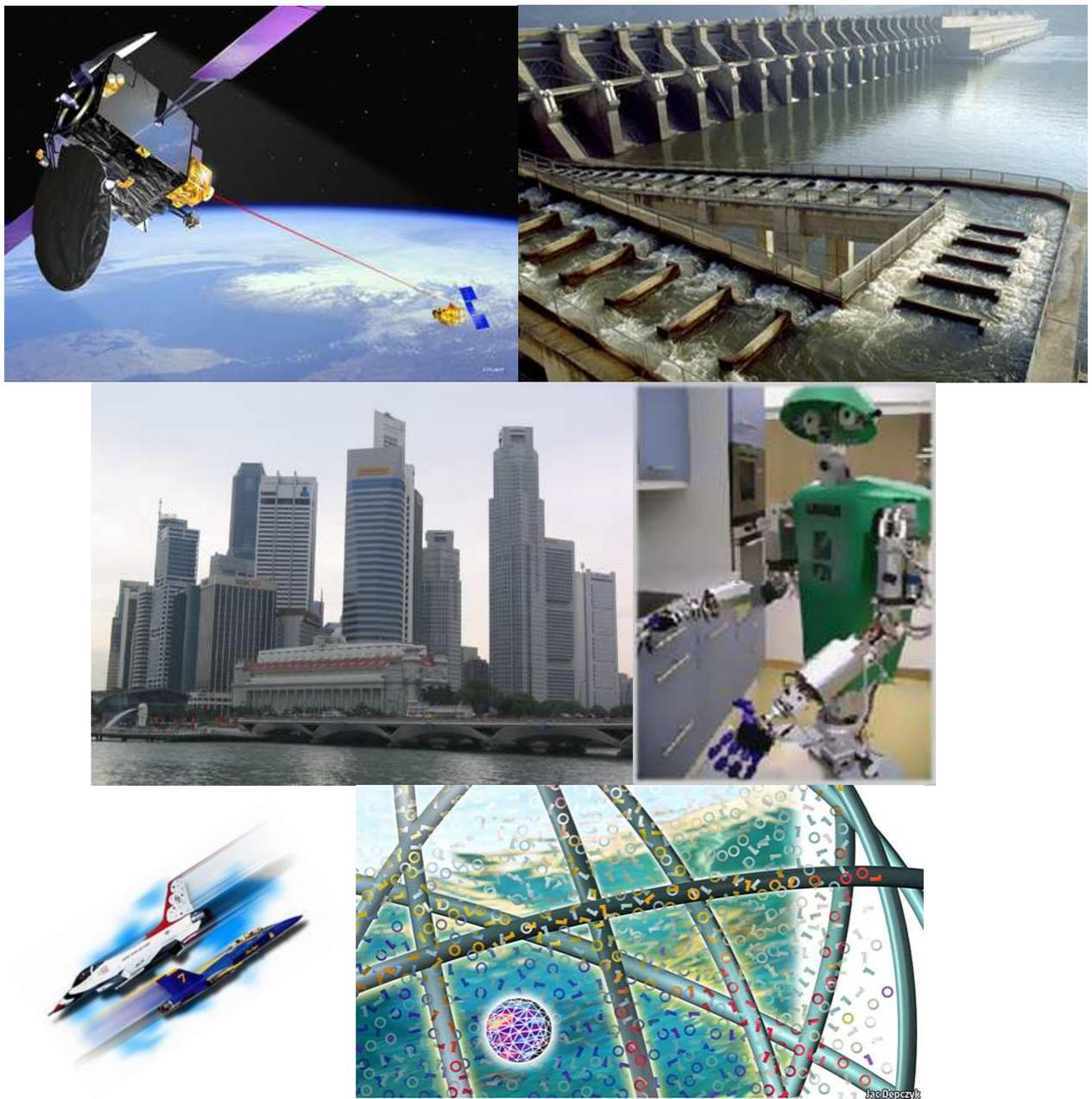


Н. В. Патяева, Е. Б. Михайлова

MODERN ENGINEERING

Учебное пособие



Нижний Новгород
2017

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Н. В. Патяева, Е.Б. Михайлова

MODERN ENGINEERING

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MODULE 1

FROM STUDENTS LIFE TO ENGINEERING CAREER

Lead in

“They know enough who know how to learn”

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

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

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.

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

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

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 plan in good time, to complete tasks, to be responsible for, to cram, to rely on myself/ the others/ the Internet/ etc.

Activity 1.1 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

2. 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 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 without it! I write everything in it and cross it off when its done. It makes me get things done and remember to do them.

V..... I choose times 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>)

3. 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.

4. 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 1.2 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.

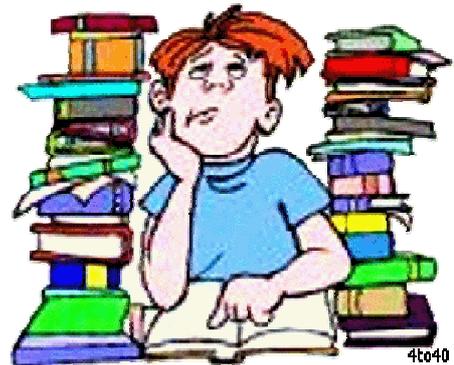
(See page 75)

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 1.3
Revising for Exams

1. How often do you have to take exams? How do you feel about exams? Do you enjoy them/ hate them/ get nervous about them?

