж сейчас в саду, он сажает деревья. 8. Что ты хочешь? – Я хочу пить. 9. Извините, но я с вами не согласен. 10. Она сейчас ищет одежду. 11. Он никогда не соглашается с тем, что я говорю. 12. Вы меня понимаете? – Нет, я вас не понимаю. 13. Она наблюдает сейчас за нами. 14. Ты меня ищешь? – Нет, я ищу свою сестру. 15. Я часто работаю ночью, поэтому у меня сегодня выходной. 16. Чему вы отдаете предпочтение: прогулкам или поездкам? 17. Сейчас ребенок рисует в соседней комнате. 18. Что вы думаете о спорте? 19. Чем они занимаются? – Они обсуждают мою новую книгу.

Упражнение 4. Раскройте скобки, употребляя глаголы в Present Indefinite или Present Continuous.

1. Let's go out. It (not/to rain) now.
2. Julia is very good at languages. She (to speak) four languages very well.
3. Hurry up! Everybody (to wait) for you.
4. " …. (you/ to listen) to the radio?"– "No, you can turn it off."
5. " …. (you/ to listen) to the radio every day?"– "No, just occasionally."
6. The River Nile (to flow) into the Mediterranean.
7. Look at the river. It (to flow) very fast today – much faster than usual.
8. We usually (to grow) vegetables in our garden but this year we (not/ to grow) any.
9. "How is your English?" – "Not bad. It (to improve) slowly''.
10. Ron is in London at the moment. He (to stay) at the Park Hotel. He always (to stay) there when he's in London.

The Past Continuous (Progressive) Tense
Прошедшее продолженное время

The Past Continuous Tense (прошедшее продолженное время) обозначает действие, происходившее в определённый момент в прошлом, который обозначен либо обстоятельством времени, либо другим действием в прошлом. При этом ни начало, ни конец длительного действия неизвестны. Подчёркивается сам процесс действия, его продолжительность.

I was writing a letter to my friend at 5 o'clock yesterday.
I was writing a letter to my friend from 5 to 6 on Sunday.
I was writing a letter to my friend when my brother came.
I was writing a letter while my mother was cooking dinner.

Кроме того, Past Continuous может употребляться для выражения одновременных действий, протекавших в прошлом в один и тот же момент.

The children were playing while their mother was watching them. –
Дети играли, в то время как их мать наблюдала за ними.
As I was taking a shower, mother was cooking breakfast. –
В то время, когда я принимала душ, мама готовила завтрак.

Past Continuous образуется из сочетания вспомогательного глагола to be в Past Indefinite и Participle I знаменательного глагола (was/were + working).

Утвердительная форма	Отрицательная форма	Вопросительная форма
I, he, she, it was writing	I, he, she, it was not writing	Was I (he, she, it) writing?
We, you, they were writing	We, you, they were not Writing	Were we (you, they) writing ?

was not = wasn't; were not = weren't

На длительный характер действия в Past Continuous могут указывать обстоятельства времени from six to seven – с шести до семи, all day long last Saturday – весь день в прошлую субботу, the whole day yesterday – весь вчерашний день и т.д.

Упражнение 1. Раскройте скобки, употребляя глаголы в форме Past Continuous. Поставьте данные предложения в вопросительную и отрицательную форму.

1. I (to read) a book at two o'clock yesterday. 2. They (to write) the test at this time yesterday. 3. He (to work) in the garden from two till five o'clock. 4. We (to watch) television the whole evening. 5. You (to play) football at six o'clock. 6. You (to drink) coffee at seven o'clock. 7. He (to draw) all day long last Saturday. 8. It (to rain) the whole day yesterday. 9. They (to skate) at three o'clock. 10. You (not to sleep) at nine o'clock last night. 11. I (not to write) a letter to my granny at eight o'clock. 12. She (not to help) mother about the house from two till six. 13. George (to do) his lessons the whole evening. 14. This time last year I (to live) in my native town.

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Present Continuous или в Past Continuous.

1. What you (to do) from seven till nine yesterday?
2. What she (to drink) now? – She (to drink) juice.
3. Nick (to draw) a picture when I saw him.
4. Who (to stand) near the door now?
5. When I looked through the window, the sun (to shine) but the wind (to blow).
6. What they (to discuss) at the moment?
7. It (to snow) when I left my house yesterday.
8. Robert (to have) dinner now? – No, he (to read) a book.

9. Our children (to make) noise the whole evening yesterday.
10. What they (to speak) about when I (to enter) the room?
11. He (to look) for his keys at the moment.
12. Look! Somebody (to swim) across the river.
13. He (to go) to the office when I met him in the street.
14. She (to read) a book while I was watching television.
15. My friend (to wait) for a bus when I saw him at the bus stop.

Упражнение 3. Раскройте скобки, употребляя глаголы в форме Past Indefinite или Past Continuous.

1. Jane (to wait) for me when I (to arrive). 2. “What you (to do) this time yesterday?” “I was asleep.” 3. “You (to go) last night?” “No, I was too tired.” 4. “Was Carol at the party last night?” “Yes, she (to wear) a really nice dress.” 5. How fast you (to drive) when the accident (to happen)? 6. John (to take) a photograph of me while I (not to look). 7. We were in a very difficult position. We (not to know) what to do. 8. I haven’t seen Alan for ages. When I last (to see) him, he (to try) to find a job in London. 9. I (to walk) along the street when suddenly I (to hear) footsteps behind me. Somebody (to follow) me. I was frightened and I (to start) to run. 10. When I was young, I (to want) to be a bus driver.

Упражнение 4. Раскройте скобки, употребляя глаголы в форме Past Indefinite или Past Continuous.

1. When the taxi (to arrive) I still (to pack) my things. 2. What you (to do) in the evening yesterday? – I (to watch) TV and my wife (to wash up). 3. I (to do) all the exercises while you (to smoke). 4. Mr. Brown, where you (to be) when they (to drive) your car at midnight? 5. When the clock (to strike) nine she (to run) up the stairs to her office because the lift (not to work). 6. He (to stand) and (to watch) while the boys (to fight). 7. She (to wear) marvelous new dress at the party and (to look) fantastic! 8. He (to wait) for her for an hour but she never (to come). 9. When the telephone (to ring) I (to bake) a cake and (to ask) Mary who (to do) nothing at the moment to answer the call. 10. Why you (not to attend) the lecture on Saturday? Professor B (to speak) about UFO and other mysterious objects.

The Future Continuous (Progressive) Tense
Будущее продолженное время

The Future Continuous Tense (будущее продолженное время) обозначает будущее действие в процессе его совершения, т.е. незаконченное длительное действие. Future Continuous употребляется также для выражения намерения совершить действие в будущем или уверенности в его совершении.

He will be writing a letter to his friend … at 5 o'clock tomorrow.
… from 5 to 6 on Sunday.
… when I come.

Он будет писать письмо другу … завтра в 5 часов, … с 5 до 6 в воскресенье, … когда я приду.

I will (shall) be visiting him tomorrow. Завтра я собираюсь навестить его.

Future Continuous образуется при помощи Future Indefinite вспомогательного глагола to be и Participle I знаменательного глагола (shall/will be + working).

Утвердительная форма	Отрицательная форма	Вопросительная форма
I (we) he, she, it, will be writing We, you, they	I (we) he, she, it, will not be we, you, they writing	Shall (will) I (we) be writing? Will he (she, it, we, you, they) be writing?

Упражнение 1. Раскройте скобки, употребляя глаголы в форме Future Continuous. Поставьте каждое предложение в вопросительную и отрицательную форму.

