Н. В. Патяева, Е. Б. Михайлова

THE SCOPE OF ENGINEERING

Нижний Новгород
2021

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THE SCOPE OF ENGINEERING

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CONTENTS

MODULE 1

EDUCATION IN ENGINEERING

Lead in

"They know enough who know how to learn"

Henry Brooks Adams (1838 –1918), an American novelist, journalist, historian and academic.

1. Do you know how to learn?

2. You have entered the university and become a student. It means that you had good grades at school and did well enough in state exams. What helped you to reach a success in your studies? (the words below are to help you).

to attend, to take part in, to prepare, to revise for examinations,
to improve, to set goals, to achieve goals, to make progress,
to learn by heart, to give a talk/presentation, to work in teams,
to complete tasks, to be responsible for, to cram,
to rely on myself/ the others/ the Internet/ etc.

3. Do you plan to learn something new? If yes, what would you like to learn?

UNIT 1
WHAT COMES INTO LEARNING

"A university should be a place of light, of liberty and learning"

Benjamin Disraeli

Culture corner

Benjamin Disraeli (1804 – 1881) was a British politician and writer. He served in government for three decades, twice as Prime Minister of the United Kingdom. He was the creator of the modern Conservative Party.

For a start What do you think can help you when studying at university? (you can use the words from Lead-in section).

Activity 1
Academic Success Story

1. Emily is a high-achieving university student. Before reading about her, match the English words and phrases to their Russian equivalents.

1. waste of (space / time)	a. мозговой штурм
2. online databases	b. убедиться, удостовериться
3. to write out the key terms	c. постараться, сделать все возможное
4. to make sure	d. бесполезная, пустая трата
5. schedule	e. выписать ключевые термины
6. to take breaks	f. делать перерывы
7. brainstorming	g. следовать чьему-либо примеру
8. intelligent	h. онлайн базы данных
9. to do your best	i. расписание
10. to follow sb's lead	j. умный

- **Read her Academic Success Story and find out what are the keys to her success (for the moment, ignore gaps 1-7).**

Studying at university is a lot different than in school. I study by reading a lot and I listen in class to remember what's been talked about in the lectures. It is strange, but I find that I am studying less now that I am in college, but I am studying the more important things. I have understood which information is important in a text book, and which information is just a waste of space in my memory.

I. …… Another difference is that I have to use a lot of outside resources. I spend many hours using online databases, library resources to complete tasks, while in school I simply relied on the sources given to me by my teacher.

II…….. My mind is fresh and ready to learn. I find that I do so much better if I get up early and study a little bit every day. It is so important for me to review everything as I go along. It is impossible to do well if I cram it all in last minute. I tried that strategy once, not good!

III…… I make notes, and write out the key terms. I look at my notes sometimes during the weeks before the test. I make sure that I have it all down the night before the test, and the next morning I get up earlier for a 2 hour cram study to get it fresh in my head for the test that day. It works for me most of the time, but I am not the best test taker in the world, I get too nervous! So I study as hard as I can.

IV…… Keeping busy! I find that if I have nothing to do on a certain day, I am less likely to get things done. If I have a set schedule and a set place, I make sure I have things done. My biggest secret is my PLANNER!! I would die with-

out it! I write everything in it and cross it off when it's done. It makes me get things done and remember to do them.

V……. I choose time to study for each exam. I decide which subject needs more attention, and I focus more time on that one. I also take breaks in between. Nobody can study for 5 hours straight without going crazy! I have to get up and walk around, or go running, or paint my nails or something to give me a break from studying every once in a while. That way I will be totally focused when I am studying and not so tired and crazy that I don't understand what I'm reading.

VI..... These are my favourites!! I think brainstorming is the key to starting off a good task. I think you have to make a plan before you are going to write. I also think that grammar is so important, and you have to make sure that you at least sound intelligent through what you write.

VII…… Do your best and motivate other students to want to do as well as you. Show them how much it means to you and maybe they will follow your lead. Don't do it all by yourself. I've done this before and it is a lot of unnecessary stress that can be avoided when the others want to help you. Find out what motivates your team and make it fun for everyone to work together!

(Adapted from http://www.mycollegesuccessstory.com/success-stories/EmilyB.html)

- **Choose the best subtitle for each paragraph.**
  A. My time management secret.
  B. How I succeed in team projects.
  C. My method of revising.
  D. How I find information.
  E. How I study for end of term tests.
  F. My strategies for writing tasks.
  G. My study method is usually an early morning one.

- **Discuss the following questions:**

A. Which of Emily's keys to success are the most effective?

B. Which of these keys do you use in your studies?

C. Do you use any other methods that help you to learn effectively?

Activity 2
Grammar review

Present Simple and Present Continuous

Complete the rules with *present simple* or *present continuous.*

We use the ..... to:

- give factual information.

The earth goes round the sun.

- talk about routine activities.

I look at my notes sometimes during the weeks before the test.

Some verbs are almost always used in the present simple rather than present continuous, for example, *like, want, know, understand, belong, seem, believe, remember*.

We use the ..... to:

- describe activities in progress at the moment of speaking.

I am studying less now that I am in college.

- describe temporary situations.

That machine isn't working. It broke down this morning.

- describe changing situations.

The population of the world is rising very fast.

(See page 86)

1. Find examples of the present simple and the present continuous in the text above.

2. Complete these sentences with either the present simple or the

present continuous form of the verbs in brackets:

a. The River Volga ..... (flow) into the Caspian Sea.
b. …….. your English .....(get) better?
c. I called the office, but I.....(not remember) who I spoke to.
d. How often ……. you ..... (go) to the library?
e. She ..... (talk) to him on the phone right now.
f. Currently we ..... (do) a project on history of space exploration.
g. …… you ..... (belong) to any students society?

Activity 3
Learning English

What do you think the best ways to learn English are?

1. Work in pairs or small groups. Look at the following ways of learning. Put them in order from the most effective to the least effective. Think of other ways to learn English.

1. Reading texts to retell them
2. Translating texts
3. Reading aloud
4. Discussing/brainstorming different topics
5. Doing grammar/ vocabulary exercises (filling the gaps, etc.)
6. Working with a partner/ in a group
7. Role-playing different situations
8. Listening to records
9. Watching videos
10. Doing projects
11. Writing letters and essays
12. Etc.

2. Compare your ideas with other pairs/ groups.

Activity 4
Learning Vocabulary

How do you learn new words?

1. **You are going to read the text about learning English vocabulary. Before reading match the English words with their Russian equivalents:**

make it fun	сложный
tools and techniques	без сомнения
memorise	запоминать
engaging way	инструменты и методы
challenging	сделать это весело
no doubt	увлекательный способ

2. **Read the text quickly and compare it with your ideas of learning vocabulary.**
3. **Read the text again and answer the questions in the right column.**

9 Ways To Learn New English Vocabulary

To successfully learn new vocabulary, you need to create good study habits, keep it interesting and make it fun! The truth is, we all learn differently. Here is a list of different tools and techniques that you can use to improve your vocabulary (in the way that works best for you)!

1. Don't learn individual words on their own! Learn words in groups that they are commonly used in. Have you heard of *collocations*? A collocation is two or more words that are often said together. They just	• What do you think of this idea? • Do you

'sound right' together because native English speakers use them together often. By learning words together, you'll quickly start to understand which words '*sound right*' together. You'll learn how words correctly join together in a sentence, then later, you can start adding or replacing new words, as you learn new ones. For example, instead of memorising the word '*apply*', learn the phrase '*apply for a job*'. You can learn hundreds of new individual words in English but you will be frustrated if you can't correctly put them into your sentence together, in a way that makes sense and sounds natural. When you learn words in groups, you're learning new words WITH the verbs, nouns and prepositions they are used with so you sound more natural when you speak.	memorise words in collocations? • Would you like to try this way of learning words?
2. Learn new vocabulary through stories. Stories are full of new words, phrases and interesting expressions that show you how words come together in an interesting, fun and engaging way! Just like the collocation method, you are learning new vocabulary *in context*. You're not only learning *what* words to use but *how to use* them! Read stories that are fun and enjoyable! If you are not very confident with English, start with children's books. There are lots of great children's books that are interesting, funny and full of adventure! Start with children's books, and	• What do you think of this idea? • Have you read any books in English? • What books would you like to read?

when reading them becomes too easy, try something a little more challenging!	
3. Listen while you read. Take English storytime to a whole new level using audiobooks! Some of you will prefer to listen and read in English, so you can see new words as they're read.	• What do you think of this idea? • Have you ever listened to audiobooks in English?
4. Learn new vocabulary through songs If you love listening to music, there is no doubt that learning new vocabulary through songs will help you remember them. You'll need to find songs where the words are not sung very fast so that you can hear each word and how it's pronounced. It's more effective if you can download the lyrics and read as you listen to learn the words and rhythm correctly. Singing them out loud will improve your pronunciation.	• What do you think of this idea? • Do you pay attention to the words of English songs? Do you look up the lyrics? • Do you use any sites for that?
5. Use Online dictionaries! Online dictionaries offer so many ways to practice and learn new vocabulary! Let's look at the verb 'produce' as an example. When you look up this word in an online dictionary you can: • Read the definition(s)	• What do you think of this idea? • Do you use online dictionaries?

• Read and listen to the different verb forms (*produces, produced, producing, etc.*) • Read lots of example sentences, that show how the word is used in context • Learn synonyms and collocations • View the word family, including *produce* (verb), *producer* (noun), *production* (noun), *productive* (adjective), *unproductive* (adjective antonym), *productively* (adverb), *product* (noun) and *produce* (noun). • Listen to the pronunciation. In this example, you'll be surprised to learn that the verb *produce* and the noun *produce* are pronounced differently! The Oxford Learner's Dictionary has great apps for iPhone and Android.	• Do you use any applications to look up the words?
6. Labels & Flashcards  Flashcards have been a favourite way of learning new vocabulary for years and years. But there are different options available for us today. You might prefer to hand-write flashcards with an English phrase on one side and the translation to your native language on the other side.	• What do you think of this idea? • Have you ever used flashcards to learn new words?
7. Describe the world around you If you like using a dictionary to learn new English vo-	What do you think of this

cabulary, getting into the habit of describing things that are happening around you in English is a great way to study. When you are unsure of words, look it up! It will help you fill in the gaps in your vocabulary. For example, when you are outside, ask yourself: • *Do I know the English name of all the items around?* • *How can I describe people in front of you?* When you can't think of a word, stop and look it up. Understand how to use it and practice it again the next time you go out!	idea?

Most importantly, you need to find ways to learn vocabulary that work best for YOU. Because we all learn differently, we have different priorities. You need to create your own good study habits and find ways to enjoy English!

(Adapted from https://www.mmmenglish.com/2016/04/13/9-ways-to-learn-new-english-vocabulary/)

4. Match the words in columns to make collocations and translate them:

create	sense
keep it	good study habits
make	the lyrics
confident	interesting
download	the gaps
fill in	with English

5. Have a look at tip 5, pay attention to the words defining parts of speech and match English and Russian equivalents.

Verb (v)	Глагол
Noun (n)	Наречие
Adjective (adj)	Предлог
Adverb (adv)	Прилагательное
Preposition (prep)	Существительное

6. Do you have any other good ideas for learning English vocabulary?

7. You can go and try the following sites and applications:

https://www.goconqr.com/ - flashcards, Mindmaps, quizzes

https://vocapp.com/ - flashcards

https://lyricstraining.com/ - with apps on GooglePlay and AppStore - for those, who would like to learn the words while listening to songs

Application Quiz Your English

Activity 5
Internet use

1. Search for applications that can help to study English, explore them, choose the best ones.

2. Present your findings to the other students, show and describe the application you like.

Word List

achieve goals	make it fun
attend (v)	make progress
be responsible for	make sense
brainstorming (n)	make sure
challenging (adj)	memorise (v)
complete tasks	no doubt (n)
confident with English	online databases
cram (v)	prepare (v)
create good study habits	rely on myself/ the others/ the Internet/
do your best	revise for examinations
download the lyrics	schedule (n)
engaging way	set goals
fill in the gaps	take breaks
follow sb's lead	take part in
give a talk/presentation	tools and techniques (n)
improve (v)	waste of (space / time)
intelligent (adj)	work in teams
keep it interesting	write out the key terms
learn by heart	

UNIT 2

ENGINEERING IN THE 21st CENTURY

For a start

Technology is improving at an exponential rate and millennial workers switch jobs every 4.4 years, on average.