Last-minute 'cramming' for exams is the worst of all - it is very stressful, is unlikely to lead to good marks and you won't be able to remember much of it after leaving the exam room. It makes much more sense to start exam revision in plenty of time - all it takes is a little planning and self-discipline to avoid those late nights and so-so grades.



2. Here are eight tips on revising for exams. Choose three most useful tips and explain your choice.

- a. Make use of your learning style when you revise
- b. Plan in good time
- c. Make your revision active
- d. Look through old exam papers
- e. Use your time well.

Help Box

tip (*countable*) – a helpful piece of advice

- f. Revise with other people.
- g. Mark your progress on your revision plan
- h. Trust your memory.

3. Can you add some more tips?

Activity 1.4
Grammar review

Look at the table. Tick the grammar areas according to your knowledge.

Grammar area	Know well and can use when I speak and write	Know the form but not sure when and how to use	Need to revise	Have never heard of it
Present Simple				
Future Simple				
Past Simple				
Present Continuous				
Past Continuous				
Present Perfect				
Past Perfect				
Present Perfect Continuous				
Past Perfect Continuous				
Passive Voice				
Infinitive				
Participle I				
Gerund				
To be going				
Modal verbs and their equivalents				

Grammar area	Know well and can use when I speak and write	Know the form but not sure when and how to use	Need to revise	Have never heard of it
Conditional I				
Conditional II				
Conditional III				
Articles				
Nouns (singular, plural)				
Pronouns				
Adjectives and adverbs (degrees of comparison)				
Much, many, few, little				
Numerals (ordinal, cardinal)				

UNIT 2

ENGINEERING STUDENTS' SOCIETIES

Lead in

«What do Neil Armstrong, Jimmy Carter, and Alfred Hitchcock have in common? Though they eventually chose very different careers - one as an astronaut, one as a president, and one as a filmmaker - they all started with an engineering education»

Raymond Landis, dean of engineering and technology at California State University



1. Do you know any other famous people who had/ have engineering education?
2. What makes it special in comparison with other kinds of education (humanitarian, economic, etc.)?
3. What do you expect to get from engineering education?
4. Do you think that extracurricular activities can help you develop professional skills?

Activity 2.1

Students' engineering societies

All work and no play makes Jack a dull boy.

English proverb

1. Are there any students' clubs/ societies at your university?
2. Do you belong to any? If not, would you like to? Why/ why not?
3. What is the purpose of creating professional societies for students?

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, teambuilding 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

Activity 2.2
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. organization**ion** / leadership**ship**/ involvement**ment**
2. learner**er**/ teacher**er**/ doctor**or**
3. personal**al**/ active**ive**/ daily**ly**/ powerful**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
effect	ful	er/ or
invent		ism
success		
help		
revise		
achieve		

construct		
appoint		
visible		
employ		
mechanic		
develop		

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 2.3
Events



Culture corner

The University of Alberta (U of A) is one of the largest universities in Canada. Founded in 1908 it currently enrolls over 36,000 students. The main campus covers 50 city blocks with over 90 buildings.

The Engineering Students' Society hosts a number of events throughout the year.

1. Before reading think what these abbreviations stand for:

e. g. APEGGA - [Association of Professional Engineers, Geologists and Geophysicists of Alberta](#)

UAEC -

ESS -

BBQ -

2. Read about the events and match the titles to the paragraphs:

Country Crusade

charity events

National Engineering & Geoscience Week

Geer Week

soft skills seminars

The University of Alberta Engineering Competition

GEER 101

Culture corner

GEER 101, General Engineering Entrance Requirement, is a week-long event that takes place during the second week of classes every fall. Its purpose is to show first-years that there's more to a degree than a GPA (grade point average - средний балл)
101 (обозначение учебного курса нижнего уровня)
e.g. History 101 — начальный курс истории.

I _____

Dating back to the early 1940's, is a celebration of all things engineering. Held annually in the second week of the winter semester at the University of Alberta, it includes a series of competitions and parties, with engineering disciplines fighting to become the winner.

Some of the events are:

- Toboggan Races
- Battle of the Bands & Dance Troupe
- Design Competition
- Movie Night
- Technical Display
- Floor Hockey



II _____

..... is one of the most popular social events at the University of Alberta. Twice a year, the Engineering Students' Society buses out a few hundred engineering students out to mystery small town Alberta to relax and party with the locals.

III _____



Throughout September, brings out first year engineering students to meet one another on a more social setting. The ESS hosts a free BBQ, a pool tournament, and other social events to help ease the transition for first

year engineering students.

IV _____

..... is an annual competition at the University of Alberta. UAEC consists of various design and presentation events to challenge students to apply their skills to the solution of engineering problems. Participants and winners of UAEC move on to compete in the Western Engineering Competition.

V _____

In the spring, the Engineering Students' Society celebrates....., a series of events organized by the Association of Professional Engineers, Geologists and Geophysicists of Alberta . It is meant to



promote the profession of engineering to the general public. A number of events are held throughout the week, including design competitions, a pancake breakfast, and a speech contest.

VI _____

Throughout the year, the ESS works with APEGGA to organize professional events for the students. At the technical mixers, professionals from the engineering industry come to meet with students in a social setting.



At the....., a speaker will come in to present to students on different topics, such as networking, interviewing skills, and financial management.

VII _____



The ESS is involved in a number of.....:

Engineering Head Shave to raise money for the Alberta Cancer Foundation.