1. I (to read) newspapers all evening tomorrow. 2. She (to work) at home the whole morning tomorrow. 3. They (to stay) at a new hotel at 6 o'clock tomorrow. 4. He (to live) in Kazan for the next few weeks. 5. Beth (to write) a letter at that time next week. 6. You (to do) your home task all these days. 7. Dan (to enjoy) the sunshine on the beach at that time next summer. 8. Peter (to read) the whole night. 9. We (to have) coffee from five to six. 10. At this time tomorrow I (to take) my exam. 11. I (not to work) at the library from 3 till 4 o'clock tomorrow. 12. The conference (not to take place) from 2 till 6 o'clock on Monday. 13. He (not to wait) for us at 6 o'clock tomorrow. 14. She (to type) letters at 5 o'clock tomorrow.

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Future Indefinite или Future Continuous.

1. You (to work) all tomorrow morning?
2. He (to see) them tomorrow. He (to tell) them what you said.
3. I (to visit) her office next day. I (to ask) her then.
4. My son (to stay) with my parents for the holidays.
5. You (to stay) here all weekend?
6. Don't disturb him at that moment tomorrow, he (to have) breakfast.
7. I (to see) manager at the meeting next week. And he (to give) me all the information he knows.
8. Next year he (to come) to Paris.
9. You (to come) to our party? – No, I (to work) on my report.
10. She (to give) me this book? – No, she (to be) busy at that time.

Упражнение 3. Переведите на английский язык, употребляя глаголы в форме Present Indefinite, Present Continuous, Future Indefinite или Future Continuous.

1. Он сейчас работает над докладом, но через час он сможет поговорить с вами.
2. Когда они возвратятся домой, бабушка будет накрывать на стол.
3. Ежегодно мы проводим отпуск в деревне, но в следующем году мы поедем за границу.
4. Когда ты пригласишь их на вечеринку? – Я сделаю это, как только увижу их.
5. Я думаю, что он не остановится в отеле, когда приедет в ваш город.
6. Когда он будет просматривать газеты, он найдет статью, которую ищет.
7. Следующим летом я поеду на море. Я буду лежать на солнце весь день.
8. Где твой брат? – Он работает в библиотеке. Он будет работать там еще три дня.
9. Вы останетесь на обед? – Нет. К сожалению, мы очень заняты.
10. Не уходите, пока он не вернется. – Хорошо. Мы подождем его еще полчаса.

Unit 6. GEOTHERMAL POWER
Text A. Heat energy from underground

Introduction

The centre of the Earth is around 6000 degrees Celsius – easily hot enough to melt rock. Even a few kilometres down, the temperature can be over 250 degrees Celsius if the Earth's crust is thin. In general, the temperature rises one degree Celsius for every 30 –50 metres you go down, but this does vary depending on location

In volcanic areas, molten rock can be very close to the surface. Sometimes we can use that heat.

Geothermal energy has been used for thousands of years in some countries for cooking and heating.

The name "geothermal" comes from two Greek words: "geo" means "Earth" and "thermal" means "heat".

How it works

Hot rocks underground heat water to produce steam.

We drill holes down to the hot region, steam comes up, is purified and used to drive turbines, which drive electric generators.

There may be natural "groundwater" in the hot rocks anyway, or we may need to drill more holes and pump water down to them.

The first geothermal power station was built at Landrello, in Italy, and the second was at Wairekei in New Zealand. Others are in Iceland, Japan, the Philippines and the United States.

In Iceland, geothermal heat is used to heat houses as well as for generating electricity.

If the rocks aren't hot enough to produce steam we can sometimes still use the energy – the Civic Centre in Southampton, England, is partly heated this way as part of a district heating scheme with thousands of customers..

More

Geothermal energy is an important resource in volcanically active places such as Iceland and New Zealand.

How useful it is depends on how hot the water gets. This depends on how hot the rocks were to start with, and how much water we pump down to them.

Water is pumped down an "injection well", filters through the cracks in the rocks in the hot region, and comes back up the "recovery well" under pressure. It "flashes" into steam when it reaches the surface.

The steam may be used to drive a turbogenerator, or passed through a heat exchanger to heat water to warm houses. A town in Iceland is heated this way.

The steam must be purified before it is used to drive a turbine, or the turbine blades will get "furred up" like your kettle and be ruined.

Is it renewable?

Geothermal energy is renewable.

The energy keeps on coming, as long as we don't pump too much cold water down and cool the rocks too much (source: http://www.darvill.clara.net/altenerg/geothermal.htm).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
steam	пар
filter	фильтрация
turbogenerator	турбогенератор
exchanger	теплообменник
Verbs and verbal phrases	
to warm	согреться
to depend	зависеть
to pump	перекачать
Adjectives	
purified	очищенный

Comprehension check

1. Answer the following questions and give examples.

1) Where was the first geothermal power station?
2) Where is geothermal heat used to heat houses as well as for generating electricity?
3) What can we use if the rocks aren't hot enough to produce steam?
4) Is geothermal energy an important resource in volcanically active places such as Iceland and New Zealand?
5) How useful is geothermal energy?

2. Find key words and phrases which best express the general meaning of each paragraph.

3. Write a summary of Text A.

4. Put the statements into the correct column. Analyze the advantages and disadvantages of geothermal power.

Advantages	Disadvantages

1. Geothermal energy does not produce any pollution, and does not contribute to the greenhouse effect.
2. The power stations do not take up much room, so there is not much impact on the environment.
3. No fuel is needed.
4. Once you've built a geothermal power station, the energy is almost free.
5. It may need a little energy to run a pump, but this can be taken from the energy being generated.
6. The big problem is that there are not many places where you can build a geothermal power station.
7. You need hot rocks of a suitable type, at a depth where we can drill down to them.
8. The type of rock above is also important, it must be of a type that we can easily drill through.
9. Sometimes a geothermal site may "run out of steam", perhaps for decades.
10. Hazardous gases and minerals may come up from underground, and can be difficult to safely dispose of.

Text B. Geothermal energy

Geothermal Energy has been around for as long as the Earth has existed. "Geo" means earth, and "thermal" means heat. So, geothermal means earth heat.

Have you ever cut a boiled egg in half? The egg is similar to how the earth looks like inside. The yellow yolk of the egg is like the core of the earth. The white part is the mantle of the earth. And the thin shell of the egg, that would have surrounded the boiled egg if you didn't peel it off, is like the earth's crust.

Below the crust of the earth, the top layer of the mantle is a hot liquid rock called magma. The crust of the earth floats on this liquid magma mantle. When magma breaks through the surface of the earth in a volcano, it is called lava.

For every 100 meters you go below ground, the temperature of the rock increases about 3 degrees Celsius. Or for every 328 feet below ground, the temperature increases 5,4 degrees Fahrenheit. So, if you went about 10,000 feet below ground, the temperature of the rock would be hot enough to boil water.

Deep under the surface, water sometimes makes its way close to the hot rock and turns into boiling hot water or into steam. The hot water can reach temperatures of more than 300 degrees Fahrenheit (148 degrees Celsius). This is hotter than boiling water (212 degrees F / 100 degrees C). It doesn't turn into steam because it is not in contact with the air.

When this hot water comes up through a crack in the earth, we call it a hot spring, like Emerald Pool at Yellowstone National Park.

About 10,000 years ago, Indians used hot springs in North American for cooking. Areas around hot springs were neutral zones. Warriors of fighting tribes would bathe together in peace. Every major hot spring in the United States can be associated with Native American tribes. California hot springs, like at the Geysers in the Napa area, were important and sacred areas to tribes from that area.

In other places around the world, people used hot springs for rest and relaxation. The ancient Romans built elaborate buildings to enjoy hot baths, and the Japanese have enjoyed natural hot springs for centuries (source: http://www.energyquest.ca.gov/story/chapter11.html)/.