We live in a fast-changing world, and producing more of the same knowledge and skills will not suffice to address the challenges of the future. A generation ago, students could expect that what they were taught would last their lifetime. Today, because of rapid economic and social change, students have to be prepared for jobs that have not yet been created, technologies that have not yet been invented and problems that we don't yet know will arise.

In the face of rapid change, educators and activists are promoting **21st century skills** to prepare students for an unknown future and jobs that have yet to be created.

1. Do you think you are ready for the challenges of the future?

2. What skills does a 21st-century engineer need to get to operate efficiently in the fast-changing world?

Make a list of skills needed for an engineer.

Activity 1
Engineering in the 21st Century

You are going to read the text about 21st century skills.

1. Before reading decide whether you think these statements are true (T) or false (F).

1. Engineering has changed greatly since the last century.

2. Knowing the basic information in every engineering discipline is enough to succeed professionally.
3. There are only five skills important for future engineers.
4. Working in a team is the easiest skill to acquire.
5. The money that company makes depends very much on communication skills of its employees.
6. In the digital age it is important to use all sources of information.
7. If you are flexible you don't want to accept someone's ideas if they are differernt from yours.
8. Creativity cannot be developed while studying.

2. Read the text and check your answers.

Rapid change has become the characteristic of the 21st century. Over the past years, humanity has made a significant step in the development of all industries known to us, and even more changes are yet to come.

Engineering in the 21st century is much different from what it used to be. Today, it requires adjusting to the fast-paced world and keeping up with development. What people thought was impossible twenty years ago is now our new reality, and there is no way to hide from these changes.

At first glance, specialists must learn the basics. However, this creates a large gap between education and what is demanded on the market. That's why undergraduate degree alone is no longer enough.

How to stay relevant and competitive as an engineer? What should a specialist keep in mind to succeed?

In today's quick and constantly shifting world, 21st century skills are essential. When students are able to adapt to new requirements and overcome unexpected obstacles, they'll succeed no matter where their life takes them.

Some of the 21st century skills in education:

Teamwork

Teamwork or collaboration means generating ideas and solving problems in a group. The essential aspect of collaboration is the willingness to share your idea for the whole team and company's benefit. Students or employees must be able to find compromises and be able to accept others' points of view.

This learning skill is one of the most important and challenging at the same time. Collaboration skills are required for many job positions.

Communication

Nowadays, proper communication skills are must-have abilities for all jobs, regardless of the industry. Efficient communication in the workplace is necessary for company profitability. Employees have to communicate when discussing ideas, exploring solutions, or participating in other project activities. Poor contact may lead to the whole project fall. For this reason, 21st century students need to learn how to communicate appropriately with different types of personalities.

Information and media literacy

Information literacy is one of the basic skills for students in the digital age. It teaches them to separate facts from fiction and not to fall victim to myths and misinformation. In the time when getting information online is getting more popular than learning from traditional paper books, it's crucial to learn this skill.

Media literacy helps us define the information source's credibility and use only trusted media resources to stay informed. Mastering media literacy, students learn to distinguish various media outlets and identify important ones for getting information in their lives.

Flexibility

Students should be flexible in our changing world. Flexibility means the willingness to adapt to changes and start doing things another way, even if it may differ from the way one wants to.

It's one of the most challenging skills for students to learn because they need to accept that their solution is not workable, and someone's idea is more efficient. If you are flexible, you show that you are always ready to learn something new and react positively to changes.

Creative thinking

Creative thinking is essential for business when it comes to finding new solutions. Creativity is not an inborn talent, and one can learn and develop this skill to generate more ideas when solving problems.

Learning creativity, students need to understand the necessity for changing and improving things. Creativity helps students notice concepts from another perspective for driving innovations. Whatever industry you might work in, innovation is the key to success for every company.

The best way to keep up with the rapidly changing industry is to become a lifelong learner!

3. Match the words to form expressions from the text and translate them.

1. rapid	a) world
2. significant	b) change
3. fast-paced	c) engineer
4. At first	d) profitability
5. competitive	e) glance
6. generate	f) step
7. company	g) ideas
8. lifelong	h) learner

4. Match the English phrases to their Russian equivalents.

1. to keep up with development 2. to create a large gap 3. demanded on the market 4. to keep in mind 5. to overcome unexpected obstacles 6. must-have abilities 7. to fall victim to misinformation 8. source's credibility	a) востребован на рынке b) достоверность источника c) идти в ногу с развитием d) иметь ввиду (помнить) e) обязательные способности f) пасть жертвой дезинформации g) преодолеть неожиданные препятствия h) создать большой разрыв

5. Match the words in columns with their synonyms:

willingness essential efficient crucial flexible	effective adaptable desire necessary important

6. Why are the skills listed in the text called the 21st century skills?

Activity 2
Networking

It's not what you know, it's who you know.

English proverb

Networking (making professional connections) is one of the 21st century skills important for engineers. Do you agree?

1. **How can students develop networking skills at university?**
2. **Can students' clubs/ societies help to develop them?**
3. **Do you belong to any? If not, would you like to? Why/ why not?**
4. **Do you have a professional society for students at your university?**

In the US for most disciplines in engineering there exists a professional society with a student chapter (студенческое отделение). With guidance from faculty, students organize the chapter's activities such as industry plant tours and inviting speakers to campus. These societies provide a valuable link to the professional world.

Read what members say about the advantages of belonging to a students' engineering society and see if you have come up with the same ideas.

1. Before you read match the words in column A with their definitions in column B:

A	B
confident individual	everyday troubles and events
daily hassles and happenings	feeling of participation
hands-on experience	have better knowledge or experience
provide valuable contacts	practical knowledge/ skills
sense of involvement (with)	supply important connections
get better acquainted (with)	sure of oneself person

"What you get from participating in student organizations is based on what you put into it. Not only can you develop invaluable friendships, but you also build your communication, leadership and team skills, which in turn makes you a more confident individual. From my experience, the things that I have learned from being involved with student organizations are just as, if not more, important than schoolwork. Student organizations represent real life - the daily hassles and happenings that you would deal with in the working

world." (Kristin Shuda, a co-president of the college's Polygon Engineering Council in University of Wisconsin, USA)

"Among the many advantages of belonging to a professional society, I place hands-on experience, team-building skills and skills in interpersonal relations among the top. Professional societies also provide valuable contacts and job opportunities that would be hard to come by anywhere else". (Neel Vasavada, a member of the American Society of Mechanical Engineers)

"One of the greatest benefits of belonging to an engineering society is in the friendships and sense of involvement with the college that it generates. I have also been able to get better acquainted with the faculty, which I think is a big plus. If I had not gotten involved with ASCE, I surely would know less people, have less understanding of the profession and would not have gained the leadership, social and organization skills that I have developed." (Jeremy Tomesh, American Society of Civil Engineers (ASCE) student chapter leader)

2. Read the extract again and divide the advantages into the following three columns. Can you add some other advantages?

Professional skills	Social skills	Other benefits

Activity 3
Vocabulary
Word building

"Not only can you develop invaluable friendships..."

1. **What do the following prefixes in bold mean? Add**

some more words to each category. *e.g. re- means "again"*

1. **re**play/ **re**charge
2. **in**valuable/ **il**logical/ **im**possible/ **ir**regular/ **un**usual/ **dis**advantage
3. **inter**personal/ **inter**active
4. **sub**marine/ **sub**way
5. **over**crowded/ **over**estimate
6. **under**weight/ **under**estimate
7. **post**graduate

2. What parts of speech (noun or adjective) do the suffixes in bold indicate?

1. organizat**ion** / leader**ship**/ involve**ment**
2. learn**er**/ teach**er**/ doct**or**
3. person**al**/ act**ive**/ dai**ly**/ power**ful**

3. Make as many words as you can by combining different parts of the box:

communicate	-ive	-ion
friend	-al	-ship
profession	-ly	-ment
develop	-ful	-er/ or
invent		-ism
success		
help		
revise		
achieve		
construct		
appoint		
visible		
employ		
mechanic		

4. Make the words from exercise 3 negative using the following prefixes:

dis- un- in-

5. Choose at least six words you formed and write a sentence for each to illustrate the meaning.

Activity 4
Professional Success

1. **Have a look at 21st century skills in Activity 1 and say which skills are essential to make a successful career in engineering?**
2. **You are going to read the text about Amber, a successful engineer. Before reading match the words with their Russian equivalents.**

run faultlessly	вопрос, вызывающий большую озабоченность
diversity	информировать клиентов
remote working	нанимать людей на работу
update customers	работать безупречно
an issue of great concern	разнообразие
recruit people	снижать выбросы
reduce emissions	удаленная работа
fragile	хрупкий

3. **Read the text and define the skills that helped her to achieve professional success.**

A day in the life of Amber O'Connor, the manager of a global team of gas turbine experts

At the age of 26, Amber works as an Equipment Health Monitoring & Performance Engineer and Remote Diagnostic Services Program Manager in Warwick, England. Not only is she able to interpret a gas turbine's 3,500 data measurements per minute, she leads a team to ensure they're running faultlessly in every region of the world. And if that wasn't impressive enough,

she’s a mother of two and a champion of diversity.

"There's always loads of things going on, and I do a lot of juggling. But the challenge really excites me," she says. She balances her global projects with her social work - as well as parental duties.

Be the change you want to see in the world

After preparing breakfast for her two young children, Amber starts her day. As she looks through her emails it's clear that flexibility is key. “Usually I work three days in the office and two days from home.” It’s a family-friendly flexibility that enables her to look after her children in the afternoons and talk to her team in Canada and the U.S. in the evenings.

Making a global difference, remotely

With her children at daycare, Amber video calls her team. As a global team, remote working tools such as video conferencing are essential.

Her team is responsible for the remote monitoring of industrial gas turbines across the globe, working with data to detect even the slightest of problems. “Since we manufacture the turbines at our company, we know them inside out. We understand them and that’s why we are able to offer a high level of service.”

Communication is key to move in the right direction

With over 180 units worldwide in her area of responsibility, regularly updating her customers is a huge task. In the past, it’s taken her to places from the U.S. and Canada to Qatar and across Europe. Today, she checks in with her customers remotely. These calls are essential to meet their changing needs as well as helping them develop new services, from engineering techniques to

greater automation.

With such diverse clients that have a wide range of needs, she often has to adapt her approach to truly understand what they want from her. It's a skill that's served her well at home with her kids and husband too.

One growing challenge is cyber security: "It's an issue of great concern," warns Amber. "Our systems produce the energy that drive the world. If a hacker were to succeed in penetrating them, the consequences would be severe." That's why her team is constantly developing new ways to keep pace with the development of technology.

Engineering is for everyone

Amber also works on another project close to her heart, supporting women entering Science, Technology, Engineering and Math fields.

Her educational work focuses on changing the perception of engineering. "I get my nails done. I work at a desk. That doesn't make me less of an engineer. It just means I'm a different kind of engineer." Although she points out it's not specifically about recruiting women, but rather to "recruit people who are best for the job and that shouldn't matter what gender you are."

Changing the world for future generations

She hopes the growing interest in green energy will bring more diversity to the industry. Amber's work helps her customers reduce emissions by ensuring everything runs as efficiently as possible. She's a firm believer that making changes for a better tomorrow needs to start right now.

"Our world is fragile, and we need to adapt in order to protect it. It's essential that everyone changes."

