Н. Ю. Бухнер

АНГЛИЙСКИЙ ЯЗЫК ДЛЯ ИНЖЕНЕРОВ

АлтГТУ

Барнаул 2026

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Н. Ю. Бухнер

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Учебно-методическое пособие

Рекомендовано Алтайским государственным техническим университетом им. И.И. Ползунова в качестве учебно-методического пособия для студентов инженерно-технических направлений подготовки АлтГТУ

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Учебное пособие разработано дисциплине «Иностранный язык» и предназначено для расширенного изучения английского языка студентов 2-го курса всех технических специальностей и направлений подготовки, владеющих грамматикой и имеющих базовый запас английских лексических единиц.

Пособие состоит из 6 уроков. Каждый урок включает аутентичный текст по направлению, словарь с транскрипцией, вопросы для проверки понимания прочитанного и цикл упражнений на закрепление материала. Разработанные задания способствуют усвоению и запоминанию специальных терминов. Упражнения помогают развитию умений и навыков устной речи: умение дать мотивированный ответ, опровергнуть неправильные утверждения. Пособие может быть использовано как на аудиторных занятиях, так и для организации самостоятельной работы студентов.

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Вперед (к оглавлению)

СОДЕРЖАНИЕ

INTRODUCTION

Training of engineering students adapted to the modern conditions of international economic relations requires studying the foreign language. Fluency in English is an advantage when applying for a job, developing a professional career. It is especially important to study special terminology in a particular technical field. This will allow future engineers to work with foreign partners or technical documentation, understanding multiple meaning English terms in the appropriate context.

This book is for second-year students studying engineering who are not familiar with technical concepts yet. «English for Engineering» presents around 150 of the most important words and phrases in English that engineers need for their work. The book has 6 units and appendix. Each unit covers an important area of engineering such as Evolution of Engineering, Measurement, Materials, Tools, 20th Century Engineering, Engines and Motors. Each unit has six parts: listening and reading, notes and vocabulary, reading comprehension, analyze, translate, and speak. Each lesson includes an authentic text about engineering, vocabulary with transcription, and different types of exercises and activities. The developed exercises promote learning and memorization of special terms. The activities help to develop oral skills: the ability to give a motivated answer, refute incorrect statements. The Appendix includes three subsections: glossary, English grammar, measurement.

You can use the book on your own for self-study, or with a teacher in the classroom, one-to-one or in groups.

UNIT 1

EVOLUTION OF ENGINEERING

Preview

Answer the questions. Then talk about your answers.

1. Where do engineers work?

2. When and where did the history of engineering begin?

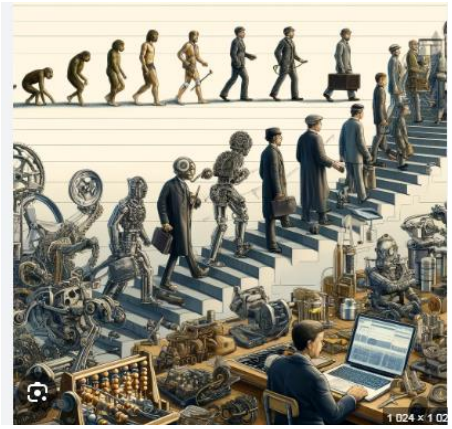
3. What do you know about the history of engineering?

I. LISTENING AND READING

Listen to the text

Read and translate it

EVOLUTION OF ENGINEERING



Engineering is one of the fastest growing industries in the world. It has evolved from the invention of the lever and the wheel to robotics and biomedical engineering. The origin of engineering is related to the need of people to transform the environment. Thus the earliest human engineering inventions were the wheel, lever and pulley. Early civilizations such as the Egyptians, Greeks, and Romans built amazing structures such as pyramids, aqueducts, and bridges using six classic simple mechanisms: lever, wheel and axle, block, inclined plane, wedge, and screw.

In the Middle Ages, advances in science and mathematics began to transform engineering. Leonardo da Vinci, one of the most famous engineers of all time, carefully studied the principles of anatomy, physics, optics, math, and applied them to the design of machines and other engineering works.

The beginning of the Industrial Revolution is associated with the invention of the steam engine in Great Britain in the second half of the 17th century. Immediately after its creation, steam engines began to be used in various sectors of the economy: industry, transportation, mining and shipping. This was a new milestone in the development of engineering.

The 19th and 20th centuries were the time of social transformations that would not have been possible without the achievements of science and engineering. The 19th century is associated with the emergence of electrical, chemical, and civil engineering.

Engineering has a promising future. Engineers will be the first to meet the challenges of modernity in such fields as:

- **Robotics and Automation:** The rise of robotics and automation is set to revolutionize manufacturing, transportation, and healthcare, among other industries.
- **Green Technologies:** Climate change and environmental concerns are driving the development of renewable energy sources, green transportation, and sustainable building materials.
- **Biomedical Engineering:** The aging population and rising healthcare costs are creating new opportunities for engineers working in the field of biomedical engineering.