International Pi Throw to raise money for Habitat for Humanity.

3. Discuss with your partner:



1. What events would you like to take part in?
2. What events do you have at your university?
3. What other events would you like to have?

Activity 2.4 Abbreviations

1. While reading articles very often you can come across different abbreviations. Divide the following abbreviations into three categories:

AC	alternating current
BSc/ BS(AmE)	Bachelor of Science
CAD	computer aided design
CIS	Commonwealth of Independent States
CPU	central processing unit
dpi	dot per inch
EM	electronic mail
EU	European Union
FEANI	European Federation of National Engineering Associations (Fédération Européenne d'Associations Nationales d'Ingénieurs)
IE	Information Engineering
ISO/OSI	International Standards Organization/ Open System Interconnection
MS-DOS	Microsoft disk operating system
PC	personal computer
PDF	Portable Document File
QC	quality control
RAEE	Russian Association for Engineering Education
SAE	Society of Automotive Engineers
TQM	Total Quality Management
URL	Uniform Resource Locator

engineering	information technology	other

2. Add at least one more abbreviation to each category.

Activity 2.5 Project work

Imagine you are the members of ESS Executive (a group of students responsible for managing the society's work). You have

to develop a plan of events for the students of your university.

You may surf the following university websites to see the examples of events.

<http://cses.carleton.ca/events/social/>

<http://engsoc.queensu.ca/events>

1. Work in small groups, describe possible events and discuss with your partners which of them could be included in the Calendar for the next academic year. Use expressions from the Functional language box to help you.

Functional language

Making suggestions

We could offer...

Why don't we... ?

How about... ?

What about... ?

Giving opinions

I think we should...

I feel that we have to consider...

I'm sure/ convinced/ positive that...

Agreeing

Yes, that's right.

I think I agree with you.

Exactly.

Good/ Excellent idea.

Disagreeing

I'm not sure I agree.

I really don't agree.

month week	September	October	November	December	January	February	March	April	May

3. Choose one or two of the events and design a leaflet. (see Writing file p 79)

UNIT 3

THE SCOPE OF ENGINEERING

For a start

1 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.

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?



Which areas of society are represented in the pictures on page 22?

Activity 3.1

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 3.2
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 3.3
Pronunciation

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

A.

Truck, equipment, reduce, consumption, construct, simulate, technique, manufacture, fuel, semiconductor, pollutant, computer, structure, population, support, product, humankind.

as in cl <u>u</u> b	as in <u>u</u> se	as in qu <u>u</u> ick	as in su <u>u</u> ccess	as in chequ <u>e</u>

B.

Diagnostic, machine, artificial, prosthetic, devices, design, vehicle, satellite, missile, irrigation, experiment, plastic, fiber, medicine, fertilizer, chemical, various, material, engineer, physics, electricity, magnetism, service, diagram, benefit.

as in <u>f</u> ine	as in d <u>i</u> alogue	as in h <u>i</u> t

Activity 3.4

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

Activity 3.5**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 3.6
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.

Find at least five words which you think are important to learn and teach them to the other students in your group.

Present your report to the other students in the group.

Activity 3.7 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)

What professional benefits does an engineering career offer?

Activity 3.8
Top 10

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.discover.org/discover-engineering/10-reasons-to-love-engineering>)

*uncharted territory – неизведанная местность

**a launching pad – стартовая площадка

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

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

exciting	thinker
greatest	problem solving
independent	job
smart, inspiring	company
creative	profession
starting	building materials
entry-level	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)
engineering degree	заработать / заслужить уважение
dream job	защищать нашу планету
lead to success	предотвращать заболевания
field work	оставить свой след на земле
preserve the environment	приводить к успеху
save lives	придумать / предложить решения
prevent disease	работа мечты
protect our planet	сохранять окружающую среду

Discuss the following questions:**Activity 3.9**
Discussion

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

Activity 3.10
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.

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

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.

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.

Powerful tool

More exact, faster and more **energy-efficient** – the disk laser developed by the ISFW at Stuttgart University underlines Germany’s leading role in the field of laser technology. This new technology will be used in the **body assembly plant** at DaimlerChrysler. The laser involved in this new **welding system** does not move from one welding point to the next; instead the **beam of light** is directed at each point using mirrors and beam waveguides. As a result, assembly times should be **reduced** by 90%.



Metallic servants



Wouldn't it be nice to have a friendly machine to help with the house-work, to clear the table and fill the dishwasher? Who hasn't dreamt of that at some time? At Karlsruhe University's Institute for Technical Informatics, researchers like Professor Rudiger Dillmann are working hard at developing robotic helpers to the stage where they are ready for mass production. Initial prototypes of these humanoid robots are already walking around the labs in Karlsruhe. **Currently**, the specialists are working on a solution to one of the biggest problems: how does a machine get the skills that it will later need? The solution is for the robot's users to show the machine what it has to do. They perform the **appropriate** actions with **data** gloves on their hands while the process is also filmed by stereo cameras. The data is then directly transferred to the robot.

See-Through Display

In the past, **transparent** monitor **screens** only existed in science-fiction films like Minority Report. Now, however, they have become a reality at the Technical University of Braunschweig. For the first time, physicist Thomas Riedl has succeeded in **equipping** a transparent display with pixels that are both coloured and transparent at the same time. A possible **application**: the projection of navigation information onto a **car's windscreen**.