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
yolk	желток

rock	скала
shell	оболочка
crust	кора
ground	земля
degree	степень
surface	поверхность
tribe	племя
area	область
crack	трещина
warrior	воин
Verbs and verbal phrases	
to peel off	шелушиться
Adjectives	
Sacred	священный
neutral	нейтральный
natural	природный

Comprehension check

1. Complete the following sentences according to the text.

a) The crust of the earth floats on this liquid magma ...
b) When magma breaks through the surface of the earth in a volcano, it is called ...
c) The egg is similar to how the earth looks like ...
d) "Geo" means earth, and "thermal" means …
e) So, geothermal means …
f) Geothermal Energy has been around for as long as …
g) Below the crust of the earth, the top layer of the mantle is a hot liquid rock called ...

2. Answer the following questions and give examples.

1. How does the temperature of the rock increase?
2. What is the temperature if you went about 10,000 feet below ground?
4. What does the water turn into deep under the surface?
5. What temperatures can the hot water reach?
6. Why doesn’t the water turn into steam?

3. Choose the best abstract for Text B.

a) The text under consideration is about energy. It dwells on the usage of geothermal energy in nature.
b) The text deals with one category of energy such as potential. The author gives the definitions of geothermal energy and points out the examples.
c) The examples of several forms of geothermal energy usage are commented in the text. The author also touches upon the difference between geothermal and hydro energies.

4. Find key words and phrases which best express the general meaning of each paragraph.

5. Write a summary of Text B.

6. Discuss with your groupmates or in pairs the advantages of geothermal energy.

Text C. Geothermal electricity

Hot water or steam from below ground can also be used to make electricity in a geothermal power plant.

In California, there are 14 areas where we use geothermal energy to make electricity. The areas on the map show where there are known geothermal areas. Some are not used yet because the resource is too small, too isolated or the water temperatures are not hot enough to make electricity.

The main spots are:

The Geysers area north of San Francisco

In the northwest corner of the state near Lassen Volcanic National Park

In the Mammoth Lakes area – the site of a huge ancient volcano

In the Coso Hot Springs area in Inyo County

In the Imperial Valley in Southern California.

Some of the areas have so much steam and hot water that it can be used to generate electricity. Holes are drilled into the ground and pipes lowered into the hot water, like a drinking straw in a soda. The hot steam or water comes up through these pipes from below ground.

A geothermal power plant is like in a regular power plant except that no fuel is burned to heat water into steam. The steam or hot water in a geothermal power

plant is heated by the earth. It goes into a special turbine. The turbine blades spin and the shaft from the turbine is connected to a generator to make electricity. The steam then gets cooled off in a cooling tower.

The white "smoke" rises from the plants. It is steam given off in the cooling process. The cooled water can then be pumped back below ground to be reheated by the earth.

The hot water flows into turbine and out of the turbine. The turn turns the generator, and the electricity goes out to the transformer and then to the huge transmission wires that link the power plants to our homes, school and businesses. (source: http://www.energyquest.ca.gov/story/chapter11.html).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
blade	лопасть
cooling tower	градирня
smoke	дым
transformer	трансформатор
transmission wire	провода электропередачи
pipe	труба
straw	солома
mantle	мантия
soda	сода
hole	отверстие
Verbs and verbal phrases	
to reheat	разогревать
to flow	течь
to drill	пробурить
Adjectives	
huge	огромный
located	расположенный
isolated	изолированный

Comprehension check

1. Decide whether the following statements are true or false according to the text.

1. Holes are drilled into the ground and pipes lowered into the hot water, like a drinking straw in a soda.
2. Cold water from ground can also be used to make electricity in a geothermal power plant.
3. In Tatarstan, there are 14 areas where we use geothermal energy to make electricity.
4. Some of the areas have so much steam and hot water that it can be used to generate electricity.
5. Some areas are not used yet because the resource is too big, too isolated or the water temperatures are hot enough to make electricity.
6. The hot steam or water comes up through these pipes from below ground.

2. Complete the following sentences according to the text.

1. A geothermal power plant is like in …
2. The steam or hot water in a geothermal power plant is heated by …
3. The turbine blades spin and the shaft from the turbine is connected to …
4. The steam then gets cooled off in …
3. The white "smoke" rises from ….
4. It is steam given off in….
5. The cooled water can then be pumped back below ground to be reheated ….

3. Answer the following questions and give examples.

1. Does the hot water flow into turbine or out of the turbine?
2. Does the turn the generator?
3. Does the electricity go out to the transformer?
4. Do the huge transmission wires link the power plants to our homes, school and businesses?

4. ***What parts of the text can you define? Do they correspond to the paragraphs? Name each part.***

1. _____ 4._____
2._____ 5._____
3._____ … _____

5. ***Write a summary of Text C.***

Grammar section
The Present Perfect Tense
Настоящее совершенное время

The Present Perfect Tense (настоящее совершенное (перфектное) время) употребляется:

1. Для выражения действия, завершившегося к моменту речи. Время действия не указывается, важен сам факт совершения действия к настоящему моменту или его результат.

She has read this book. Она прочитала эту книгу. (Действие завершено к моменту речи).

В этом значении Present Perfect часто употребляется с наречиями just – только что, already – уже, yet – ещё, lately – недавно, of late – в последнее время, recently – недавно.

The mail has just come. Почта только что пришла.

He has seen many films lately. В последнее время он посмотрел много фильмов.

2. Для выражения действия, которое завершилось, но тот период, в котором оно происходило, ещё продолжается и может быть обозначен обстоятельствами времени today – сегодня, this week – на этой неделе, this month – в этом месяце, this century – в нашем веке и др.

I have written a letter this morning. Я написал письмо сегодня утром.

3. Для выражения действия, которое началось в прошлом и продолжается до настоящего времени.

I have known him all my life. Я знаю его всю жизнь.

I have known him for 2 years. Я знаю его 2 года.

He has not seen his parents since January. Он не видел своих родителей с января.

Present Perfect может употребляться с наречиями always – всегда, often – часто, seldom – редко, ever – когда-нибудь, never – никогда.

She has never been to London. *Она никогда не была в Лондоне.*
Have you ever been to Moscow? *Вы когда-нибудь были в Москве?*

Present Perfect образуется при помощи вспомогательного глагола to have в Present Indefinite и Participle II (Причастия II) смыслового глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I, we, you, they have seen	I, we, you, they have not seen	Have I (we, you, they) seen ?
He, she, it has seen	He, she, it has not seen	Has he (she, it) seen ?

I have = I've; He has = He's; I have not = I haven't; He has not = He hasn't

Упражнение 1. Измените время глаголов на форму Present Perfect. Поставьте полученные предложения в вопросительную и отрицательную форму. Переведите предложения на русский язык.

1. She is watering the flowers. 2. He is taking his examination. 3. Beth is opening the window. 4. I am dusting the furniture. 5. John is washing his car. 6. The teacher is explaining the rule. 7. Mary is reading the letter. 8. We are having dinner. 9. I am cleaning my teeth. 10. Jane is translating the article. 11. Little Frank is breaking his toys. 12. He is having breakfast. 13. Nick is drawing a picture. 14. My daughter is having lunch. 15. He is putting on his coat.

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Present Perfect. Обратите внимание на употребление предлогов for и since.

1. I (to live) here (for/since) 1999. 2. He (to work) there (for/since) May. 3. They (to be) friends (for/since) they started college. 4. We (to know) him (for/since) three years. 5. They (to live) in our house (for/since) two years. 6. She (to be ill) (for/since) Friday. 7. I (not to be) in London (for/since) I (to be) a child. 8. I (to leave) Paris last year and I (not to see) my best friend (for/since). 9. He (to study) French (for/since) ten years. 10. My mother (to work) in the factory (for/since) some years. 11. They (to live) in Brasil (for/since) 1960. 12. I (not to see) him (for/since) this Tuesday. 13. He (to be) in prison (for/since) five years. 14. She (not to hear) about them (for/since) almost a year. 15. I (to know) nothing about him (for/since) several month.