(Adapted from https://www.siemens-energy.com/global/en/news/magazine/2020/championing-diversity-in-engineering.html?stc=wwse100735)

Activity 5
Discussion

Discuss the following questions:

- **Do you think it's a good idea to combine remote work with work in the office?**
- **Do you agree with Amber that making changes for a better tomorrow needs to start right now?**
- **What can we change right now?**

Word List

an issue of great concern at first glance company profitability competitive engineer create a large gap crucial (adj) demanded on the market diversity (n) efficient (adj) essential (adj) fall victim to misinformation fast-paced world flexible (adj) fragile (adj) generate ideas	keep in mind keep up with development lifelong learner must-have abilities overcome unexpected obstacles rapid change recruit people reduce emissions remote working run faultlessly significant step source's credibility update customers willingness (n)

UNIT 3

CHOOSING A CAREER IN ENGINEERING

For a start Engineering has been called “invisible profession” or the “stealth profession” because most people have no clue what engineers do. A 1998 poll in the USA indicated 61% of adults felt “not very well” or “not at all well” informed about engineering.

1. Being a student in engineering do you know what engineers do? What areas of our society do they work in? The pictures below refer to some of the areas. Can you name them?








2. In the table there is a list of areas of society. What types of engineers work in each area?

Tick all the types of engineers who work in each area.

Types of engineers / Areas of society	aerospace	agricultural	biomedical	chemical	civil	computer	electrical	environmental	mechanical	nuclear
Agriculture		√		√				√	√	
Communications										
Computers										
Construction										
Energy										
Entertainment										
Environment										
Machines										
Medicine										
Space										
Transportation										

Which areas of society are represented in the pictures on page 29?

Activity 1 **What types of engineers are involved in the following activities?**

1. Develop diagnostic machines, artificial organs and prosthetic devices.
2. Design vehicles – cars, trucks, heavy equipment, buses, aircraft.
3. Work up ways to reduce energy consumption .
4. Construct the wings, landing gear, etc. Design, analyze, model, simulate, and test satellites, missiles, and rockets.
5. Create irrigation systems, tractors and buildings, experiment with food processing and farming techniques.
6. Discover and manufacture better plastics, paints, fuels, fibers, medicines, fertilizers, semiconductors, paper, and all other kinds of chemicals.
7. Make sure pollutants are removed from various streams released to the air and water.
8. Use computer technologies and advanced materials to design structures that meet the needs of a growing population.
9. Engineer structural supports for human colonies in space or on the moon.
10. Apply the laws of physics governing electricity, magnetism, and light to develop products and services for the benefit of humankind.

Activity 2
Vocabulary Focus **Match the words to form expressions from the text and translate the expressions into Russian:**

1. artificial	a. gear
2. prosthetic	b. processing
3. heavy	c. the needs
4. energy	d. devices
5. landing	e. organs
6. irrigation	f. consumption
7. food	g. systems
8. meet	h. equipment

Activity 3
Pronunciation

Put the words from the boxes in the correct columns according to the pronunciation of the letters in bold:

A.

Tr**u**ck, eq**u**ipment, red**u**ce, cons**u**mption, constr**u**ct, sim**u**late, techniq**u**e, man**u**facture, f**u**el, semicond**u**ctor, poll**u**tant, comp**u**ter, str**u**cture, pop**u**lation, s**u**pport, prod**u**ct, h**u**mankind.

as in cl**u**b	as in **u**se	as in q**u**ick	as in s**u**ccess	as in cheq**u**e

B.

D**i**agnostic, mach**i**ne, art**i**f**i**c**i**al, prosthet**i**c, dev**i**ces, des**i**g**n**, veh**i**cle, satell**i**te, m**i**ss**i**le, **i**rr**i**gation, exper**i**ment, plast**i**c, f**i**ber, med**i**c**i**ne, fertil**i**zer, chem**i**cal, var**i**ous, mater**i**al, eng**i**neer, phys**i**cs, electr**i**c**i**ty, magnet**i**sm, serv**i**ce, d**i**agram, benef**i**t.

as in f**i**ne	as in d**i**alogue	as in h**i**t

Activity 4

Underline the verbs used to describe engineering activities. What other verbs can be used?

Activity 5
Each One Teach One

Make up your own sentences about tasks and activities of engineers. Don't name the type of engineer, let the other students guess it.

Activity 6
Internet use

Use internet site http://www.engineergirl.org/33.aspx to prepare a short report about the type of engineer which appeals to you.

Present your report to the other students in the group.

Activity 7
Definitions

1. Can you define the term "engineering"?

Engineering is …

2. Read the definitions of engineering given by professionals and choose the one which is the closest to yours.

"Engineering is the application of math and science to create something of value from our natural resources"

(http://www.discovere.org/discover-engineering)

"Engineering is the art of deliberately modifying the physical world for the use and conveniences of mankind"

(paraphrased from charter for ICE (Institute of Civil Engineers), 1828)

"Engineering is not merely knowing and being knowledgeable, like a walking encyclopedia; engineering is not merely analysis... Engineers operate at the interface between science and society..."

(Dean Gordon Brown; Massachusetts Institute of Technology (1962)

"Engineering is the art or science of making practical."

(Samuel C. Florman)

"Engineering is the science of economy, of conserving the energy, kinetic and potential, provided and stored up by nature for the use of man. It is the business of engineering to utilize this energy to the best advantage, so that there may be the least possible waste."

(Willard A. Smith)

Activity 8
Top 10

What professional benefits does an engineering career offer?

1. Read the text "*10 Reasons to Love Engineering*" from the site of American Engineering community The DiscoverE and match the paragraphs to the right headings.

Earn a big salary Work with great people Change the world Be creative Solve problems, design things that matter Enjoy job flexibility Travel Make a difference Never be bored Love your work, and live your life too!

10 Reasons to Love Engineering

1 _____

Engineering is an exciting profession, but one of its greatest advantages is that it will leave you time for all the other things in your life that you love!

2 _____

Engineering is a great outlet for the imagination – the perfect field for independent thinkers.

3 _____

Engineering takes teamwork, and you'll collaborate with all kinds of people inside and outside the field. Whether they're designers or architects, doctors or entrepreneurs, you'll be surrounded by smart, inspiring people.

4 _____

Come up with solutions no one else has thought of. Make your mark on the world.

5 _____

Creative problem solving will take you into uncharted territory*, and the ideas of your colleagues will expose you to different ways of thinking. Be prepared to be fascinated and to have your talents stretched in ways you never expected.

6 _____

Engineers not only earn lots of respect, but they're highly paid. Even the starting salary for an entry-level job is impressive!

7 _____

An engineering degree offers you lots of freedom in finding your dream job. It can be a launching pad** for jobs in business, design, medicine, law, and government. To employers or graduate schools, an engineering degree reflects a well-educated individual who has been taught ways of analyzing and solving problems that can lead to success in all kinds of fields.

8 _____

Field work is a big part of engineering. You may end up designing a skyscraper in London or developing safe drinking-water systems in Asia. Or you may stay closer to home, working with a nearby high-tech company or a hospital.

9 _____

Everywhere you look you'll see examples of engineering having a positive effect on everyday life. Cars are safer, sound systems deliver better acoustics, medical tests are more accurate, and computers and cell phones are a lot more fun! You'll be giving back to your community***.

10 _____

Imagine what life would be like without pollution controls to preserve the environment, lifesaving medical equipment, or low-cost building materials for fighting global poverty. All this takes engineering. In very real and concrete ways, engineers save lives, prevent disease, reduce poverty, and protect our planet.

(from http://www.discovere.org/discover-engineering/10-reasons-to-love-engineering)

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*uncharted territory – неизведанная область

**a launching pad – стартовая площадка

***give back to your community – служить своему сообществу

2 Match the adjectives to the nouns to make up phrases and translate them:

exciting great-	thinker
est independent	problem solving
smart, inspiring	job
creative start-	company profes-
ing	sion building ma-
entry-level	terials individual
well-educated	advantage
high-tech	salary
low-cost	people

3. Match the English phrases to their Russian equivalents:

come up with solutions	инженерная степень
make your mark on the world	спасать жизни
earn respect	полевые работы (на местах) за-
engineering degree	работать / заслужить уважение
dream job	защищать нашу планету предот-
lead to success	вращать заболевания оставить
field work	свой след на земле приводить к
preserve the environment	успеху
save lives	придумать / предложить решения
prevent disease	работа мечты
protect our planet	сохранять окружающую среду

Activity 9
Discussion

Discuss the following questions:

1. Why have you chosen engineering profession?
2. Which of the benefits listed in the text above is the most important to you?
3. What other considerations did you take into account while making your choice?

Functional language

Asking for and expressing opinions

I think … I believe … In my opinion, … In my view, … It seems to me that … From my point of view, … As far as I'm concerned, … If you ask me, … (informal)	What do you think of … (career opportunities/ …)? How do you feel about … (developing problem-solving skills/ the idea of benefiting society/ …)? What's your opinion of ...(professional benefits/ …)?

Activity 10
Case Study
Innovative products

Background

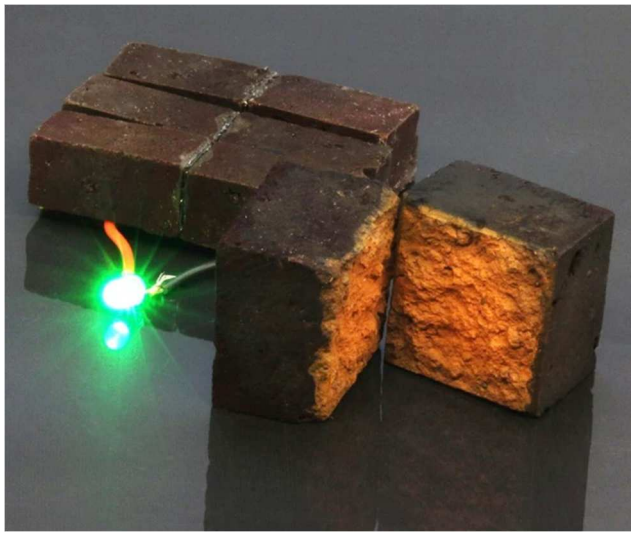
IPF Investments provides the funding and support to develop and launch innovative products in Russian market. IPFI is run by a group of rich people who are willing to take risks and back projects which seem advanced and beneficial. However they also expect to make money.

Help Box
An invention is an object, process, or technique which displays an element of novelty. While an invention is merely theoretical, an innovation is an invention that has been put into practice.

A team of IPFI investors is currently considering several innovative products developed in the USA and Europe to launch in Russia. After hearing presentations IPFI will decide which projects it will invest in.

Task 1

You are researchers who need finance for your project. Work in groups. Read the description of the products and choose the one you are going to present to the team of investors.



Energy storing bricks

Scientists have found a way **to store energy** in the red bricks that are used to build houses.

Researchers led by Washington University in St Louis, in Missouri, US, have developed a method that can turn the cheap and **widely available** building material into "smart bricks" that can store energy like a battery.

Although the research is still in the proof-of-concept stage, the scientists claim that walls made of these bricks "could store a substantial amount of energy" and can "**be recharged** hundreds of thousands of times within an hour".

Self-healing 'living concrete'

Scientists have developed what they call living **concrete** by using sand, gel and bacteria.

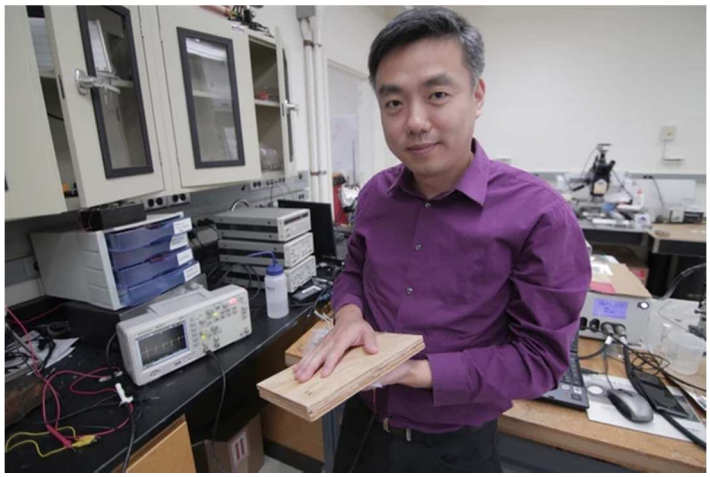
Researchers said this building material has structural **load-bearing function**, is capable of self-healing and is more environmentally friendly than concrete – which is the second **most-consumed material** on Earth after water.