Intelligent models from Nature



Bionics involves the technological application of methods and procedures found in nature. German researchers are leaders in this field. Wilhelm Barthlott, the professor from Bonn, patented the self-cleaning lotus effect in the mid-1990s. In 1999 a new façade paint was put on the market that didn't allow dirt to stick – it simply ran off like raindrops on a lotus leaf. Another model from nature is being examined by researchers from the Max Planck

Institute of Colloids and Interfaces in Potsdam. They discovered that the glass skeleton of an ocean glass sponge is practically **indestructible**. They want to use this knowledge to develop new, especially **stable** structures.

Revolution in the fuel tank

What the Saxon company Choren Industries produces in Freiberg is the dream of many ecologists: it is **tar-free, biodegradable and carbon-dioxide neutral**. The **fuel**, which has been named SunDiesel, is produced from



biomass, such as wood, straw or agricultural waste, using the three-stage Carbo-V process, for which the east German producers own the global patents. Together with oil giant Shell, the company is currently investing 49 million euros in the world's first

SunDiesel **refinery**. The planned **output** is 16.5 million litres of fuel a year, produced from 67,000 tonnes of biomass. Five large plants across Germany are already planned to be producing the new fuel by 2008.

Task 2. Prepare the presentation of your products. Write a structure for your presentation and make notes under key points. Then write an introduction and conclusion.

(See page 78)

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 79)

Activity 3.11
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	irrigation
equipment	support	fiber
technique	product	fertilizer
fuel	humankind	application
semiconductor	machine	refinery
pollutant	vehicle	output
structure	satellite	service
benefit	missile	data

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	energy-efficient laser
entry-level job	body assembly plant
well-educated individual	welding system
high-tech company	beam of light
low-cost building materials	reduce assembly times
come up with solutions	appropriate actions
make your mark on the world	transparent monitor screens
earn respect	a car's windscreen
engineering degree	indestructible stable structures
dream job	tar-free, biodegradable and carbon-
lead to success	dioxide neutral fuel

Progress Monitoring

Return back to the beginning of Module 1. Look at the list of different ways of learning English. Would you change your list of the most effective ones?

MODULE 2**TECHNOLOGICAL WONDERS AT HOME AND IN
INDUSTRY****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

ACHIEVEMENTS OF MODERN ENGINEERING

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

James Allen (American novelist, 1849-1923)

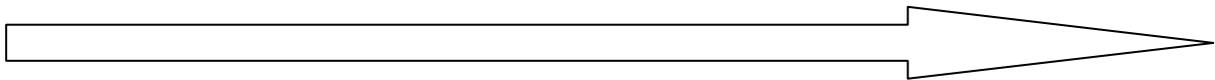
For a start

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



- a. Computer mouse makes its public debut
- b. Home video game systems become available
- c. World Wide Web becomes available to the general public
- d. Ford Model T is introduced
- e. Sound barrier is broken
- f. First practical radar
- g. Televisor
- h. IBM Personal Computer is released
- i. First practical domestic vacuum cleaner is invented
- j. Sputnik I is launched



Early military radar system

Turn to page 83 and check your answers.

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

Activity 4.1
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.



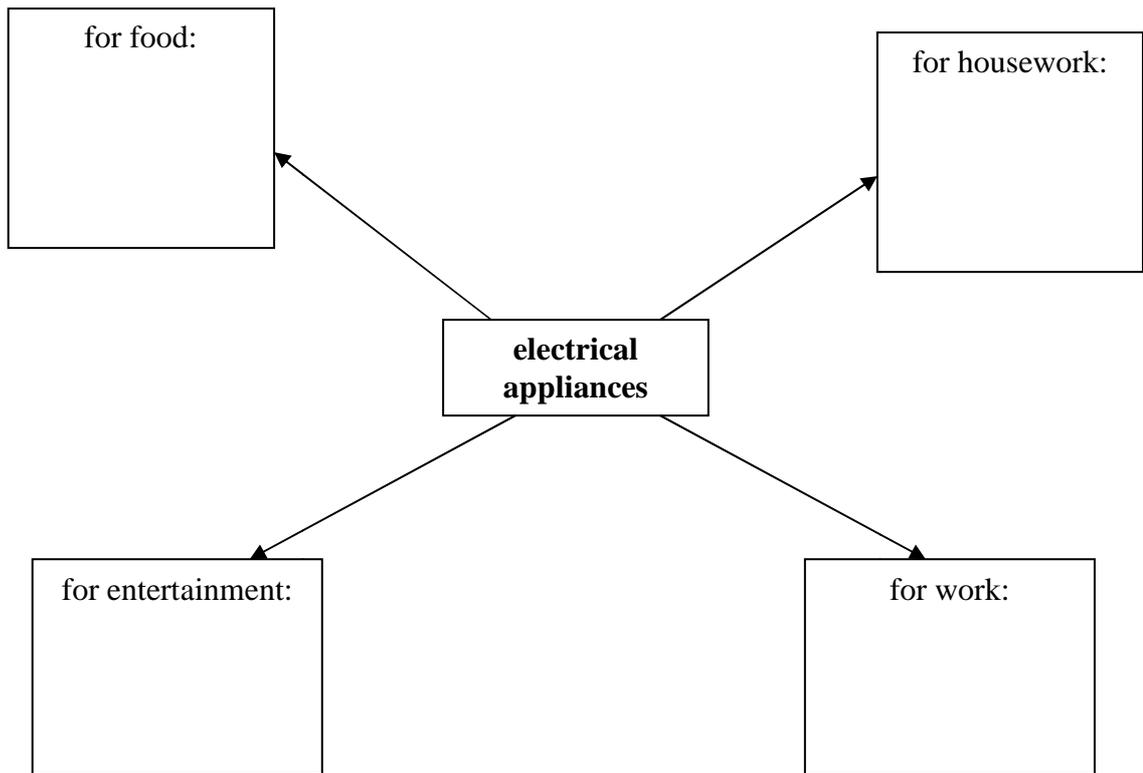
Washers and dryers that "talk" to each other improve clothes care and save time. The opportunity for innovation is as great as ever in this world of classical functions.