Упражнение 3. Раскройте скобки, употребляя глаголы в Present Perfect или в Past Simple.

1. She (to visit) all capital cities of Europe this year. 2. John (to travel) around Europe last year. 3. You ever (to live) in a foreign country? 4. My friend knows a lot because he (to read) a lot. 5. She (to go) home two days ago. 6. She is free now. She (to pass) her final exam. 7. David (to start) school in 1990. 8. Look! Somebody (to break) my window. 9. I (to leave) home early last night. 10. Is he still watching this programme? – No, he just (to watch) it. 11. We (not to see) them last week. 12. His family (to build) a new house this year. 13. It (to stop) snowing an hour ago. 14. I (not to decide) where to go tonight. 15. I (to learn) all the new words. Now I can translate this text. 16. When you (to arrive) to Paris? 17. We (not to know) about the disco last night. 18. You (to read) this book before? 19. He (to work) here two month ago? 20. Tom (to be) to London before?

Упражнение 4. Переведите на английский язык. Обратите внимание на употребление Present Perfect.

1. Мы не видели ее с того времени, как она вышла из офиса. 2. Я живу в этом доме около семи лет, но я хочу переехать. 3. Она знает эту семью пять лет. Они познакомились в Лондоне восемь лет назад. 4. Он учил немецкий язык на протяжении двух лет, но потом решил бросить учебу. 5. Я работаю на этом заводе с сентября. 6. Наш ребенок болел почти две недели. 7. Я могу поговорить с директором? – Извините, он вышел несколько минут назад. 8. Моя подруга звонила мне сегодня? – Нет, она еще не звонила. 9. Этот ученик не знает ответа, потому что он не выучил урок. 10. Почему ты еще не сделал уроки?

Past Perfect Tense
Прошедшее совершенное время

The Past Perfect Tense (прошедшее совершенное (перфектное) время) выражает прошедшее действие, предшествовавшее какому– то определенному моменту в прошлом или завершившееся до другого действия в прошлом, иначе говоря, предпрошедшее.

Past Perfect употребляется:

1. Для выражения прошедшего действия, которое уже совершилось до определенного момента в прошлом. Этот момент может быть указан обстоятельством времени: by 5 o'clock – к пяти часам, by Saturday – к субботе, by that time – к тому времени, by the end of the year – к концу года.

She had left by the 1 st of June. – Она уехала (еще) до первого июня.

I had cleaned the apartment by 5 o'clock. – К пяти часам я убрала квартиру.

2. Для выражения прошедшего действия, которое уже завершилось до другого, более позднего прошедшего действия, выраженного глаголом в Past Indefinite. В таких случаях Past Perfect употребляется главным образом в сложноподчиненных предложениях.

They had already gone when I arrived. – Они уже ушли, когда я появился.

Past Perfect часто употребляется в придаточных предложениях с союзами after – после того как, before – прежде чем, до того как.

Past Perfect образуется путем сочетания вспомогательного глагола to have в Past Indefinite и Participle II (Причастие II) знаменательного глагола.

Утвердительная форма		Отрицательная форма		Вопросительная форма
I, we		I		Had I worked (done) ?
You	had done	You	had not worked	Had you worked (done)?
He, she, it	had worked	He, she	had not done	Had he (she, it) worked?
They		It, they		Had they worked (done)?

I had = I'd; I had not = I hadn't

Упражнение 1. Раскройте скобки, употребляя глаголы в Past Perfect. Поставьте каждое предложение в вопросительную и отрицательную форму.

1. My father (to visit) London before, and so the city was not new to him. 2. When we came the plane (to take off). 3. I went to sleep as soon as the show (to finish). 4. When they came home mother (to do) everything about the house. 5. I went to see the sights after I (to buy) a map of Moscow. 6. Karen didn't want to come to the cinema with us because she already (to see) this film. 7. We knew our itinerary only after the leader of the group (to tell) us. 8. After I (to spend) all the money I turned to my father. 9. She understood the letter after she (to read) it a second time. 10. We (to keep) waiting until we lost patience.

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Past Indefinite или в Past Perfect.

1. When the police (to arrive), the car (to go). 2. When she (to get) to the shop, it (to close). 3. The train (to leave) when he (to come) to the station. 4. We

(to eat) everything by the time he (to arrive) at the party. 5. I (to know) that he (not to learn) the poem. 6. He (to take) the decision before I (to come). 7. Nick (to return) from office by seven o'clock. 8. I (to think) that my parents already (to return). 9. It (to be) the second time she (to make) that mistake. 10. He (to be sure) that we (not to recognize) him. 11. The car (to go) when I (to look) into the street. 12. You (to find) your key which you (to lose) before? 13. Meg (to say) that she (to be) in this city. 14. The doctor (to arrive) when we already (to help) him. 15. He (to study) guitar for two years when he (to be) a teenager.

The Future Perfect Tense
Будущее перфектное время

The Future Perfect Tense (будущее перфектное время) употребляется для выражения будущего действия, которое закончится до определенного момента в будущем. Момент в будущем, до которого закончится действие, может быть выражен:

1) обстоятельством времени с предлогом by (by five o'clock – к пяти часам, by the end of the year к концу года)

By the end of the week we'll have finished this work. – К концу недели мы закончим эту работу.

2) другим будущим действием, выраженным Present Indefinite в придаточном предложении времени и условия с такими союзами, как before – до того как, when – когда.

When we meet next time, I'll have read this book. – Когда мы встретимся в следующий раз, я уже прочитаю эту книгу.

Future Perfect образуется при помощи вспомогательного глагола to have в Future Indefinite и Participle II (Причастие II) знаменательного глагола (shall/will have + worked).

Утвердительная форма		Отрицательная форма		Вопросительная форма
I, we he, she, it you, they	will have worked	I, we he, she, it, you, they	will not have worked	Shall (will) I (we) have worked ? Will he (she, it, you, they) have worked ?

Упражнение 1. Раскройте скобки, употребляя глаголы в форме Future Perfect. Поставьте предложения в вопросительную и отрицательную форму.

1. I (to do) it by that time. 2. He (to write) a letter by the time she comes. 3.We (to build) a new house by the end of the year. 4. Mother (to cook) dinner when we come home. 5. You (to do) your homework by seven o'clock. 6. They (to arrive) by the evening. 7. She (to come) by five o'clock. 8. I (to look) by this time through all magazines.

Упражнение 2. Раскройте скобки, употребляя глаголы в форме Future Simple, Future Continuous, Future Perfect.

1. He (to write) a letter at seven o'clock tomorrow. 2. Where she (to go) to buy a new dress? 3. What country he (to visit) by the next year? 4. Our family (to have) dinner at half past four. 5. What time he (to come) this evening? – He (to come) by seven o'clock. 6. I (to meet) you at the station at nine o'clock tomorrow.– My train already (to arrive) by that time. 7. What you (to buy) him for his birthday? 8. When you (to finish) the University? 9. My sister and I (to do) washing– up by the time mother comes. 10. I (to go) to the cinema with you tomorrow.

Упражнение 3. Переведите предложения, употребляя глаголы в форме Future Perfect.

1. Они не переведут эту статью до трех часов. 2. Она сделает эту работу до конца месяца. 3. Почему твой друг не напишет статью до вечера? 4. Ты закончишь читать эту книгу до завтра? 5. Сбудется ли мое желание до Нового года? 6. Они уже уйдут к тому времени. 7. Почему она не начнет работать до девяти утра? 8. Эта телепередача закончится к четырем часам? 9.Учитель проверит все тексты до завтра.

Unit 7. NUCLEAR POWER
Text A. Energy Resources: Nuclear power

How it works

Nuclear power stations work in pretty much the same way as fossil fuel–burning stations, except that a "chain reaction" inside a nuclear reactor makes the heat instead.