The team from the University of Colorado Boulder believe their work paves the way for future **building structures** that could "**heal** their own cracks, suck up dangerous toxins from the air or even glow **on command**".

Innovative wind turbines

Although the benefits of wind farms are clear in exploiting **renewable wind energy**, they often cause controversy as locals report them as being "noisy and ugly". But wind is one of the most prolific natural energies available, and so presents a key developmental area in green technology

The French company NewWind focused its new product Tree Vent to function in **low-wind environments**. It is also aimed to be **visually pleasing**, as the array of vertical wind turbines resemble a tree. These demonstrate a cheerful playground-like appearance and so could work well in many communal **urban areas**.



Energy-harvesting floorboards

Engineers at the University of Wisconsin-Madison have designed incredible wooden floorboards that use electro-magnetic induction to **generate electricity** from footsteps. The floorboards are also **sustainable** and **inexpensive** as they are made from wood pulp, and the embedded **nanofibres** within the design could save a lot on bills as they **power electrical household items**.

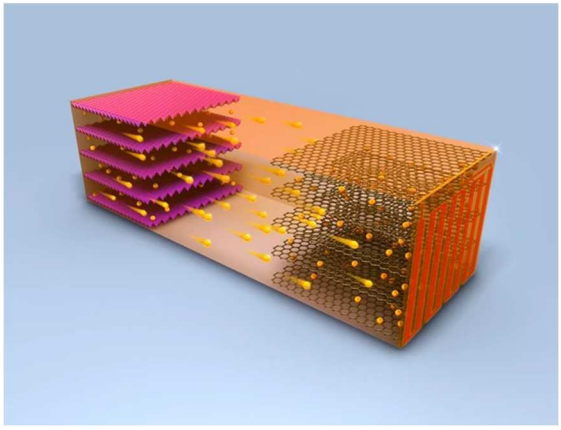
This lays the pathway for some great future applications, such as inviting friends over for a party and also simultaneously creating electricity. The researchers also suggest its potential **future application** in pavements and high footfall areas, such as football stadiums and airports. Perhaps a vital green development of the future will lie undiscovered beneath our feet…

Car batteries that charge in 10 minutes

Fast-charging of **electric vehicles** is seen as key to their take-up, so motorists can stop at a service station and fully charge their car in the time it takes to get a coffee and use the toilet – taking no longer than a conventional break. But rapid charging

of lithium-ion batteries can **degrade the batteries**, researchers at Penn State University in the US say. This is because the flow of lithium particles known as ions from one electrode to another **to charge** the unit and hold the energy ready for use does not happen smoothly with rapid charging at lower temperatures.

However, they have now found that if the batteries could heat to 60°C for just 10 minutes and then rapidly cool again to ambient temperatures, lithium spikes would not form and **heat damage** would be avoided. The battery design they have come up with is self-heating, using a thin nickel foil which creates an **electrical circuit** that heats in less than 30 seconds to warm the inside of the battery. The **rapid cooling** that would be needed after the battery is charged would be done using the cooling system designed into the car.



(Adapted from https://www.sciencefocus.com/future-technology/future-technology-22-ideas-about-to-change-our-world/ https://www.sciencefocus.com/future-technology/exciting-new-green-technology-of-the-future/)

Task 2. Prepare the presentation of your products. Write a plan for your presentation and make notes under key points. Then write an introduction and conclusion.
(See page 89)

Key points for product presentation.

1. A description of the product.
2. Its innovative features.
3. Its potential consumers and main buyers.
4. Field where you can use it.

Task 3

Practice your presentation until it sounds natural and make any necessary changes. Then present your proposal to the rest of the class.

Task 4

Once each group has presented, the class should consider which innovative product has the greatest potential.

Writing

You are head of the IPFI team of investors. Write a report to the chairman of IPFI. Describe the projects you have chosen and explain why IPFI should invest in them.

(See Sample report on page 90)

Activity 11
Progress monitoring

In this unit you came across the following words and expressions. Tick those which you understand and can translate into Russian.

Types of engineers

aerospace	computer
agricultural	electrical
biomedical	environmental
chemical	mechanical
civil	nuclear

Verbs

develop	model	discover
design	simulate	manufacture
work up	reduce	equip
construct	create	engineer
analyze	experiment with	apply

Nouns

truck	population	benefit
equipment	support	irrigation
technique	humankind	fiber
fuel	machine	fertilizer
semiconductor	vehicle	application
pollutant	satellite	concrete
structure	missile	damage

Phrases

exciting profession	field work
greatest advantage	preserve the environment
independent thinker	save lives
smart, inspiring people	prevent disease
creative problem solving	protect our planet
starting salary	store energy
entry-level job	widely available
well-educated individual	load-bearing function
high-tech company	building structures
low-cost building materials	on command
come up with solutions	renewable wind energy
make your mark on the world	visually pleasing
earn respect	urban areas
engineering degree	generate electricity
dream job	electrical household items
lead to success	electrical circuit
	fast-charging

MODULE 2

MAKING CHANGES FOR A BETTER TOMORROW

Lead in

"Our civilization is largely a product of technology".
Sir Arthur Charles Clarke (1917–2008), a British science fiction author, inventor, and futurist.

How have technologies changed our life? You can consider the changes in the following spheres:

- communication
- travelling
- housework
- working environment
- entertainment

What would you add?

UNIT 4

TECHNOLOGICAL WONDERS AT HOME AND IN INDUSTRY

The greatest achievements were at first and for a time dreams.

James Allen (American novelist, 1849-1923)

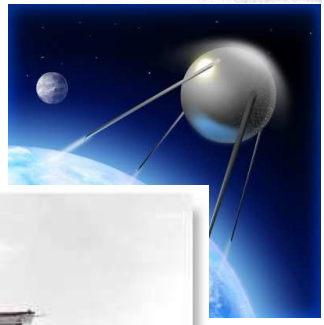
For a start

1. Automobiles, telephones, television, and computers are just a few of the innovations introduced by engineers in the twentieth century. What other innovations do you know?

2. Look at the timeline and match the dates to the engineering achievements:

1907 1908 1925 1935 1947 1957 1968 1972 1981 1991

e



Early military radar system

a. Computer mouse made its public debut

b.Home video game systems became available

c. World Wide Web became available to the general public

d.Ford Model T was introduced

e. Sound barrier was broken

f. First practical radar

g.Televisor

h. IBM Personal Computer was released

i. First practical domestic vacuum cleaner was invented

j. Sputnik I was launched

Turn to page 92 and check your answers.

3. What inventions of the 21st century do you know?

Activity 1
High-tech Household Appliances

1. What household appliances do you have at home? Have you ever thought of them as "high-tech"? How do they improve our life?

2. Read the first part of the article by Roland W. Schmitt, President Emeritus of Rensselaer Polytechnic Institute, and Retired Senior Vice President of General Electric Company. Compare your ideas with the ones in the text. Underline all the electronic appliances and their functions in the text.

Before joining General Electric, I'd never really thought of household appliances as "high-tech." The functions they perform — heating, cooling, cleaning, blowing, mixing — are as old as civilization itself.

Today, our kitchen has an electric range with plenty of electronic controls, a microwave, a toaster oven, several mixers, a dishwasher that's sometimes smarter than I am, a refrigerator-freezer, and a disposal*. Our utility room has a brainy clothes washer, a smart dryer, a freezer, and a vacuum cleaner. Another refrigerator-freezer resides in the basement along with the equipment for central heating, dehumidifying, and air conditioning.

But all of these fancy pieces of equipment still only heat, cool, clean, blow, and mix!

We take high tech for granted in household appliances and hardly notice it while seeing it

prominently in our "electronic" appliances: televisions; audio equipment; mobile telephones; VCR, CD, and DVD recorders and players; digital cameras; pocket organizers; GPS devices; and, of course, in our Internet-connected computers. These items do things that our ancestors couldn't even dream of.

The high-tech of household appliances is a lot more than just electronics. New and improved materials enable designs of convenience and efficiency. High performance plastics, especially, allow us to build style as well as functionality into our appliances. Household appliance engineers have just as many opportunities to feed their inventive minds as any other engineers. Innovation continues: using light makes cooking food eight times faster than with conventional ovens.

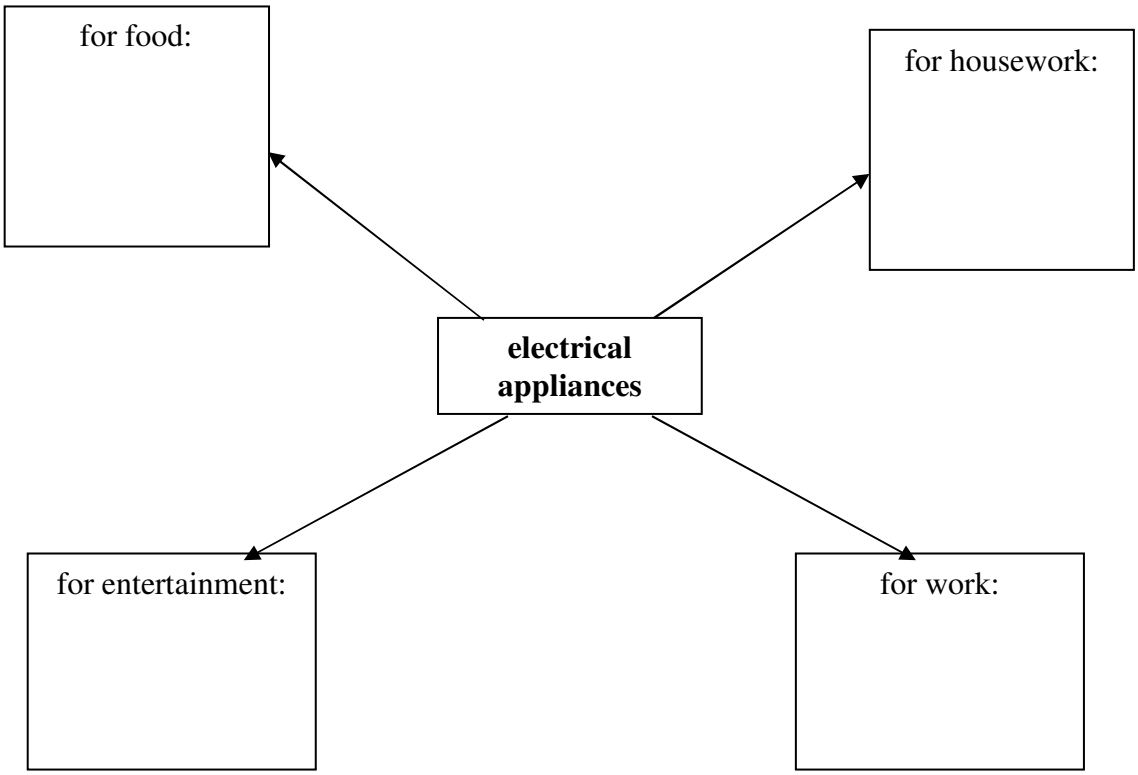
Washers and dryers that "talk" to each other improve clothes care and save time. The opportunity for innovation is as great as ever in this world of classical functions.

The incorporation of high-tech advances into the field of classic functions makes household appliances one of the great achievements of modern engineering. For the engineer there is something especially attractive about doing something that is functionally very, very old with ideas that are the newest of high-tech.

**disposal - AmE a small machine under the kitchen sink which breaks vegetable waste into small pieces*

Activity 2
Vocabulary focus

1. Fill in the diagram with the electrical appliances from the text. Some of them can go into different categories.



2. Work in groups. One person thinks of an electrical appliance. The others ask questions to guess what the appliance is. You can only ask *yes/no* questions.