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 4.2
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 4.3
Extension



Discuss the following questions:

1. Which household appliances don't you have at home? Which would you like to have? Why?

2. Do you think working in the field of household appliances is as exciting as working in IT or aerospace? (see the last paragraph of the text)

Activity 4.4
Reading

1. Have you ever visited a plant that makes electrical appliances?

2. What advanced technologies are used in modern manufacturing?

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/>)

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

Activity 4.5
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.*

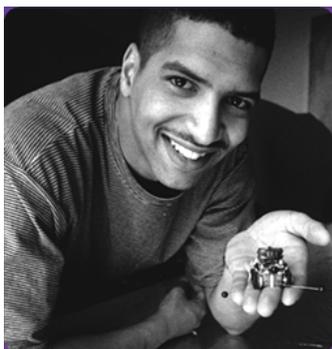
- If we want to mention who performed an action we can use *by*.
*First practical domestic vacuum cleaner **was invented by** James Spangler.*

(See page 76)

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 4.6
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.

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 4.7
Vocabulary focus

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

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

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

mass production	робот с цифровым управлением
consumer and industrial goods	выполнять работу
perform jobs	дистанционное управление
be in widespread use	обслуживание
remote control	точность
keep track of	механическое устройство

digitally operated robot	потребительские товары и промышленные
mechanical device	изделия
reliability	отслеживать, следить
accuracy	массовое производство
maintenance	широко использоваться
	надежность

Activity 4.8**Writing: discursive composition**

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

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.

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 science fiction novels, then think again. Robots are the largest growing technological 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 bored 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 chemicals 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 which robots are used. Ninety percent of robots are used in factory work and assembly lines. They assemble cars, package food, load machines and repair 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 invention 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 producing 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 appearance 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

UNIT 5

FUTURE 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 5.1
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 and rank them from the most probable (1) to the least probable (9). Explain why.

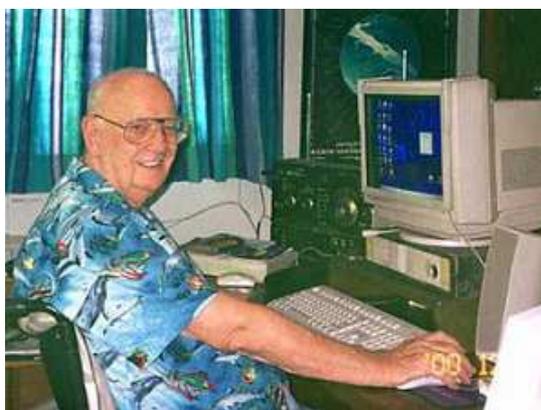
Arthur C. Clarke's predictions for the 21st century:

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 5.2
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:

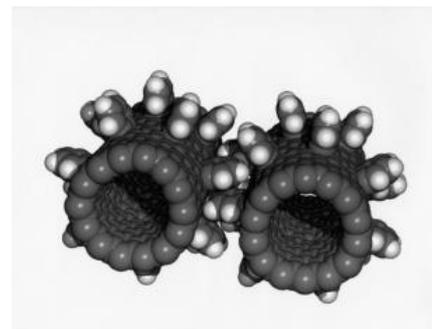
1. What is nanotechnology?
2. Where is it used nowadays?
3. Where could it be used in future?

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.

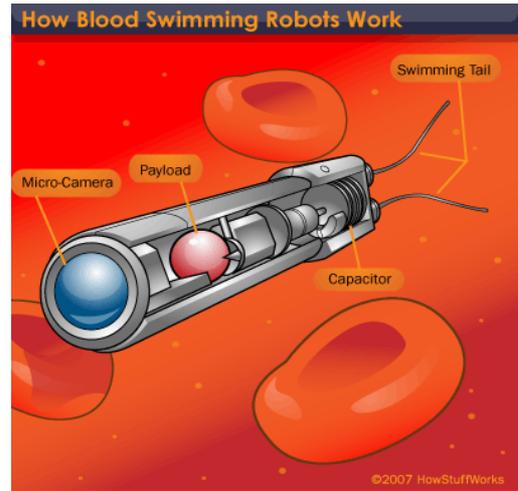
- B. Nanoscience (or nanotechnology) refers to the study of things that are smaller than about 100 or 200 nanometers. It is the study and development of the small so that it will affect the large. One of the basic goals of nanotechnology research is to control individual atoms. Carbon, hydrogen, oxygen, 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?