The reactor uses Uranium rods as fuel, and the heat is generated by nuclear fission: neutrons smash into the nucleus of the uranium atoms, which split roughly in half and release energy in the form of heat.

Carbon dioxide gas or water is pumped through the reactor to take the heat away, this then heats water to make steam.

The steam drives turbines which drive generators.

Modern nuclear power stations use the same type of turbines and generators as conventional power stations.

In Britain, nuclear power stations are often built on the coast, and use sea water for cooling the steam ready to be pumped round again. This means that they don't have the huge "cooling towers" seen at other power stations.

The reactor is controlled with "control rods", made of boron, which absorb neutrons. When the rods are lowered into the reactor, they absorb more neutrons and the fission process slows down. To generate more power, the rods are raised and more neutrons can crash into uranium atoms.

More

Natural uranium is only 0.7% "uranium – 235", which is the type of uranium that undergoes fission in this type of reactor.

The rest is U – 238, which just sits there getting in the way. Modern reactors use "enriched" uranium fuel, which has a higher proportion of U – 235.

The fuel arrives encased in metal tubes, which are lowered into the reactor whilst it's running, using a special crane sealed onto the top of the reactor.

With an AGR or Magnox station, carbon dioxide gas is blown through the reactor to carry the heat away. Carbon dioxide is chosen because it is a very good coolant, able to carry a great deal of heat energy. It also helps to reduce any fire risk in the reactor (it's around 600 degrees Celsius in there) and it doesn't turn into anything nasty (well, nothing long-lived and nasty) when it's bombarded with neutrons.

You have to be very careful about the materials you use to build reactors – some materials will turn into horrible things in that environment. If a piece of metal in the reactor pressure vessel turns brittle and snaps, you're probably in

trouble – once the reactor has been built and started you can't go in there to fix anything.

Uranium itself isn't particularly radioactive, so when the fuel rods arrive at the power station they can be handled using thin plastic gloves. A rod can last for several years before it needs replacing.

It's when the "spent" fuel rods are taken out of the reactor that you need the full remote– control robot arms and Homer Simpson equipment.

Should I worry about nuclear power?

Nuclear power stations are not atomic bombs waiting to go off, and are not prone to "meltdowns".

There is a lot of U – 238 in there slowing things down – you need a high concentration of U – 235 to make a bomb.

If the reactor gets too hot, the control rods are lowered in and it cools down.

If that doesn't work, there are sets of emergency control rods that automatically drop in and shut the reactor down completely.

With reactors in the UK, the computers will shut the reactor down automatically if things get out of hand (unless engineers intervene within a set time). At Chernobyl, in Ukraine, they did not have such a sophisticated system, indeed they over-rode the automatic systems they did have. When they got it wrong, the reactor overheated, melted and the excessive pressure blew out the containment system before they could stop it. Then, with the coolant gone, there was a serious fire. Many people lost their lives trying to sort out the mess. A quick web search will tell you more about this, including companies who operate tours of the site.

If something does go wrong in a really big way, much of the world could be affected some radioactive dust (called "fallout") from the Chernobyl accident landed in the UK. That's travelled a long way.

With AGR reactors (the most common type in Britain) there are additional safety systems, such as flooding the reactor with nitrogen and/or water to absorb all the neutrons although the water option means that reactor can never be restarted.

So should I worry? I think the answer is "so long as things are being done properly, I don't need to worry too much. The bit that does worry me is the small amount of high-level nuclear waste from power stations. Although there's not much of it, it's very, very dangerous and we have no way to deal with it apart from bury it and wait for a few thousand years...

There are many different opinions about nuclear power, and it strikes me that most of the people who protest about it don't have any idea what they're talking about. But please make up your own mind, find out as much as you can,

and if someone tries to get you to believe their opinion ask yourself "what's in it for them?"

Is it renewable?

Nuclear energy from Uranium is not renewable. Once we've dug up all the Earth's uranium and used it, there isn't any more.

Actually, it's not that simple – we can use "fast breeder" reactors to convert uranium into other nuclear fuels whilst also getting the energy from it. There are two types of breeder reactors – ones that make weapons– grade plutonium and ones that are for energy production (source: http://www.darvill.clara.net/altenerg/nuclear.htm).

Answer the following question and read the text below to check your answer.

Why can nuclear power be considered as an alternative to fossil fuels?

Text B. Nuclear power

When you hear the words "nuclear power", different images may flicker through your mind: concrete coolant towers emitting torrents of steam or a mushroom cloud rising high into the sky.

Some people praise the technology as a low-cost, low-emission alternative to fossil fuel, while others stress the negative impact of nuclear waste and accidents such as Three Mile island and Chernobyl. There's a lot of discussion out there about nuclear power's role in our lives, but what's going on at the heart of these power plants? As of July 2008, there were more than 430 operating nuclear power plants and, together, they provided about 15 percent of the world's electricity in 2007. Of these 31 countries, some depend more on nuclear power than others. For instance, in France about 77 percent of the country's electricity comes from nuclear power Lithuania comes in second, with an impressive 65 percent. In the United States, 104 nuclear power plants supply 20 percent of the electricity overall, with some states benefiting more than others.

Despite all the cosmic energy that the word "nuclear" invokes, power plants that depend on atomic energy don't operate that differently from a typical coal burning power plant. Both heat water into pressurized steam, which drives a turbine generator. The key difference between the two plants is the method of heating the water. While older plants burn fossil fuels, nuclear plants depend on the heat that occurs during nuclear fission, when one atom splits into two (source: www.naturalgaz.org).

Active vocabulary

1. Try to memorize the following words and phrases.

Nouns and noun phrases	
coolant	хладагент
torrent	поток
image	изображение
coal– burning	угле сжигающий
Verbs and verbal phrases	
to flicker	мерцать
to praise	хвалить
to invoke	вызывать
to emit	испускать
Adjectives	
cosmic	космический
impressive	впечатляющий
Adverbs	
overall	в общем

2. Choose the right word.

1) Nuclear power is *(reduced/generated/ increased)* using Uranium, which is a metal mined in various *(parts / kinds / stages)* of the world.
2) The first large– scale nuclear power station *(demolished /closed/opened)* at Calder Hall in Cumbria, England, in 1956.
3) Some *(cargo / civil / military)* ships and submarines have nuclear power plants for *(chambers / engines /fission).*
4) *(Metal / concrete)* plays an important role in containing *(nuclear / radioactive)* materials.

Comprehension check

1. Answer the following questions and give examples.

1) What do statistics of 2008 show?
2) What countries depend on nuclear power more than others?
3) What is the same about nuclear power and coal burning power plants?
4) What is the key difference between them?

5) What is fission?
6) What are people's opinions related to nuclear power?
7) What accidents make them feel negative?
8) How many countries depend on nuclear power?
9) When you hear the words "nuclear power", what do you imagine?
10) Is there any difference between words "nuclear" and "atomic"?

2. Decide whether the following statements are true or false according to the text.

1) They provided more than 15 percent of the world's electricity in 2008.
2) In France about 77 percent of the country's electricity comes from nuclear power.
3) In Baltic republics nuclear power plants supply 65 percent of the electricity overall.
4) The technology of nuclear power is a low-cost, low-emission alternative to fossil fuels.
5) It doesn't produce any negative impact.
6) According to data of July 2008, there were more than 430 operating nuclear power plants.
7) In the United States some states benefit more than others.
8) Power plants that depend on atomic energy don't operate that differently from a typical fuel burning power plant.
9) Coal burning power plant heats water into pressurized steam, which drives a turbine generator.
10) Nuclear plants depend on the heat that occurs during nuclear fusion.