For example:

- *Is it made of metal?* *Partly.*
- *Do you find it in the kitchen?* *Yes.*
- *Is it used to wash dishes?* *Yes.*
- *Is it the dishwasher?* *Yes, it is.*

Activity 3
Smart Home Technology

1. Have you ever heard about a smart home? What is it?

2. Read the text and compare with your ideas.

What Is Smart Home Technology?

What if all the devices in your life could connect to the internet? Not just computers and smartphones, but *everything:* clocks, speakers, lights, doorbells, cameras, windows, window blinds, hot water heaters, appliances, cooking utensils, you name

it. And what if those devices could all communicate, send you information, and perform your commands? It's not science fiction; it's the Internet of Things (IoT), and it's a key component of home automation and smart homes.

Home automation is exactly what it sounds like: automating the ability to control items around the house – from window shades to pet feeders – with a simple push of a button (or a voice command). Some activities, like setting up a lamp to turn on and off at your whim, are simple and relatively inexpensive. Others, like advanced surveillance cameras, may require a more serious investment of time and money.

INSIDE BILL GATES' HOME

Microsoft Chairman Bill Gates' home just outside of Seattle, Wash., might be the most famous smart home to date. Everyone in the home is pinned with an electronic tracking chip. As you move through the rooms, lights come on ahead of you and fade behind you. Your favorite songs will follow you throughout the house, as will whatever you're watching on television. The chip keeps track of all that you do and makes adjustments as it learns your preferences. When two different chips enter the same room, the system tries to compromise on something that both people will like.

With a smart home, you could connect the devices and appliances in your home so they can communicate with each other and with you.

(*Adapted from* https://home.howstuffworks.com/smart-home6.htm)

3. Can you think of examples of smart home appliances and their functions?

(see appendix on page 91 for more examples)

Activity 4
Extension

Discuss the following questions:

1. **Which household appliances don't you have at home? Which would you like to have? Why?**
2. **Smart homes look great on paper, but are they for everyone? Do all individuals need all this technology?**

Activity 5
Reading

- Have you ever visited a plant that makes electrical appliances?
- What advanced technologies are used in modern manufacturing?

1. Scan the second part of the article by Roland W. Schmitt to find out what technologies are used in manufacturing household appliances, give Russian equivalents.

There is yet another dimension of high-tech in household appliances: the way we make them. Walk through any plant that makes household appliances and you're likely to see robots, lasers, intelligent conveyors, electronically controlled machine tools, computer-driven assembly stations, and smart test equipment. And, behind the scenes will be software that keeps track of everything, from incoming orders, in- process and final inventory, custom orders, shipments, and supply chain status. And when these products leave the factory into the hands of marketing and sales, they increasingly will be tracked and supervised by more and more sophisticated systems controlled by software.

(Adapted from http://www.greatachievements.org/)

2. What is the role of computers in manufacturing? What processes are controlled by computers?

Activity 6
Grammar Review

Passives

- We make passive verb forms with the verb *to be* + past participle.

*Renault cars **are made** in France.*

- We often choose a passive structure when we are not interested in or it is not necessary to know who performs an action.

*Sound barrier **was broken** in 1947.*

- If we want to mention who performed an action we can use *by*.

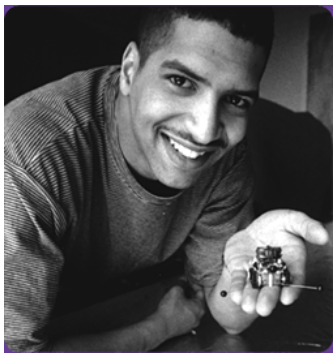
*First practical domestic vacuum cleaner **was invented by** James Spangler.*

(See page 87)

1. Change these active sentences into the passive so that they sound more natural.

1. Somebody produces mobile phones in Finland.
2. A mechanic is repairing my car at the moment.
3. Somebody made this video game in Japan.
4. Anybody can find lots of information by searching Google.
5. They manufacture electronic goods in China.
6. They will print the newspaper at 3 a.m.

2. Read the article "Robotic Ants Inventor" and choose the appropriate verb forms (active or passive).



At MIT's Artificial Intelligence Lab, James McLurkin *is developing / is being developed* robotics by combining ideas from engineering with biology.

McLurkin *built / was built* his first robot, Rover, at age 15.

For his thesis project as a student, he *decided / was decided* to develop a group of smaller robots that could work together.

While working on this project, McLurkin *observed / was observed* a large container of ants which *kept / was kept* on his desk. Twelve "ant" robots *designed and built / were designed and built*. Being about an inch size, each ant *powers / is powered* by a tiny internal computer that *runs / is run* three motors. Each ant's sensors *allow / are allowed* it to detect and go around obstacles and move toward light. These mechanisms *make / are made* the robots interact in ways that mimic the behavior of real ants.

"Biology *can use / can be used* to open the secrets of intelligence. We could then take robots and possibly change things about biology."

Nature also *is studying / is being studied* by many other inventors to develop different types of robots. Animals serving as robot inspirations *include / are included* mice, ladybugs, bats, cockroaches, and crabs.

Activity 7
Robots

1. Have you ever seen a robot in real life? Can you give a definition of a robot? The pictures below can help you.

Compare your definitions with the ones given by [www.dictionary.com.](http://www.dictionary.com)

A ***robot*** is

1. a mechanical device that sometimes resembles a human and is capable of performing a variety of often complex human tasks on command or by being programmed in advance.
2. a machine or device that operates automatically or by remote control.

2. Do you know in what sphere the first robot was used? Work in pairs. Make a list of spheres where robots are used now.

3. Read the extract and compare it with your list.

Stories of artificial helpers and companions and attempts to create them have a long history but fully autonomous machines only appeared in the 20th century. The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal and stack them. Today, commercial and industrial robots are in widespread use performing jobs more cheaply or with greater accuracy and reliability

than humans. They are also employed for jobs which are too dirty, dangerous or dull to be suitable for humans. Robots are widely used in manufacturing, assembly and packing, transport, earth and space exploration, surgery, weaponry, laboratory research, and mass production of consumer and industrial goods. Domestic robots for cleaning and maintenance are increasingly common in and around homes.

(Adapted from www.wikipedia.org)

Activity 8
Vocabulary focus

1. Match the words in the columns to make word combinations.

home	research
intelligent	assembly stations
electronically controlled	test equipment
computer-driven	exploration
smart	helpers
earth and space	automation
sophisticated	conveyors
artificial	robots
domestic	machine tools
laboratory	systems

2. Match the following words/expressions in English with their Russian equivalents:

perform your commands	робот с цифровым управлением
mass production	камеры видеонаблюдения вы-
consumer and industrial goods	полнять работу дистанционное
perform jobs	управление обслуживание
surveillance cameras	

remote control	точность
keep track of	механическое устройство потребитель-
digitally operated robot	ские и промышленные товары отслежи-
mechanical device reli-	вать, следить
ability	массовое производство
accuracy	выполнять ваши команды
maintenance	надежность

Activity 9
Writing: discursive composition

Help Box Discursive composition must have a definite point of view. You may want to:

- argue in favor of something,
- argue against something,
- give both sides of the argument.

1. Here is an example of a student composition on the topic: "The Reasons for Using Robots". Read it and answer the following questions:

In what areas is it good? In what areas is it weak?

Think about:

- **length of sentences**
- **grammar**
- **spelling**
- **vocabulary**
- **organisation of ideas and paragraphing**
- **use of linking expressions**
- **logical order of argument**

The Reasons for Using Robots

What do you think of when you think about 'robots'? If you think they are only the stuff of space movies and sience fiction novels, then think again. Robots are the largest growing teknological devices in the world. They perform many functions ranging from

space exploration to entertainment. The reasons for using robots are almost endless for example ; robots are ideal for jobs that require repetitive , precise movements. Human workers get board doing the same thing over and over, which can lead to fatigue and costly mistakes. Robots are also ideal for tasks that are dangerous, or where human workers may damage the product. For example, in a factory manufacturing medicines and cemicals that may harm humans, and factories that manufacture food that humans may damage by handling. Also used in tasks that are impossible for humans eg. navigating mars or deep sea exploration. The uses for robots are almost as endless as the reasons for using them. There are some areas in wich robots are used. Ninety percent of robots are used in factory work and asembly lines. They assemble cars, package food, load machines and repare machines. Busy families use robots to clean their floors so that they can get on with other more interesting things. Even kids are using robots, with the envention of robotic pets and the soon to be released robotic dolls that act just like real babies would. Another major area that robots are used in is space exploration. NASA spends hundreds of thousands of dollars a year produsing robots that allow the scientific world to discover more and more about the solar system that we live in. With robots used in space exploration and factory work, their apearance is not really important, as long as they carry out their function and complete the task. Space exploration robots are usually bulky with many wheels and factory robots usually have many arms to carry out their task efficiently.

2. Work with a partner. Go through the essay and:

a.correct spelling, grammar and punctuation mistakes you can find

b.divide it into paragraphs

3. Underline all the linking expressions in the text. Which of them are used to:

- **give more information**
- **list ideas**
- **explain the consequence of something**

4. Fill in the gaps in the following sentences with an appropriate linking word/ phrase from the table.

Linking words and phrases

- give more information

and, for example, also, in addition (to), moreover, what is more

- explain the consequence of something (show cause and effect)

so, because, because of (this), as a result (of), consequently

- list ideas

firstly, secondly, thirdly, finally, to begin with, next, then

- contrasting idea

but, However, although, On the one hand… On the other hand…

- summarise

In conclusion… To conclude

1 ……he trained every day, he couldn't improve his writing skills.

2. I really like the job I'm doing at the moment. ..... , the salary is awful.

3. Robots often star in films, ... , dangerous machines like Terminator or cute ones like R2D2 in Star Wars.
4. Nuclear power is relatively cheap..... , you could argue that it's not safe. I had to move because of my job.
5. Sea levels are rising.....climate change.
6. Television kills conversation in families. ....., it has led to an increase in violent crime.

5. Write a composition giving your opinion on the following question: "Modern technology has created more problems than solutions in society. Do you agree?" Use the following steps to write effectively:

- "brainstorm" your ideas on paper
- organise your ideas by grouping similar points together
- make a paragraph plan
- develop points by giving examples or explaining what you mean
- use linking words
- write a clear introduction and conclusion

Word List

accuracy (n)	laboratory research
artificial helpers	maintenance (n)
computer-driven assembly stations	mass production
consumer and industrial goods	mechanical device
digitally operated robot	perform jobs
domestic robots	perform your commands
earth and space exploration	reliability (n)
electronically controlled machine tools	remote control
home automation	smart test equipment
intelligent conveyors	sophisticated systems
keep track of	surveillance cameras

UNIT 5 FU-

TURE PERFECT?

For a start

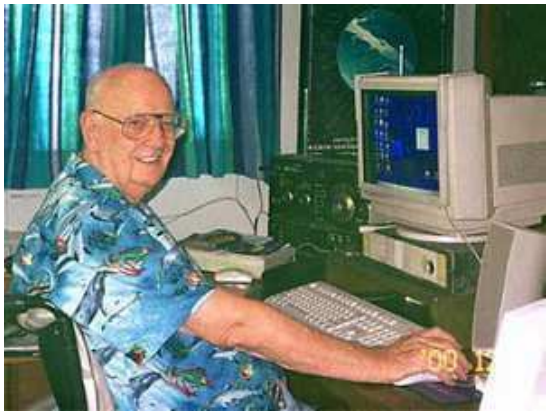
How do you feel about the future?

Which of these words best describes your feelings about it? Explain why.

excited	confident	worried	hopeful	afraid	optimistic	uncertain

Activity 1
Predictions

Sir Arthur Charles Clarke, (1917–2008) was a British science fiction author, inventor, and futurist. In his book *Profiles of the Future* he published a timetable of predictions up to the year 2100.



1. **Read the predictions for years from 2010 up to now and say which of them came true.**
2. Read the rest of the predictions and decide which of them are likely to be realized in these years. Explain why.

Arthur C. Clarke's predictions for the 21st century:

2010 A new form of space-based energy is adopted.

2011 Space flights become available for the public.

2016 All existing currencies are abolished. A universal currency is adopted.

2020 Artificial Intelligence reaches human levels. There are now two intelligent species on Earth, one biological, and one nonbiological.