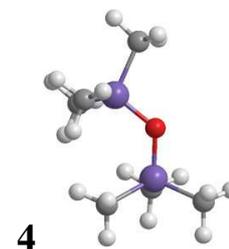
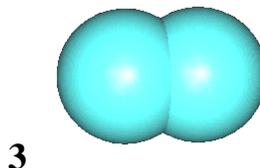
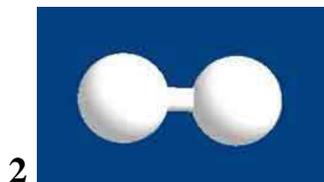
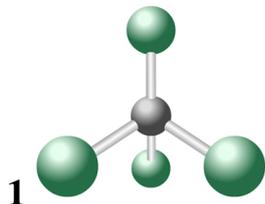
	<p>what could be done with the help of nanotechnology</p> <p>difference between nature and people in creating things</p> <p>how nanotechnology is used now</p> <p>subject and aim of nanotechnology</p> <p>the meaning of nano</p> <p>imitating nature by nanotechnologists</p>
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Activity 5.3
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



3. Fill in the gapped sentences with the following word combinations. 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 5.4
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 5.5 Interview

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

Jonathan Mitchener has always got an eye on the future. And he's got one of the most interesting - and intriguing - jobs at British Telecommunications Group plc (BT), he is a futurologist.

2. Read the interview with Jonathan Mitchener and answer the questions:

- **What does his job involve?**
- **What does he say about future development of technology?**

Before reading the text match the words from column A with their synonyms in column B.

•

A

device
change
business
stuff
break down
benefit
obstacle
approach

B

difficulty
method
cram
industry
alter
split
gadget
gain

Jonathan, what is your job at BT?

I'm a futurologist. It's my job to look ahead to see how technology will develop in the coming years. And I work with BT's bigger customers to see what's up-and-coming and to identify disruptive technologies.

'Disruptive technologies?' What are they?

They're technologies that have changed the way business is done. Probably the best example of a disruptive technology is the internet. It has fundamentally changed the way businesses operate – you could say it's turned the business world on its head. Another would be the iPod. It hasn't just changed the way people listen to music it's altered the way people buy music. It's forced the music industry to change.

I know you're really keen on gadgets - what can we expect in the future?

What's clear is that you can expect gadgets and devices to carry more and more functions. You've only got to look at a mobile phone today - with a built-in camera, video, radio, net access etc - to see that. The problem, is that as gadgets are filled with more and more functions, people find them harder to use. That's why gadgets need to be easier to use.

How can this be achieved?

Easy-to-use touch-screens are one way to solve this problems but this is not enough on its own. The solution needs to be more radical. It's not just about stuffing more functions into one box. In fact, we now need to split functions.

What do you mean?

We need to break down the functions from single devices into multiple devices. Instead of cramming all these functions into one device, we need to have separate devices - a camera, a phone, a radio... But we need to come up with devices that can still co-operate with each other...that talk to each other. By breaking things up we can solve the problems of complexity.

Is this possible?

Of course! But it will come in stages. You're already seeing it happen to a certain degree with the next generation of Bluetooth. Another example is ultra-wideband (UWB) which would enable lots of information to be transmitted very fast over very short distances. I believe we could be using gadgets this way in the next six or seven years.

It sounds interesting. Any reasons why this might not happen?

One of the obstacles to this cooperative approach might be those manufacturers that don't want their products to work with those from other manufacturers. They may not like the idea but it could end up delivering more benefits in the long run.

What about the environment?

At the moment there is lots being done to remove harmful chemicals - everything from solder to plastics - from PCs and gadgets. There is now a greater green attitude to manufacturing electronic products, which could be recycled. New battery technology is also being developed that makes them even faster to charge, and there is also work going on to develop solar-powered gadgets.

So the future looks set to deliver some interesting developments?

It certainly does...

4. Read again and mark the following statements as true or false. Correct the false ones.

1. Disruptive technologies have changed the way businesses operate.
2. iPod made the music industry change.
3. It's necessary to include more and more functions into gadgets.

4. We need to have separate devices that can cooperate with each other.
5. Manufacturers nowadays are more concerned about environment.
6. Jonathan sounds pessimistic about future development of technology.

Activity 5.6
Extension



Discuss the following questions:

1. Do you believe that gadgets will be easier to use in future? Why/ Why not?
2. Do you agree that manufacturing electronic products is becoming more environmentally-friendly? Can you give examples?

Activity 5.7
Vocabulary

Make nouns from the following words:

develop
operate
solve
complex
possible
succeed
transmit
manufacture

Activity 5.8
Reading

Gadgets

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

Discuss your ideas in groups.

<p>1</p>  <p>Dog's Eye View</p>	<p>2</p> 
<p>3</p>  <p>Full Page Scanner</p>	<p>4</p>  <p>WristRickRolled!</p>

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

<p>A. You can display the current Wi-Fi signal strength to yourself and everyone around you with this stylish Wi-Fi Detector Shirt. The glowing bars on the front of the shirt dynamically change as the surrounding Wi-Fi signal strength <u>fluctuates</u>.</p> <p>Product Features</p> <ul style="list-style-type: none"> • Battery pack is <u>concealed</u> in a small pocket sewn inside the shirt • Runs for hours off three AAA batteries • Black 100% cotton T-shirt 	<p>B. This is <u>Stainless Steel</u> Video Watch with a massive 8GB of internal flash memory and a full color 1.8" screen. Plus this watch has a built-in voice recorder, a built-in high quality speaker and an earphone, the ability to view JPEG pictures and listen to music at the same time.</p> <p>Product Features</p> <ul style="list-style-type: none"> • Video format: MTV • Music format: MP3, WMA, WAV • Languages: English, Chinese, Portuguese, French, Korean, Spanish, Japanese, German, Italian • System: Windows 98/SE/ME/2000/XP/Vista
---	--

C. How can you find out what your pet really does all day? It's easy, if you have a Pet's Eye View Digital Camera. Just clip it to their collar, set the timer to record a shot every 1, 5, or 15 minutes and it will record snapshots of their day! At the end of the day, you can download the shots to your computer and see what your pet did all day.