3. Write a summary of Text B.

4. Match the Russian and English equivalents.

d)	to flicker through one’s mind	1) извлекать пользы больше остальных
e)	concrete coolant towers	2) главное отличие
f)	torrents of steam	3) грибовидное облако
g)	a mushroom cloud	4) грандиозная энергия
h)	to praise the technology	5) промелькнуть в голове
i)	to benefit more than others	6) пар под давлением
j)	cosmic energy	7) потоки пара
k)	pressurized steam	8) турбогенератор

l) the key difference	9) превозносить технологию
m) a turbine generator	10) бетонные охладительные башни

5. Translate the text into Russian in written form paying attention to active vocabulary.

What is a Difference Between Atomic and Nuclear Energy?

Nuclear energy or atomic energy is the type of energy that comes from the nuclei of atoms. Both protons (positive electric charge) and neutrons (neutral) are found in the nucleus of an atom. The nucleus contains most of the mass of an atom, Energy is released any time there is a change in an atom's nucleus.

But "atomic energy" is really a misnomer for nuclear energy. It is the fission of the nucleus which causes energy to be released. At the atomic level we are dealing with chemical reactions, but in the early days people did talk of atomic power and atomic bombs.

Answer the following question and read the text below to check your answer.
How many tons of wastes does a nuclear power plant generate per year?

Text C. Pros and cons of nuclear power plants

Whether you view nuclear power as the promise for a better tomorrow or a whopping down payment on a mutant filled apocalypse, there's a good chance you won't be easily converted to the other side. After all, nuclear power boasts a number of advantages, as well as its share of downright depressing negatives.

As far as positives go, nuclear power's biggest advantages are tied to the simple fact that it doesn't depend on fossil fuels. Coal and natural gas power plants emit carbon dioxide into the atmosphere, contributing to climate change. With nuclear power plants, CO2, emissions are minimal.

According to the Nuclear Energy Institute, the power produced by the world's nuclear plants would normally produce 2 billon metric tons of CO_2 per year if they depended on fossil fuels. In fact, a properly functioning nuclear power plant actually releases less radioactivity into the atmosphere than a coal fired power plant. By not depending on fossil fuels, the cost of nuclear power also isn't affected by fluctuations in oil and gas prices.

As for negatives, nuclear fuel may not produce CO2 but it does provide its share of problems. Historically, mining and purifying uranium hasn't been a very clean process. Even transporting nuclear fuel to and from plants poses a contamination risk.

And once the fuel is spent, you can't just throw it in the city dump. It's still radioactive and potentially deadly.

On average, a nuclear power plant annually generates 20 metric tons of used nuclear fuel, classified as high– level radioactive waste. When you take into account every nuclear plant on the Earth, the combined total climbs to roughly 2,000 metric tons yearly.

All of this waste emits radiation and heat, meaning that it will eventually corrode any container and can prove lethal to nearby life forms. As if this weren't bad enough, nuclear power plants produce a great deal of low-level radioactive waste in the form of radiated parts and equipment.

Eventually spent nuclear fuel will decay to safe radioactive levels, but it takes tens of thousands of years. Even low-level radioactive waste requires centuries to reach acceptable levels. Currently, the nuclear industry lets waste cool for years before mixing it with glass and storing it in massive cooled, concrete structures. In the future, much of this waste may be transported deep underground. In the meantime, however, this waste has to be maintained, monitored and guarded to prevent the materials from falling into the wrong hands. All of these services and added materials cost money – on top of the high costs required to build a plant.

Nuclear waste can pose a problem, and it's the result of properly functioning nuclear power plants. When something goes wrong, the situation can turn catastrophic. The Chernobyl disaster is a good recent example. In 1986 the Ukrainian nuclear reactor exploded, spewing 50 tons of radioactive material into the surrounding area, contaminating millions of acres of forest. The disaster forced the evacuation of at least 30,000 people, and eventually caused thousands to die from cancer and other illnesses (source: www.naturalgaz.org).

Active vocabulary

Try to memorize the following words and phrases.

Nouns and noun phrases	
city dump	городская свалка
Verbs and verbal phrases	
to contribute	внести свой вклад
to pose	представлять
to purify	очистить
to guard	охранять
Adjectives	
lethal	летальный

Comprehension check

1. Decide whether the following statements are true or false according lo the text.

1) A coal– fired power plant discharges less radioactivity into the atmosphere than a nuclear power plant.
2) There is always a contamination risk while transporting nuclear fuel to and from plants.
3) Nuclear power depends on fossil fuels.
4) Coal and natural gas power plants contribute to climate change.
3) A nuclear power plant generates high– level radioactive waste.
5) It takes tens of years for spent nuclear fuel to decay to safe radioactive levels.
6) Now the nuclear industry mixes wastes with glass and cool them for years.

2. Answer the following questions and give examples.

1) Are CO_2 emissions minimal or maximal from nuclear power plants? Why? Why not?
2) What isn't the cost of nuclear power affected by?
3) What problems does nuclear fuel produce?
4) Does nuclear power have a number of drawbacks? Why? Why not?
5) Why can't we throw nuclear fuel after it has been spent?
6) What do radioactive wastes emit?
7) How many years does low-level radioactive waste require to reach acceptable levels?
8) How are nuclear wastes stored?
9) What has to be done to radioactive wastes?

3. Find key words and phrases which best express the general meaning of each paragraph.

4. Write a summary of Text C.

5. Put the statements into the correct column. Analyze the advantages and disadvantages of nuclear power.

Advantages	Disadvantages

1) Nuclear power costs about the same as coal, so it's not expensive to make.

2) Although not much waste is produced, it is very, very dangerous.

3) It must be sealed up and buried for many years to allow the radioactivity to die away.

4) Produces small amounts of waste.

5) Nuclear power is reliable.

6) Does not produce smoke or carbon dioxide, so it does not contribute to the greenhouse effect.

7) Nuclear power is reliable, but a lot of money has to be spent on safety– if it does go wrong, a nuclear accident can be a major disaster.

8) Produces huge amounts of energy from small amounts of fuel.

9) People are increasingly concerned about this – in the 1990's nuclear power was the fastest growing source of power in much of the world. In 2005 it's the second slowest growing.

6. Discuss in your group the prospects of nuclear power development in Russia. Find out additional information.

Grammar section
Active and Passive Voices.
Действительный и страдательный залоги в английском языке.

Залог – это форма глагола, которая показывает, является ли подлежащее предложения производителем или объектом действия, выраженного сказуемым. В английском языке имеется два залога: the Active Voice (действительный залог) и the Passive Voice (страдательный залог).

Страдательный залог употребляется, когда исполнитель действия очевиден или несуществен или когда действие или его результат более интересны, чем исполнитель. Страдательный залог образуется с помощью глагола to be в соответствующем времени и III формы глагола (причастие II).

Passive voice			
	Indefinite	**Continuous**	**Perfect**
Present	**am is + V3 are**	**am is + being V3 are**	**have (has) + been + V3**
Past	**was + V3 were**	**was + being V3 were**	**had + been + V3**
Future	**shall + be V3 will**		**shall + have + been V3 will**

Сравним действительный залог со страдательным залогом:
Active Voice
Tom delivers the mail. Том доставляет почту.

Passive Voice
The mail is delivered by Tom. Почта доставляется Томом.

Как и в русском языке, существительное, играющее роль дополнения в предложении действительного залога, в предложении страдательного залога становится обычно подлежащим. Если в оборотах со страдательным залогом указан производитель действия, то в русском языке он обозначается творительным падежом, а в английском ему предшествует предлог by. Употребление времени в английском страдательном залоге принципиально не отличается от его употребления в действительном залоге.

Следует обратить особое внимание на перевод глаголов с предлогом в страдательном залоге. Наиболее распространённые из этих глаголов:

hear of – слышать о
laugh at – смеяться над
look after – присматривать за (кем– либо)
look at – смотреть на
rely on – полагаться на
send for – посылать за
speak of (about) – говорить о
pay attention to – обращать внимание на
take care of – заботиться о

The book is much spoken about. Об этой книге много говорят.
He can't be relied on. На него нельзя положиться.