2021 The first human landing on Mars is achieved.

2023 Dinosaurs are cloned from fragments of DNA. A dinosaur zoo opens in Florida.

2025 Brain research leads to an understanding of all human senses. Full immersion virtual reality becomes available. The user puts on a metal helmet and is then able to enter "new universes."

2040 A universal replicator based on nanotechnology is now able to create any object from meals to diamonds. The only thing that has value is information.

2095 The first humans are sent out to nearby star systems already visited by robots.

Activity 2
Nanotechnology

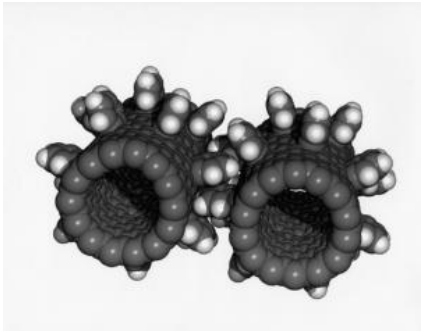
Many scientists all over the world say: 21st-century nanotechnology will be more important than all the greatest technologies of the 20th century put together.

Do you know:

1. What is nanotechnology?
2. Where is it used nowadays?
3. Where could it be used in future?

1. Read the text and find answers to the questions above.

Nanotechnology



Tiny things

A. The prefix "nano" means one-billionth. So, 1 nanosecond is one-billionth of a second, and 1 nanometer is one-billionth of a meter.

A human hair is about 80,000 nanometers wide.

B. Nanoscience (or nanotechnology) refers to the study of things that are smaller than about 100 or 200 nanometers. It is the study and development of the small so that it will affect the large. One of the basic goals of nanotechnology research is to control individual atoms. Carbon, hydrogen, oxygen, and other types of atoms are the building blocks of the universe. They make up galaxies, stars, planets, rocks, water, people, trees, CDs, cells — all the stuff out there.

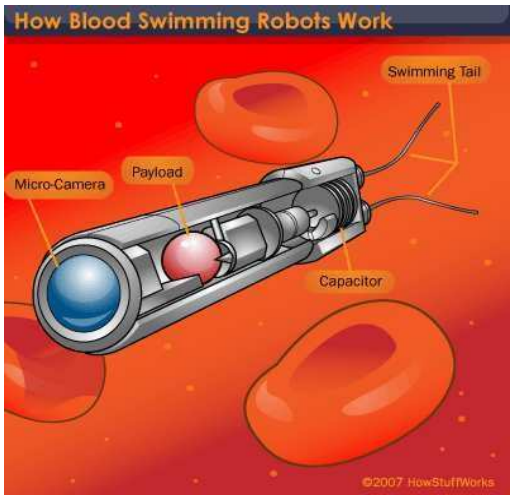
Copying nature

C. Most things that people build come together in a "top-down" way. If you want to make a table, for instance, you cut down a big tree, make wooden boards, and hammer them together. Nature, on the other hand, builds things from the bottom up. When atoms join together, they make molecules. Each molecule has a certain shape, and a molecule's structure determines what it can do. Molecules can then come together to make a cell — or a tree.

D. Nanotechnologists want to do what nature does. They want to create tiny, intricate structures — atom by atom or molecule by molecule — that have specific features or applications. For example, instead of cutting and processing thin slices of silicon to make computer chips, engineers work with individual molecules to build computer processors and memories. Putting such molecules together would create a tiny chip that could hold an enormous amount of memory. You could end up with a supercomputer the size of your cell phone.

E. Eventually, nanotech could touch every part of our lives. There might be molecular motors and nanorobots that can build other nanomachines. In medicine, nanodevices could go inside the body to deliver drugs exactly where they need to go, monitor vital signs, or perform delicate

operations. A nanoscale coating on glass could help turn the sun's energy into electricity. Nanotech could also help make light bulbs more efficient.



F. Already, a company called Nano-Tex makes fabrics with different kinds of "molecular hooks" that can repel stains, eliminate wrinkles, or shed water. In the future, nanotech-enhanced clothes could respond to the weather to warm you up or cool you down. The U.S. Navy is using nanotech coatings on their submarines to keep sea creatures off and reduce corrosion. Other nanomaterials could lead to lightweight airplanes and other types of equipment.

2. Read the text again. Which paragraphs give information about the following things?

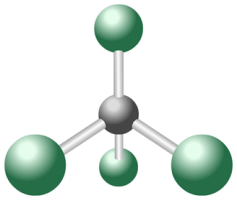
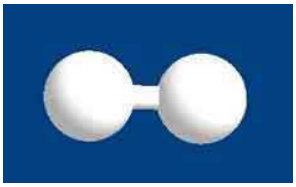
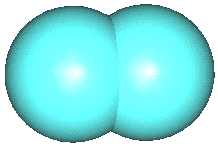
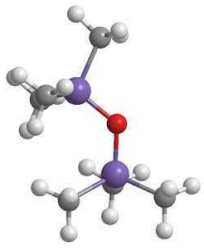
	what could be done with the help of nanotechnology
	difference between nature and people in creating things
	how nanotechnology is used now
	subject and aim of nanotechnology
	the meaning of nano
	imitating nature by nanotechnologists

Activity 3
Vocabulary focus

1. Find in the text all the words with the prefix "nano".

2. Match the elements with their molecules:

hydrogen, oxygen, carbon, silicon

1  **2**  **3**  **4** 

3. Fill in the gapped sentences with the following words. Change the form of the word if necessary:

application, cell, fabric, coating, determine, universe

1. Early astronomers thought that our planet was the centre of the …….
2. They can manufacture a whole host of body parts, from neurons to muscles to blood …….
3. The amount of available water …… the number of houses that can be built.
4. Students learned the practical …….. of the theory they had discussed in the classroom.
5. The tent has a waterproof ..... on both sides.
6. Man-made..... such as polyester are easy to wash and iron.

4. a. Match the following words and phrases. Translate them into Russian.

tiny, intricate	water
deliver	the weather
monitor	wrinkles
repel	corrosion
eliminate	structures
shed	creatures
respond to	drugs
reduce	stains
sea	vital signs

b. Make up your own sentences using these expressions.

Activity 4
Threats

The possibilities for nanotechnology may seem limitless, but there are potential problems that already worry some people.

- Certain nanoscale particles could cause health problems, for example. Researchers have already found that molecules can harm living cells.
- And what about nanorobots that could make copies of themselves, growing in number so quickly that they take over the world, destroying the environment?
- ……
- ……

Can you think of the other problems which could be caused by nanotechnology? Add to the list.

Activity 5
Smartphone

1. Nowadays a smartphone can be easily named the main gadget for most people.

- **What functions does your phone have?**
- **Do you use all of them?**
- **Would you like to have more/ less functions?**

2. Read the text about smartphone and say which features listed in the text you have in your smartphone.

What is a smartphone?

A smartphone is a mobile or cellular phone that runs off a mobile operating system (OS) and functions like a mini computer. Smartphones also function as portable media players, digital cameras, video cameras and GPS navigational devices. The operating system equips the device with advanced computing capabilities, runs applications and enables the device to perform the following basic features:

- Access Web pages and browse the Web using 4G and 3G data networks and Wi-Fi support
- View, edit and share documents
- Download files
- Create and play music playlists
- Take photos and record videos
- Play games and watch movies
- Communicate with friends and family through text messages and video chats.

A mobile operating system (OS) supports the smartphone and provides the device with advanced computing capacities. A smartphone is more than just a cell phone; it's a media player, gaming console, camera, video recorder, document editor and GPS navigational device. It's your handy tech tool for navigating your day and managing your life, especially with the millions of apps available to download. Here's just a glance at what you can do with a single tap and swipe on a smartphone's touch screen:

- Budget, pay bills and monitor finances
- Run a business

- Watch TV shows and movies
- Track health habits and log workouts
- Follow current events and sports teams
- Stay organized and productive
- Plan trips.

3. What features and applications do you use?

Activity 6
Vocabulary

Make nouns from the following words:

develop op-

erate solve

complex

possible

succeed

manufacture

apply rec-

ord down-

load

Activity 7
Reading

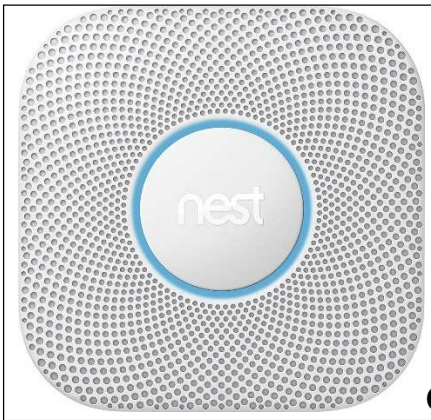
Gadgets

1. Look at the pictures. What do you think the things are?

Discuss your ideas in groups.

A

B

 C	 D

2 Read the descriptions (1-4) and match them with the pictures (A-D).

1. Bluetooth Tracker and Finder for Keys, Pet Collars and Bags The New Tile Pro is the most powerful Bluetooth tracker for finding all your things. Ring your things: find lost items with your phone. If your Tile is within the 300 ft Bluetooth range, it will play a loud tune until you find it. Find your phone: can't find your phone? Simply *double press* the Tile button on your Tile Pro to make your phone ring, even when it's on silent. Product features: • Product Dimensions: 0.3 x 1.6 x 1.6 inches • Item Weight: 0.48 ounces • Water resistant • Easy to attach • Durable • It has a 300 ft. range • Replaceable Battery - 1 Lithium Metal batteries required. (included).	**2. Smart Smoke / Carbon Monoxide Alarm** Nest Protect reliably detects and alerts you to the presence of smoke or carbon monoxide in your home. The alarm speaks to you in a calm, clear, human voice, telling you the location of the danger. It also provides smartphone alerts and battery status updates to help protect your home while you're away. If a cooking mishap leads to a small amount of smoke, Nest Protect will let you know without *setting off* the full alarm. Product Features: • Product Weight: 1.7 pounds • 4 screws, 3 wire nuts • 3 AA batteries, 120V AC connector, backplate • Works with Google Assistant, Hue, Nest, Wink • Color: White.
3. Smart speaker with clock and Alexa This version of Echo Dot has an LED display that can show the time, outdoor temperature, or timers. Play music, get the news, call almost anyone, and control	**4. Mug Warmer for Desk** Adjustable temperature of the mug warmer is suitable for coffee, tea, milk and cocoa. It always remembers the right temperature you used last time,

compatible smart home devices — just ask Alexa.
The LED display also has a light sensor that automatically adjusts brightness so you can see the time, day or night.
Make your life easier at home. Use your voice *to set* timers, add items to lists, and create calendar events and reminders.
You can also check the news, weather or traffic. Ask for sports scores, movie showtimes, restaurant hours, or information.
Manage compatible smart home devices using your voice. *Switch on* the lamp before getting out of bed, dim the lights from the couch to watch a movie, or *turn* the thermostat *up* as you head out.

Product Features:

- Size: 3.9" x 3.9" x 1.7" (99 mm x 99 mm x 43 mm)
- Weight: 10.6 oz. (300 grams)
- Display: LED display
- Speakers: 1.6" speaker
- Wi-Fi connectivity
- Bluetooth connectivity
- System requirements: comes ready to connect to your Wi-Fi; compatible with Fire OS, Android, and iOS devices and also accessible via your web browser.

when you are heating your beverage, the temperature will be adjusted.
Easy to use, no need to manually *turn off* the switch, auto shut off mug warmer for desk will stop working when it leaves the base. It automatically stops after 4 hours.
Easy to clean with the glass panel design. If you are occasionally clumsy, the beverage warmer will be fit for you, just clean it with a towel. The fireproof material and low power heating design ensured that the warmer is not shorted.

Product Features:

- Three Temperature Setting: 131°F, 149°F, 167°F, the right temperature for you.
- Memory Function: remembers the right temperature used last time, the temperature will be adjusted.
- Protective Function: will stop automatically after 4 hours.
- Sensitive Gravity Switch: saves troubles during busy hours.
- Item weight: 12 ounces.