Product Features

- Resolution: 640 x 480
- Image capacity: 40 (jpeg)
- Battery: lithium-ion, rechargeable (through USB cord)
- Dimensions: 2.25" x 2" x 0.75"

D. 9 inches wide and as big as your finger, DocuPen could drag its shiny reader surface lightly across any surface and scan in its contents. With its ability to accept micro-SD card expansion, you could scan up to 100 pages before you have to connect it with your computer for retrieval.

Product Features

- 8 MB onboard
- Up to 24 bit color and 400 dpi
- Supports Windows 2000/XP/Vista and Mac OS X
- Connects and charges to your computer via USB

(Adapted from www.thinkgeek.com)

3. Read the texts (A-D) again and match the sentences (1-6) below with the gadgets.

1. It is useful for studying.
2. You can listen to music with this.
3. You need it only if you have a pet.
4. You will attract people's attention with it.
5. You can record your voice with it.
6. It helps you see if there is internet access nearby without your laptop.

Help Box

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

Activity 5.9

Vocabulary focus

Complete the definitions (1-7) with the underlined words in the texts (two of them are synonyms). Use your dictionary to

help you.

1. A _____ is the top layer of something.
2. To _____ means to keep changing.
3. To _____ means to move information from the Net or a digital device to a computer.
4. _____ means hidden.
5. _____ is a photograph taken quickly.

6. _____ is the process of getting specific information from stored data.
7. _____ is a type of metal.

Activity 5.10
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 5.11
Dealing with numbers

1. Say these numbers. Check with the teacher after each group (See page 77).

1. 47 362 1,841 15,000 36,503 684,321 4,537,295
2. 3.5 2.89 9.875
3. $\frac{1}{3}$ $\frac{3}{8}$ $\frac{5}{7}$ $\frac{1}{2}$ $\frac{3}{4}$
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 mobile-phone subscriptions are there in your country?
4. How many members are there in a) your social network? b) most popular social network?
5. 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 5.12
Project work

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

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

2. Work in teams. Design a gadget. Do a drawing of your gadget and write information about it. Prepare a short presentation for the other students in the group.

3. Use the internet to find examples of strange or unusual gadgets. Bring them into class. Decide who has found the strangest or the most unusual gadget.

UNIT 6

INFORMATION AGE?

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

Benjamin Disraeli

Lead in

- 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 6.1
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

Help Box
decade is a period of
ten years

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.

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.

* 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 6.2 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

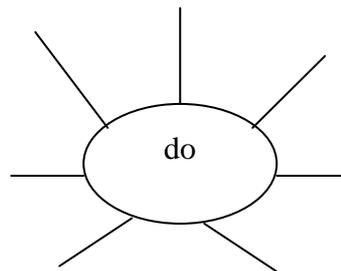
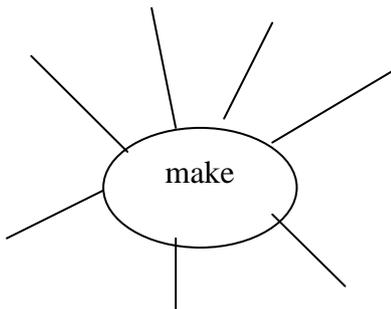
2. a. Match the following words/expressions in English with their Russian equivalents:

meet the needs	распознавать речь и почерк
run our lives and businesses	оплачивать счета
play a leading role/a key role	информировать и развлекать
pay bills	управлять нашей жизнью и делами
keep us informed and entertained	удовлетворять потребности
recognize speech and handwriting	поддерживать 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 6.3

Pronunciation

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

Technology, personal, **e**lectric, clearly, completely, rely, widespread, terribly, technician, **e**ven, modest, microprocessor, key, cheaper, increasing, need, version, success, evolve, learn, employ, leading, **e**conomy, leap, decade, fundamental, beyond, merely, essential, discrete, ahead, entertain, expect, era, **e**arly, dream, recognize, speech, realistic, enable, people, incredibly, excited, period, research, service, exploit.

[e]	[i:]	[i]	[]	[]

Extension**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 6.4
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 76)

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.
- you haven't done
 - you didn't do
 - you don't do
 - you do not

Activity 6.5

History of Silicon Valley

Do you know where the world largest high-tech centres are situated?

Have you ever heard of the name “Silicon Valley”? What is it famous for?

1. Read the text and answer the questions.

- Where did the name “Silicon Valley” come from? How is it connected with semiconductors?
- Why is Frederick Terman called "the father of Silicon Valley"?
- What helps Silicon Valley keep its leading position among other high-tech centres?

HISTORY OF SILICON VALLEY

Silicon Valley, about 45 miles southeast of San Francisco, is situated in Santa Clara County, California. The area is approximately 25 miles long and 10 miles wide, sandwiched between San Francisco Bay and the hills.