В русском переводе не все глаголы сохраняют предлог:

to listen to – слушать что-либо, кого-либо
to look for – искать что-либо
to provide for – обеспечить кого-либо, чем-либо
to explain to – объяснять кому-либо

He was listened to with great attention. Его слушали с большим вниманием.

Упражнение 1. Дополните предложения, используя следующие глаголы.

cause damage hold include invite make overtake show translate write

1. Many accidents – – – are caused – – – by dangerous driving.
2. Cheese – – – from milk.
3. The roof of the building – – – in a storm a few days ago.
4. There's no need to leave a tip. Service – – – in the bill.
5. You – – – to the wedding. Why didn't you go?
6. A cinema is a place where films – – –

7. In the United States, elections for President – – – every four years.

8. Originally the book – – – in Spanish and a few years ago it

9. We were driving along quite fast but we – – – by lots of other cars.

Упражнение 2. Раскройте скобки, употребляя глаголы в Present Simple or Past Simple, Active or Passive.

1. It's a big factory. Five hundred people _are employed_ (employ) there.

2. Water – – – (cover) most of the Earth's surface.

3. Most of the Earth's surface – – – (cover) by water.

4. The park gates – – – (lock) at 6.30 p.m. every evening.

5. The letter – – – (post) a week ago and it – – – (arrive) yesterday.

6. The boat – – – (sink) quickly but fortunately everybody – – – (rescue).

7. Ron's parents – – – (die) when he was very young. He and his sister – – – (bring) up by their grandparents.

8. I was born in London but I – – – (grow) up in the north of England.

9. While I was on holiday, my camera – – – (steal) from my hotel room.

10. While I was on holiday, my camera – – – (disappear) from my hotel room.

11. Why – – – (Sue/resign) from her job? Didn't she enjoy it?

12. Why – – – (Bill/sack) from his job? What did he do wrong?

13. The company is not independent. It – – – (own) by a much larger company.

14. I saw an accident last night. Somebody – – – (call) an ambulance but nobody – – – (injure) so the ambulance – – – (not/need).

15. Where – – – (these photographs/take)? In London? – – – (you/take) them?

Упражнение 3. Дополните предложения, используя следующие глаголы.

carry cause do make repair send spend wake up

1. The situation is serious. Something must be done before it's too late.

2. I haven't received the letter. It might have been sent to the wrong address.

3. A decision will not – – – until the next meeting.

4. I told the hotel receptionist that I wanted to – – – at 6.30 the next

morning.

5. Do you think that less money should – – – on armaments?

6. This road is in very bad condition. It should – – – a long time ago.

7. The injured man couldn't walk and had to – – –

8. It's not certain how the fire started but it might – – – by an electrical fault.

Упражнение 4. Перепишите предложения в пассивном залоге.

1. Somebody has cleaned the room. _The room has been cleaned._

2. They have postponed the concert. The – – –

3. Somebody is using the computer at the moment. The computer – – –

4. I didn't realise that somebody was recording our conversation. I didn't realise that – – –

5. When we got to the stadium we found that they had cancelled the game. When we got to the stadium, we found that – – –

6. They are building a new ring road round the city. – – –

7. They have built a new hospital near the airport. – – –

Упражнение 5. Перепишите предложения по образцу.

1. They didn't give me the money. I _wasn't given the money._

2. They asked me some difficult questions at the interview. I – – –

3. Janet's colleagues gave her a present when she retired. Janet – – –

4. Nobody told me that George was ill. I wasn't – – –

5. How much will they pay you? How much will you – – –

6. I think they should have offered Tom the job. I think Tom – – –

7. Has anybody shown you what to do? Have you – – –

Modal verbs
Модальные глаголы

В отличие от других глаголов, модальные глаголы не обозначают действия или состояния, а лишь передают отношение говорящего к действию, выраженному инфинитивом. Модальные глаголы могут показывать, что говорящий рассматривает действие как возможное, желательное, необходимое, сомнительное, допустимое, требуемое и т.д.

I can’t go with you. – Я не могу идти с вами.

We must go now. – Теперь нам надо идти.

Модальные глаголы отличаются от других глаголов рядом особенностей:

1. Они не изменяются по лицам и не имеют окончания –s в 3– м лице единственного числа.

2. У них нет неличных форм – инфинитива, причастия и герундия, а следовательно, нет и аналитических видовременных форм.

3. За исключением глаголов can (could) и may (might) имеют только одну форму.

4. Инфинитив смыслового глагола, следующий за модальными за исключением глагола ought, употребляется без частицы to.

5. В вопросительном и отрицательном предложениях они употребляются без вспомогательного глагола. В вопросительном предложении перед подлежащим ставится сам модальный глагол, в отрицательном отрицание not присоединяется к модальному глаголу.

Наиболее употребительны следующие модальные глаголы:

Can (could) выражает:

– умение, физическую и умственную возможность, способность (*Can you skate?);*

– возможность выполнения действий при соответствующих обстоятельствах *(You can see the forest through the other window);*

– разрешение или просьбу (*Can you use your car? You can use my car*);

– сомнение и неуверенность (*Can it be true?);*

– невероятность (*It can't be true).*

May (might) выражает:

– разрешение (*May I borrow you pen?);*

– предположение с оттенком неуверенности (*He may be ill);*

– неодобрение или упрек (*You might have helped me).*

Must выражает:

– обязательность совершения действия (*You must talk to your son about his future);*

– запрещение *(He must not leave his room for a while);*

– предположение, граничащее с уверенностью *(Your father must be eighty now).*

to have to выражает:

– обязанность (*He had to do it);*

– отсутствие необходимости *(You don't have to go there)*.

to be to выражает:

– долженствование, необходимость как результат договоренности (*We*

are to discuss it next time).

Should и ought to выражают:

- моральное обязательство (*You should (ought to) be always polite.);*
- порицание прошлого действия (*You should (ought to) have helped me).*
- совет (*You should (ought to) see a doctor);*
- предположение (*He should (ought to) be at home).*

Упражнение 1. Вставьте модальные глаголы may (might) или can (could).

1. … you help me? 2. I … not imagine her speaking in public: I knew that she was so shy. 3. Something was wrong with the car: he … not start it. 4. A fool … ask more questions than a wise man … answer. 5. She asked me if she … use my telephone. 6. … I use your pen? 7. … find a pen on that table. 8. The school was silent: nothing … be heard in the long dark corridors. 9. You … take this book: I don't need it. 10. You … read this book: you know the language well enough.

Упражнение 2. Дополните предложения, используя should или ought to.

1. You … follow instructions before taking medicines. 2. It's very late. Children … be in bed. 3. You … not smoke here. 4. It's his anniversary next week. Maybe we … to sent him a telegram. 5. Her room is dirty. She … clean it. 6. This hotel is very expensive. You … not stay here. 7. She drives very fast. She … drive carefully. 8. They … not let the children see such films. 9. They invite us to have barbecue. … we take something to eat? 10. You … not read in the car. You may feel sick. 11. He … book the tickets in advance. 12. She … leave valuable in the car. Someone broke in and stole them.

Упражнение 3. Дополните предложения, используя must, have to, ought to, should.

1. If you want to be fit, you … not eat cake, but you certainly… walk a lot. 2. I'm late. I … hurry. 3. We … wait an hour for them. 4. … you get up very early on Saturday or Sunday? 5. There is light in the house, somebody … be in. 6. We … reach the station in half an hour. 7. His English … be giving him a lot of trouble. 8. The bus we took didn't go up the hill and we … walk. 9. The doctor says I … stay in bed for a week. 10 Every child … know traffic rules. 11. My parents are going out to a party tomorrow and I … stay with my younger brother. 12. It's dark outside, it … be about 7 now. 13. You … not eat so many sweets

because they contain a lot of calories. 14. When he was at the university he … work to pay his own tuition (плата за обучение). 15. You … not speak to your mother like this. 16. … I offer her my help? 17. They got married at last. They … be very happy. 18. She … know the truth, you … tell her. 19. Why … I do somebody else's work? 20. Mother leaves early on Mondays and he … make his breakfast himself. 21. It's 2 o'clock, you … be hungry. 22. I think you … give up smoking. 23. Why … they worry if they're paid so well?