3. Read the texts (1-4) again and match the sentences (a-h) below with the gadgets. Some sentences can be used to describe two gadgets.

a) It can be a part of smart home system.

b) It runs on batteries.

c) It can be used to learn the news.

d) It can save people's lives and health.

Help Box

" = inches – дюйм (единица длины; = 1/12 фута; = 2,54 см)

ft. – abbreviation for foot – фут (единица длины; = 30 см)

ounce – унция (единица веса; 1 унция – 28,35 г.)

F – abbreviation for Fahrenheit – градус Фаренге́йта (единица измерения температуры)

e) You can set the temperature on this device.

f) You need Bluetooth connection for this gadget.

g) It is for people who like to drink slowly.

h) It is a useful gadget for people who often lose things.

Activity 8
Vocabulary focus

1. Complete the definitions (1-9) with the <u>underlined</u> words in the texts. Use your dictionary to help you.

1. _____reacting to very small changes in light, temperature, position etc.
2. _____can be changed or moved slightly to make it suitable for different purposes.
3. _____able to exist or be used together without causing problems.
4. _____the ability of computers and other electronic equipment to connect with other computers or programs.
5. _____staying in good condition for a long time, even if used a lot.
6. _____unable to be damaged by fire.
7. _____operated or done by hand or without the help of electricity, computers etc.
8. _____able to keep water from being absorbed.
9. _____suitable for a particular purpose or activity.

2. Find in the texts 1-4 words *in italics* and translate them.

3. Think of as many derivatives of the given words as you can and complete the table:

Noun	Verb	Adjective / Participle
power		
	resist	
	replace	
	connect	
	warm	
	remind	
	require	
access		
	adjust	
	protect	
sensor		

Activity 9
Extension

How useful are the gadgets? Put them in order (1= most useful, 4 = least useful). Discuss your ideas with a partner and agree on an order. Explain your list to the rest of the class.

Activity 10
Dealing with numbers

1. Say these numbers. Check with the teacher after each group (See page 88)**.**

1. 47 362 1,841 15,000 36,503 684,321 4,537,295
2. 3.5 2.89 9.875
3. $^{1}/_{3}$ $^{3}/_{8}$ $^{5}/_{7}$ $^{1}/_{2}$ $^{3}/_{4}$
4. 15% 50% 97% 100%

2. Try and answer these questions.

1. What is the population of your a) country? b) city?
2. How many people study at your university?
3. How many members are there in a) your social network? b) most popular social network?
4. What percentage of people in your country uses the Internet?

If you want to know some more statistics go online to *Internet World Statistics* http://www.internetworldstats.com/stats.htm

Activity 11
Project work

1. What information is included about each gadget? Add to this list.

- The name of the gadget.
- Description.
- ...

2. Work in teams. Prepare a short presentation of any gadget.

Word List

adjustable (adj)	fit (adj)
application (n)	manually (adv)
cell (n)	monitor vital signs
coating (n)	reduce corrosion
compatible (adj)	repel stains
connectivity (n)	respond to the weather
deliver drugs	sea creatures
determine (v)	sensitive (adj)
durable (adj)	shed water
eliminate wrinkles	tiny, intricate structures
fabric (n)	universe (n)
fireproof (adj)	water resistant (adj)

UNIT 6

LIVING IN THE INFORMATION AGE

"As a general rule, the most successful man in life is the man who has the best information."

Benjamin Disraeli

For a start

- Do you live in the age of information?
- What is information age?
- Why is this age called the information age?
- When do you think the Information Age began?
- What is it connected with?

Read the text and compare with your ideas.

Nowadays, many people tend to think of the Information Age in terms of cell phones, digital music, high definition television, digital cameras, email on the Internet, the Web, computer games, and other relatively new products and services that have come into widespread use. The pace of change brought on by such technology has been very rapid.

When did the Information Age begin? There is no single answer to this question. If you surf the internet you will find out that some people think it began in the 70s or 80s with the development of personal computers and the Internet. Others claim the Information Age actually began with the invention of telegraph when Samuel Morse held 1st successful public demonstration of the electric telegraph in 1844. However there are odd opinions that trace the Information Age back to the Bronze Age when people first started writing.

Activity 1
Computer Revolution

The idea of information age is usually linked to the concept of a Digital Age, Digital Revolution or Computer Revolution.

1. You are going to read the article by Bill Gates, the Chairman and Chief Software Architect of Microsoft Corporation, about the beginning of computer revolution. Before reading decide whether you think these statements are true (T) or false (F).

1. Bill Gates created the first desk-top computer Altair 8800.
2. BASIC programming language was rather simple, so everyone could use it.
3. At first Microsoft software was not very popular among programmers.
4. Today we completely rely on computers to run our lives and businesses.
5. We have fully exploited the PC's potential.

2. Read the article and check your answers.

For me the personal computer revolution started in the mid-1970s, when my friend Paul Allen and I saw a magazine article about the MITS Altair 8800. The Altair was the first build-it- yourself computer kit for hobbyists. For a few hundred dollars, MITS would mail you a few bags of parts and some photocopied instructions. After some careful soldering*, you had your own computer, about the size of a bread box, with rows of switches and blinking lights.

It wasn't much to look at and it wasn't terribly useful, but it felt like the start of a revolution. Until then computers were used mostly by technicians in air-conditioned rooms. Few people had the opportunity even to see a computer and even fewer got to use one. But the Altair was a computer that people could put on their desks, and what

they could do with it was limited only by their imagination — and the modest capabilities of Intel's 8080 microprocessor.

We knew that microprocessors would become cheaper and more powerful, making personal computers increasingly capable. We also knew those computers would need software to make them do useful things. So Paul and I founded a company we called Microsoft that we hoped would meet this need.

Microsoft Corporation, 1978

Our first product was a version of the BASIC programming language that could run on the Altair. Unlike many other languages available at the time, BASIC was relatively simple to use. After a few minutes of instruction, even a nontechnical person could start writing simple programs.

For its time the Altair was a huge success, and thousands of programmers used our software to make it do interesting and useful things. Since then the PC has evolved from a hobbyist's toy into a powerful tool that has transformed how we work, learn, play, and keep in touch. And it has created an industry that employs millions of people and plays a leading role in our global economy.

Computing has made many evolutionary leaps over the decades - from the command line to the graphical user interface, from stand-alone PCs to a globally connected Internet. But we're now seeing an even more fundamental change. We're in what I call the "digital decade," a time when computers are moving beyond being merely useful to becoming an essential part of our everyday lives. Today we use computers for discrete tasks—like doing e-mail and paying bills — but in the years ahead they'll play a key role in almost everything we do. We'll rely on them to run our lives and businesses. We'll want them to keep us informed and entertained. We'll expect them to be wherever we need them. It will be an era of truly personal computing.

Help Box
decade is a period of ten years

Many of our early dreams for the PC have already come true. They can recognize speech and handwriting, create realistic animation, and enable people to collaborate, communicate, and find information around the world. But we've barely scratched the surface** of the PC's potential, and I'm incredibly excited about the amazing innovations that are just over the horizon.

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* soldering - *joining two pieces of metal together by melting a small piece of soft metal*

** scratch the surface - *to deal with only a very small part of a subject or problem*

(Adapted from http://www.greatachievements.org/)

Activity 2
Vocabulary Focus

1. Match the words to form expressions from the text and translate the expressions into Russian:

evolutionary	change
discrete	tool
global	leaps
fundamental	economy
essential	success
modest	capabilities
powerful	tasks
huge	part

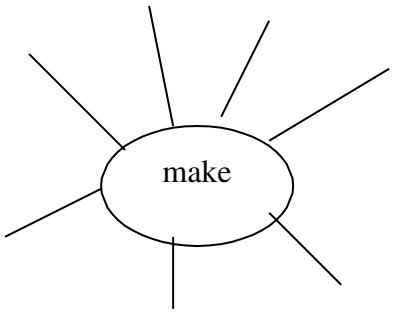
2. a. Match the following words/expressions in English with their Russian equivalents:

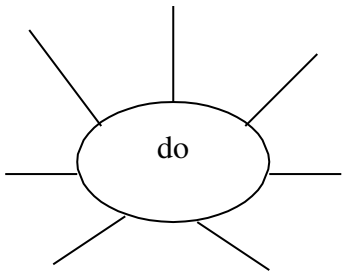
meet the needs	распознавать речь и почерк
run our lives and businesses	оплачивать счета информи-
play a leading role/a key role	ровать и развлекать
pay bills	управлять нашей жизнью и делами
keep us informed and entertained	удовлетворять потребности под-
recognize speech and handwriting	держивать связь
keep in touch	играть главную роль

b. Make up your own sentences using these expressions.

3. a. Fill in the diagrams with the following words from the box:

an effort, homework, money, your best, a mistake, progress, research, a noise, someone a favour, a phone call, nothing, a decision, business





b. Find examples of the phrases with *do* and *make* in the text above.

c. Complete the questions below with *make* or *do* in the correct form:

1. Are you generally good or bad at_____decisions? Does it depend on the kind of decision?
2. In which areas do you think you are_____most progress in your studies?
3. When was the last time you_____someone a favour? What was it?
4. How do you feel when you find out you_____mistakes in your last test?
5. Have you ever_____research? In what subject?
6. When you have holidays do you enjoy_____nothing or do you like to be active?
7. How do you feel when your neighbours_____noise? What do you usually do?

d. Ask and answer the questions.

Activity 3
Pronunciation

Put the words from the boxes in the correct columns according to the pronunciation of the letters in bold:

T**e**chnology, p**e**rsonal, **e**lectric, cl**e**arly, compl**e**tely, r**e**ly, widespr**e**ad, t**e**rribly, t**e**chnician, **e**ven, microproc**e**ssor, k**e**y, ch**e**aper, incr**e**asing, n**ee**d, v**e**rsion, succ**e**ss, l**e**arn, **e**mploy, l**e**ading, **e**conomy, l**e**ap, d**e**cade, fundam**e**ntal, **e**ssential, discr**e**te, ah**e**ad, **e**ra, **e**arly, dr**e**am, r**e**cognize, sp**ee**ch, r**e**alistic, p**e**ople, incr**e**dibly, **e**xcited, p**e**riod, res**e**arch, s**e**rvice.

as in p**e**n	as in cl**ea**n	as in **e**xam	as in t**er**m	as in h**ear**

Discussion

Discuss the following questions:

1. What was your first computer like? What tasks did you use it for?
2. What role do computers play in your life now?
3. How will computers change in the future? What functions will they perform?

Activity 4
Grammar review

Present Perfect

We use the present perfect to:

- talk about actions that continue from the past to the present.

*He **has worked** as an engineer for more than 20 years.*
(= He is still an engineer.)

- talk about past events that have a result in the present.

*The role of women **has changed** over the past 100 years.*

- talk about life experiences.

*He **has been** to many countries on business.*

The following time expressions are used with the present perfect: *since, ever, never, yet, just, already, for, so far, recently.*

Present Perfect and Past Simple

1. We use the past simple for completed actions that happen in the past. Because the time reference is past, we use time expressions that refer to finished past time.

*John **passed** his driving test **last week**.*
***Fifty years ago** people **didn't have** personal computers.*
*Bill Gates and Paul Allen **founded** Microsoft **in 1975**.*

2. The decision to use the past simple or present perfect depends on how we see the event. If we see it as related to the present, we use the present perfect. If we see it as completed in the past, we use the past simple.

*I'**ve known** Mary for many years.*
(= We are still in touch.)
*I **knew** Mary when I was at college.*
(= We don't keep in touch.)

(See page 87)

1. Find examples of the past simple and present perfect in the text above.

2. Choose the right answer.

1. When_____the company?

a) have you joined
b) did you joined
c) did you join
d) have you ever joined

2. _____ in Germany?

a) Did you ever worked
b) Have you ever worked
c) Worked you
d) Didn't you have worked

3. That's the best presentation _____

a) I never heard
b) I didn't hear
c) I heard
d) I've ever heard

4. He's the most creative person _____

a) I never met.
b) I never meet.
c) I've ever met.
d) I've never met.