The term Silicon Valley is credited to journalist Don Hoefler who used the phrase as the title of a series of articles in the weekly trade newspaper Electronic News. The series, entitled "Silicon Valley USA," began in the paper's issue dated January 11, 1971. Valley refers to the Santa Clara Valley, located at the southern end of San Francisco Bay, while Silicon refers to the high concentration of companies

involved in the semiconductor (silicon is used to create most semiconductors commercially) and computer industries that were concentrated in the area.



Since the early twentieth century, Silicon Valley has been home to a vibrant, growing electronics industry. The industry began through experimentation and innovation in the fields of radio, television, and military electronics. Stanford University, its affiliates, and graduates have played a major role in the evolution of this area.

During the 1940s and 1950s, Frederick Terman, as Stanford's dean of engineering, encouraged faculty and graduates to start their own companies, among them Hewlett-Packard, Varian Associates, and other high-tech firms. Terman is often called "the father of Silicon Valley."

It was in Silicon Valley that the silicon-based integrated circuit, the microprocessor, the microcomputer, among other key technologies, were developed, and has been the site of electronic innovation for over four decades with about a quarter of a million information technology workers.

Despite the development of other high-tech economic centers throughout the United States, Silicon Valley continues to be the leading high-tech one because of its large number of cutting-edge entrepreneurs, engineers and venture capitalists.

Help Box

Compare:

British English	American English
<i>centre</i>	<i>center</i>
<i>metre</i>	<i>meter</i>
<i>colour</i>	<i>color</i>
<i>programme</i>	<i>program</i>
<i>realise</i>	<i>realize</i>
<i>etc.</i>	<i>etc.</i>

Extension Discuss the following questions:

1. Would you like to work in a high-tech centre like Silicon Valley? Why? / Why not?
2. What other high-tech centres do you know?
3. What are the advantages of concentrating high-tech companies in one area?



Activity 6.6
Internet use



On the following site you can find a **list of technology centres** throughout the world.

http://en.wikipedia.org/wiki/List_of_technology_centers

1. **Choose a country and a centre which attracts you and prepare a presentation for your classmates.**
2. **While making a presentation describe the advantages of living and working in the centre you've chosen.**
3. **Vote for the centre which you most like.**

GRAMMAR REFERENCE**Present Simple and Present Continuous****Present Simple**

Form

+ 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**

Form

+ 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

Form

+ **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

Form

+ 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

Form

+ 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
$\frac{5}{7}$ = five-sevenths	1.25 = one point two five
$\frac{2}{5}$ = two-fifths	0.754 = nought point seven five four (BrE)
$\frac{1}{2}$ = a half	zero point seven five four (AmE)
$\frac{1}{4}$ = 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

Leaflets

Leaflets come in all shapes and sizes, but they all have to tell the user as much as possible in a small space.

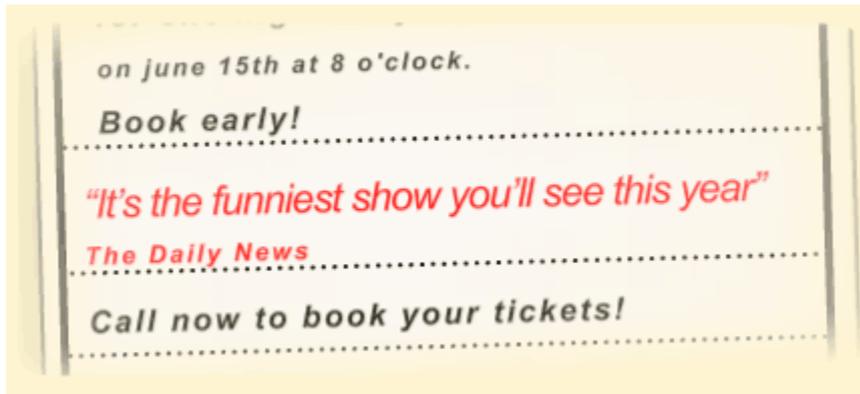
- **The heading.** Leaflets should have a clear, bold heading that catches the reader's attention and makes them want to read more.



- **The message.** You need to get as many facts as possible onto a leaflet – it needs to tell the reader everything they need to know and persuade them to do something, for example visit a restaurant or buy something.



- **Features.** Most leaflets have short messages that stand out and tell the reader what's special about the thing the leaflet is advertising. These could be prices, reviews or special offers.



- **A call to action.** This is a clear message telling the reader what to do next, for example, **Buy it now!** or **Call this number now for more details!**



- **Contact details.** If a leaflet is advertising an event or a shop, for example, it must tell people where to go (an address), and how to get in touch (telephone numbers, website details and e-mail addresses).



- **The design.** Leaflets have to catch the reader's attention, so they need to be bright and engaging.



**RYAN:
THE FUNNIEST
MAN ON EARTH!**

*Don't miss Ryan's
award-winning
comedy show.*

*The top comedian is appearing
for one night only at the Grand Theatre
on June 15th at 8 o'clock.
Book early!*

"It's the funniest show you'll see this year"
The Daily News

Call now to book your tickets!

*The Grand Theatre, 24 The High Street, Oldtown.
Telephone 0987 123 456*

Keys

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

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

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

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

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

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

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

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

In November, Nolan Bushnell forms Atari and ships Pong, a coin-operated video arcade game, designed and built by Al Alcorn. The following year Atari introduces its home version of the game, which soon outstrips Odyssey 100.

1981 **IBM Personal Computer is released.** IBM introduces 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 costs under \$3,000.

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

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