Упражнение 4. Переведите предложения, используя модальные глаголы can, could, may, might.

1. У детей богатое воображение, они могут легко придумывать различные истории. 2. Ты можешь взять словарь, он мне больше не нужен. 3. Неужели это правда, что она вышла замуж за Джона? 4. Не может быть, чтобы вы этому действительно верили. 5. Я могла бы вам это сразу сказать, но мне не хотелось вас расстраивать. 6. Можете зайти к нам после семи, если хотите. 7. Возможно, меня летом не будет в городе. 8. Не возвращайте эту книгу в библиотеку, она может вам понадобиться. 9. Ты могла бы посоветоваться с сестрой. 10. Вы могли бы быть повежливее с ним! Ведь он старше вас. 11. Неужели ребенок все еще спит? 12. Неужели они опоздали на поезд? 13. Оливер спросил, можно ли ему получить еще тарелку каши? 14. Я могла бы вас встретить, но не получила вашего письма. 15. Можно мне занять это место? 16. Больному стало лучше. Вы можете навестить его завтра.

ПРИЛОЖЕНИЕ

Таблица неправильных глаголов

Infinitive	Past simple	Past participle	Перевод
arise	arose	arisen	подняться
awake	awoke	awaked; awoke	будить; проснуться
be	was; were	been	быть
bear	bore	born; borne	родить
beat	beat	beaten	бить
become	became	become	становиться
befall	befell	befallen	случиться
beget	begot; begat	begotten	порождать
begin	began	begun	начинать
bend	bent	bent; bended	наклоняться (в стороны)
bind	bound	bound	связать
bite	bit	bit; bitten	кусать
bleed	bled	bled	кровоточить
bless	blessed	blessed; blest	благословлять
blow	blew	blown; blowed	дуть
break	broke	broken	(с)ломать
breed	bred	bred	выращивать
bring	brought	brought	приносить
broadcast	broadcast	broadcast	распространять
build	built	built	строить
burn	burnt; burned	burnt; burned	жечь; гореть
burst	burst	burst	взорваться
buy	bought	bought	покупать
can	could	could	мочь, уметь
cast	cast	cast	кинуть, лить металл

catch	caught	caught	ловить, хватать, успеть
choose	chose	chosen	выбирать
cleave	clove; cleft; cleaved	cloven; cleft; cleaved	рассечь
cling	clung	clung	цепляться; льнуть
come	came	come	приходить
cost	cost	cost	стоить
cut	cut	cut	резать
dare	durst; dared	dared	сметь
deal	dealt	dealt	иметь дело
dig	dug	dug	копать
dive	dived; dove	dived	нырять; погружаться
do	did	done	делать
draw	drew	drawn	рисовать, тащить
dream	dreamt; dreamed	dreamt; dreamed	грезить; мечтать
drink	drank	drunk	пить
drive	drove	driven	водить (машину etc.)
eat	ate	eaten	кушать; есть
fall	fell	fallen	падать
feed	fed	fed	кормить
feel	felt	felt	чувствовать
fight	fought	fought	сражаться; бороться
find	found	found	находить
fit	fit	fit	подходить по размеру
fly	flew	flown	летать
forbear	forbore	forborne	воздерживаться
forbid	forbad; forbade	forbidden	запрещать
forecast	forecast; forecasted	forecast; forecasted	предсказывать

foresee	foresaw	foreseen	предвидеть
forget	forgot	forgotten	забывать
forgive	forgave	forgiven	прощать
freeze	froze	frozen	замерзать
gainsay	gainsaid	gainsaid	отрицать; противоречить
get	got	got	получать
give	gave	given	давать
go	went	gone	идти
grave	graved	graved; graven	гравировать
grind	ground	ground	точить; молоть
grow	grew	grown	расти
hang	hung; hanged	hung; hanged	вешать
have	had	had	иметь
hear	heard	heard	слушать
hew	hewed	hewed; hewn	рубить; тесать
hide	hid	hidden	прятать(ся)
hit	hit	hit	ударять; попадать в цель
hold	held	held	держать
hurt	hurt	hurt	причинить боль
input	input; inputted	input; inputted	входить
inset	inset	inset	вставлять; вкладывать
keep	kept	kept	хранить; содержать
know	knew	known	знать
lade	laded	laded; laden	грузить
lay	laid	laid	класть; положить
lead	led	led	вести
lean	leant; leaned	leant; leaned	опираться; прислоняться
learn	learnt; learned	learnt; learned	учить

leave	left	left	оставить
lend	lent	lent	одалживать
let	let	let	позволять
lie	lay	lain	лежать
light	lit; lighted	lit; lighted	освещать
lose	lost	lost	терять
make	made	made	делать; производить
may	might	might	мочь; иметь возможность
mean	meant	meant	подразумевать
meet	met	met	встретить
pay	paid	paid	платить
put	put	put	класть
quit	quit; quitted	quit; quitted	покидать; оставлять; выходить
read	read; red	read; red	читать
rebind	rebound	rebound	перевязывать
ring	rang	rung	звонить
rise	rose	risen	подняться
rive	rived	riven	расщеплять
run	ran	run	бежать; течь
saw	sawed	sawn; sawed	пилить
say	said	said	говорить; сказать
see	saw	seen	видеть
seek	sought	sought	искать
sell	sold	sold	продавать
send	sent	sent	посылать
set	set	set	ставить; устанавливать
sew	sewed	sewed; sewn	шить
shake	shook	shaken	трясти

shave	shaved	shaved; shaven	брить(ся)
show	showed	shown; showed	показывать
shred	shred; shredded	shred; shredded	кромсать; расползаться
shrink	shrank; shrunk	shrunk	сокращаться; сжиматься; отпрянуть
shut	shut	shut	закрывать
sing	sang	sung	петь
sink	sank	sunk	опускаться; погружаться; тонуть
sit	sat	sat	сидеть
slay	slew	slain	убивать
sleep	slept	slept	спать
slide	slid	slid	скользить
smell	smelt; smelled	smelt; smelled	пахнуть; нюхать
speak	spoke	spoken	говорить
speed	sped; speeded	sped; speeded	ускорять; спешить
spell	spelt; spelled	spell; spelled	писать или читать по буквам
spend	spent	spent	тратить
spill	spilt; spilled	spilt; spilled	проливать
split	split	split	расщепить(ся)
spoil	spoilt; spoiled	spoilt; spoiled	портить
spread	spread	spread	распространиться
spring	sprang	sprung	вскочить; возникнуть
stand	stood	stood	стоять
stave	staved; stove	staved; stove	проламывать; разби(ва)ть
steal	stole	stolen	красть
stick	stuck	stuck	уколоть; приклеить
strew	strewed	strewn; strewed	усеять; устлать
swell	swelled	swollen; swelled	разбухать

swim	swam	swum	плавать
swing	swung	swung	качаться
take	took	taken	взять; брать
teach	taught	taught	учить
tear	tore	torn	рвать
tell	told	told	рассказывать; сказать
think	thought	thought	думать
thrive	throve; trived	thriven; trived	процветать
throw	threw	thrown	бросить
thrust	thrust	thrust	толкнуть; сунуть
tread	trod	trod; trodden	ступать
wake	woke; waked	woken; waked	просыпаться; будить
waylay	waylaid	waylaid	подстерегать
wear	wore	worn	носить (одежду)
wind	wound	wound	заводить (механизм)
write	wrote	written	писать

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