5. _____to him last week.

a) I spoke
b) I've already spoken
c) I didn't spoke
d) I speaked

6. The reason I look so brown is that_____from a business trip to Spain.

a) I come back
b) I came back
c) I never came back
d) I've just come back

7. It's obvious that_____your homework.

a) you haven't done
b) you didn't do
c) you don't do
d) you do not

Activity 5
Social Media

Social media is everywhere. Social media connects people and businesses across continents and it is a hub for both great and useless information.

Just to put everything into scale, there are currently **7.5 billion** people on this planet and **2.89 billion** of them can be found on some sort of social media platform.

1. Read the topic sentence and think of three arguments for and against it. Add them to the table.

Social media has made our lives better.	
Against	For

2. Look at the phrases below used to offer opinions, agreeing and disagreeing. Write them in the correct columns.

I think … Yes, but … It seems to me … In my opinion … I agree.
It's good but … I totally agree. I am not really sure. I feel …
That's true. I don't think so. Yes that's right. I don't agree with that.
Exactly! You're right. Yes I see what you are saying but …

giving your opinion	agreeing	disagreeing

3. Work in pairs. Discuss the statements in your tables giving different opinions. Use the phrases in ex. 2 to help you.

Activity 6
Multitasking

In today's digital world, people have more and more things competing for their attention. With access to so much entertainment and information, we often divide our focus between more than one task – whether it's checking social media while working or studying or watching TV and talking on the phone at once.

1.Multitasking is often associated with productivity and it is believed that it can improve performance. Do you agree?

Art Markman, cognitive psychologist, explains that multitasking is more like a time-sharing activity: *"Your brain can only actively think about one task at a time, so you focus on one task, then another takes its place. The shift is so fast you don't even notice that you're only doing one thing at a time. You feel like multitasking, but what you are actually doing is time-sharing."*

Multitasking in education

2.Do you often multitask while studying? *Do you think it can have a negative impact on your learning?* Why/Why not?

3.Now read the text about negative effects of multitasking and compare with your ideas.

Why Multitasking Is Bad For Students

Multitasking can have a number of negative effects on learning.
Since students aren't giving their full attention to their studying, they aren't as effective at absorbing the information. And without a solid comprehension of what students are learning, grades can start to get worse.

The negative effects of multitasking on students can also include:

- A weaker grasp on the information being learned
- Poor retention of the material students have studied
- Higher levels of stress and frustration
- Brain drain from doing too many tasks at once
- Distractions leading to more time required to complete each task

4.What advice would you give on how to avoid the negative effects described above?

5.Now read the list of tips on how to avoid multitasking and match the headings to the paragraphs.

Don't study in front of the television Put away anything that isn't needed
Stick to a study schedule Turn off the cell phone Work in a quiet space
Block distracting websites

How Students Can Avoid Multitasking

Here are 6 tips to break the multitasking habit:

……

Remove the distractions of social media and texts so you can focus on the task at hand. Power down your cell phone or leave it in another room until you've done with the homework assignment.

…….

Pick one task or assignment to work on and put away any books or materials that aren't needed. This will help keep your attention focused on one thing at a time rather than jumping back and forth between tasks, so you can work more effectively.

……

Studying while watching a movie can quickly turn into wasted time watching a favourite channel rather than actually studying. Set "homework time" when the TV is turned off and is only turned back on once the night's assignments are complete.

……

After school each day, create a homework schedule to complete assignments and plan study time. Set time for each assignment you need to work on, and stick to using that time for only that specific task. Use different colours for each task, and create a to-do list so you can check off a task when it is completed.

……

If you don't need a computer to complete your assignments, turn it off so you aren't tempted by social media or trying to work on multiple assignments at once. If a computer is needed for an assignment, keep the number of open tabs to a minimum.

……

Create a quiet study environment where you can work without distractions. Keep this place clutter-free by only bringing the material needed to work on the task at hand. You can use the study schedule you created to decide what materials and books you should take to your study area.

(Adapted from https://www.oxfordlearning.com/multitasking-while-doing-homework-studying/)

6.Are you going to follow these tips if you multitask while doing homework?

Vocabulary

7.Match the words to make phrases and translate them into Russian.

to compete for	assignment / task
access to	attention
to check	distractions
to stick to	drain
retention of	information
brain	material
to remove	schedule
to complete	social media

8.Match the words with similar meaning.

comprehension	advice
impact on	effects on
to turn off	grasp (on the information)
clutter-free	tidy
tip	to power down

Discussion

We are living in the information society, which is very much linked to the advancement of digital information, communication technologies and the Internet.

1. What opportunities has the information society brought to us?
2. What challenges do we have?
3. What does it mean for you to be a citizen of the information society?

Word List

access to information	keep in touch
brain drain	keep us informed and entertained
check social media	meet the needs
compete for attention	modest capabilities
complete assignment / task	pay bills
comprehension	play a leading role/a key role
discrete tasks	power down
essential part	powerful tool
evolutionary leaps	recognize speech and handwriting
fundamental change	remove distractions
global economy	retention of material
huge success	run our lives and businesses
impact on	stick to schedule

GRAMMAR REFERENCE

Present Simple and Present Continuous

Present Simple

+ I/ You/ We/ They **work**.
  He/ She/ It **works**.

- I/ You/ We/ They **don't work**.
  He/ She/ It **doesn't work**.

? **Do** I/ you/ we/ they **work**?
  Does he/ she/ it/ **work**?

Present Continuous

+ I **am going**.
  He/ She/ It **is going**.
  You/ We/ They **are going**.

- I **am not going**.
  He/ She/ It **is not going**.
  You/ We/ They **are not going**.

? **Am** I **going**?
  Is he/ she/ it **going**?
  Are you/ we/ they **going**?

Passives

+ It**'s done.** It**'s being done.** It **was done.** It **has been done.**
  It **will be done.**
- It**'s not done.** It**'s not being done.** It **wasn't done.** It **hasn't been done.**
  It **won't be done.**
? **Is** it **done? Is** it **being done? Was** it **done? Has** it **been done?**
  Will it **be done?**

Passives can also be formed with modal verbs.

Can it **be done?** It **can't be done.** It **should be done.** It **must be done.** It **might be done**.

Present Perfect

+ I/ You/ We/ They **have worked**.
  He/ She/ It **has worked**.

- I/ You/ We/ They **haven't worked**.
  He/ She/ It **hasn't worked**.

? **Have** I/ you/ we/ they **worked**?
  Has he/ she/ it/ **worked**?

Past Simple

+ I/ You/ We/ They **worked**.
  He/ She/ It **worked**.

- I/ You/ He/ She/ It/ We/ They **didn't work**.

? **Did** I/ you/ he/ she/ it/ we/ they **work**?

Dealing with numbers

Saying large numbers

For example, 912,757,250 = nine hundred and twelve million, seven hundred and fifty- seven thousand, two hundred and fifty.

British and American English differences

0 = nought / oh (BrE) 0 = zero (AmE)

Fractions	**Decimals**
$^5/_7$ = five-sevenths	1.25 = one point two five
$^2/_5$ = two-fifths	0.754 = nought point seven five four (BrE)
$^1/_2$ = a half	zero point seven five four (AmE)
$^1/_4$ = a quarter	point seven five four (BrE/AmE)

Percentages

65% = sixty-five percent

WRITING FILE

Guide to presentation

1. Make a plan of your talk. This should include at least three sections:
    - introduction
    - development
    - conclusion
2. Write detailed notes of what you will say:
    - key points and key words
    - the action points you will stress
3. Prepare visual aids
4. Practice your presentation :
    - use simple and clear language
    - don't read from your notes

Look at these expressions. In which part of a presentation would you expect them to be used?

1. On this next slide you can see …
2. To conclude, I want to tell you about …
3. I'll be happy to answer questions at the end of the presentation.
4. Let's have a look at some statistics/ figures.
5. My name is … and I'm a …
6. Finally, a few words about …
7. This brings me to the next point …
8. Thanks very much for listening to my talk.
9. My main aim today is to tell you …/ I'm here today to tell you …

Sample report

Date: 12 April 2008

Report on: location of new assembly plant

Introduction

The purpose of this report is to assess the suitability of locating the new assembly plant in Hamburg, north Germany, and recommend a suitable site.

Findings

Hamburg has excellent transport links by sea, road and air. It is one of Europe's busiest ports, Germany's two main motorways pass through the city and it has a fast-growing international airport. It is also a gateway to Scandinavia and central Europe with a fast rail link to Berlin.

The region has an educated and skilled workforce with a strong engineering tradition. It will be possible to source many components locally.

Recommendation

It is suggested that the fast-developing business park north west of the city would be an ideal site because it is next to the motorway and 10 minutes from both the harbour and rail terminal. We recommend that the site should be studied in more detail immediately.

Amanda Jones

Research and Development Manager

APPENDIX TO UNIT 4

Here are some examples of smart home products and their functions.

- **Cameras** will track your home's exterior even if it's pitch-black outside.
- **LED lights** let you program color and brightness right from your smartphone.
- **Motion sensors** will send an alert when there's motion around your house, and they can even tell the difference between pets and burglars.
- **Door locks and garage doors** can open automatically as your smartphone approaches.
- **Auto alerts** from your security system will immediately go to your smartphone, so you instantly know if there's a problem at home.
- **Refrigerators** that create dinner recipes based on the ingredients stored inside.
- **Washers and dryers** that send text message alerts when their cycle has ended.
- **Television** that can be programmed so that your children can watch it only at certain times.
- **Coffee maker** that can be turned on the from bed.
- **Trash cans** that monitor what you throw away and generate online orders for replacements.

Keys

1907 **First practical domestic vacuum cleaner was invented.** James Spangler invented the first practical domestic vacuum cleaner.

1908 **Ford Model T was introduced.** Henry Ford began making the Model T. First-year production was 10,660 cars.

1925 **Televisor.** Scottish inventor John Logie Baird successfully transmitted the first recognizable image – the head of a ventriloquist's dummy – at a London department store, using a device he called a Televisor. A mechanical system based on the spinning disk scanner developed in the 1880s by German scientist Paul Nipkow, it required synchronization of the transmitter and receiver disks. The Televisor images, composed of 30 lines flashing 10 times per second, were so hard to watch they give viewers a headache.

1935 **First practical radar.** British scientist Sir Robert Watson-Watt patented the first practical radar (for radio detection and ranging) system for meteorological applications. During World War II radar was successfully used in Great Britain to detect incoming aircraft and provide information to intercept bombers.

1947 **Sound barrier was broken.** U.S. Air Force pilot Captain Charles Yeager became the fastest man alive when he piloted the Bell X-1 faster than sound for the first time on October 14 over the town of Victorville, California.

1957 **Sputnik I was launched.** On October 4 the Soviet Union launched *Sputnik I* using a liquid-fueled rocket built by Sergei Korolev. About the size of a basketball, the first artificial Earth satellite weighed 184 pounds and took about 98 minutes to complete one orbit.

1968 **Computer mouse made its public debut.** The computer mouse made its public debut during a demonstration at a computer conference in San Francisco. Its inventor, Douglas Engelbart of the Stanford Research Institute received a patent for the mouse 2 years later.

1972 **Home video game systems became available.** In September, Magnavox shipped Odyssey 100 home game systems to distributors. The system was test marketed in 25 cities, and 9,000 units were sold in Southern California Alone during the first month at a price of $99.95.

In November, Nolan Bushnell formed Atari and shipped Pong, a coin- operated video arcade game, designed and built by Al Alcorn. The following year Atari introduced its home version of the game, which soon outstripped Odyssey 100. 1981 **IBM Personal Computer was released.** IBM introduced the IBM Personal Computer with an Intel 8088 microprocessor and an operating system – MS-DOS – designed by Microsoft. Fully equipped with 64 kilobytes of memory and a floppy disk drive, it cost under $3,000.

1991 **World Wide Web became available to the general public.** The World Wide Web became available to the general public.

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THE SCOPE OF ENGINEERING

Учебное пособие

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