[Text is adapted from URL: https://utilitiesone.com/the-evolution-of-engineering-how-it-started-and-how-far-weve-come]

II. NOTES AND VOCABULARY

Read the following notes

1.	Egyptians [ɪˈdʒɪpʃ(ə)ns]	Египтяне
2.	Greeks [griːk]	Греки
3.	Romans [ˈrəʊmənz]	Римляне
4.	Leonardo da Vinci [liənˈɑːdəʊ da vˈɪntʃi]	Леонардо да Винчи

VOCABULARY

1.	engineering [endʒɪˈnɪərɪŋ] biomedical engineering [baɪə(ʊ)ˈmedɪk(ə)l]	инженерия (машиностроение) биомедицинская инженерия
2.	to evolve [ɪˈvɒlv]	развиваться, эволюционировать
3.	lever [ˈliːvə]	рычаг
4.	environment [ɪnˈvaɪrənm(ə)nt]	окружающая среда
5.	pulley [ˈpʊlɪ] Thus the earliest human engineering inventions were the wheel, lever and pulley.	ролик, шкив, блок, ворот Таким образом, ранними инженерными изобретениям человечества были колесо, рычаг и шкив.
6.	amazing [əˈmeɪzɪŋ] amazing structures	изумительный, удивительный, поразительный удивительные конструкции

7.	aqueduct [ˈækwɪdʌkt]	акведук, водопровод
8.	axle [ˈæksəl]	ось
9.	inclined [ɪnˈklaɪnd] plane	наклонная плоскость
10.	wedge [wedʒ]	клин
11.	screw [skruː] Early civilizations built amazing structures using six classic simple mechanisms: lever, wheel and axle, block, inclined plane, wedge, and screw.	винт Ранние цивилизации возводили удивительные конструкции, используя шесть классических простейших механизма: рычаг, колесо и ось, блок, наклонная плоскость, клин и винт.
12.	anatomy [əˈnætəmɪ]	анатомия
13.	steam [stiːm] engine [ˈendʒɪn]	паровой двигатель
14.	mining [ˈmaɪnɪŋ] Immediately after its creation, steam engines began to be used in various sectors of the economy [ɪˈkɒnəmɪ]: industry, transportation, mining and shipping.	горная промышленность Как только паровой двигатель был изобретен, его стали использовать в различных секторах экономики: промышленность, перевозки, горное дело, судоходство.
15.	milestone [ˈmaɪlstəʊn] This was a new milestone in the development of engineering.	веха, этап Это стало новой вехой в развитии машиностроения.
16.	emergence [ɪˈmɜːdʒ(ə)ns] The 19th century is associated with the emergence of electrical, chemical [ˈkemɪk(ə)l], and civil [ˈsɪv(ə)l] engineering.	появление, возникновение 19 век ассоциируется с возникновением электротехники, инженерной механики, химического машиностроения и гражданского строительства.
17.	promising [ˈprɒmɪsɪŋ] promising future	многообещающий, перспективный многообещающее будущее

III. READING COMPREHENSION

1. Answer the questions

1. How has engineering evolved?

2. What is the origin of engineering related to?
3. What were the earliest human engineering inventions?
4. What did early Egyptians, Greeks, and Romans build?
5. How many simple mechanisms did early Egyptians, Greeks, and Romans use to built pyramids, aqueducts, and bridges?
6. Who is one of the most famous engineers of all time?
7. When and where was the steam engine invented?
8. In what sectors of the economy were steam engines used in the 17th century?
9. What is the 19th century associated with?
10. In what fields will engineers be the first to meet the challenges of modernity?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. Engineering is one of the fastest growing industries in the world.
2. Engineering has evolved from the invention of the lever and the wheel to healthcare and biomedical engineering.
3. The earliest human engineering inventions were the steam engine, lever and pulley.
4. Middle Ages civilizations such as the Egyptians, Greeks, and Romans built amazing structures such as pyramids, aqueducts, and bridges using six classic simple mechanisms: lever, wheel and axle, block, inclined plane, wedge, and screw.
5. In the Middle Ages, advances in science and mathematics began to transform engineering.
6. Leonardo Di Caprio, one of the most famous engineers of all time, carefully studied the principles of anatomy, physics, optics, math, and applied them to the design of machines and other engineering works.
7. The beginning of the Industrial Revolution is associated with the invention of the steam engine in Great Britain in the second half of the 19th century.
8. Immediately after its creation, steam engines began to be used in various sectors of the politics.
9. The 19th and 20th centuries were the time of social transformations that would have been possible without the achievements of science and engineering.
10. Engineering has a uncertain future.

3. Complete the sentences

1. Engineering is … .

2. It has evolved from … .
3. The origin of engineering is related … .
4. Thus the earliest human engineering inventions … .
5. Early civilizations such as the Egyptians, Greeks, and Romans … .
6. In the Middle Ages … .
7. Leonardo da Vinci, one of the most famous engineers of all time … .
8. The beginning of the Industrial Revolution is associated with … .
9. Immediately after its creation, steam engines began to be used in various sectors of the economy:… .
10. The 19th and 20th centuries were the time of social transformations … .
11. The 19th century is associated with … .
12. Engineering has a promising … .

IV. ANALYZE

1. Choose the correct word or word combination

1. Engineering is one of the … growing industries in the world.
a) fastest b) slowest c) poorest

2. Engineering has evolved from the invention of the lever and the wheel to … and biomedical engineering.
a) planting b) robotics c) cleaning

3. The origin of engineering is related to the need of … to transform the environment.
a) animals b) robots c) people

4. Early civilizations such as the Egyptians, Greeks, and Romans built amazing ... such as pyramids, aqueducts, and bridges.
a) structures b) cars c) buses

5. In the …, advances in science and mathematics began to transform engineering.
a) Middle Ages b) Metal Ages c) Ancient times

6. Leonardo da Vinci, one of the most famous … of all time.
a) teachers b) actors c) engineers

7. The beginning of the Industrial Revolution is associated with the invention of the steam engine in Great Britain in the second half of the … century.
a) 17th b) 18th c) 19th

8. The 19th and 20th centuries were the time of social ... that would not have been possible without the achievements of science and engineering.
a) purification b) isolation c) transformations

9. Engineering has a ... future.

a) dark b) uncertain c) promising

10. The aging population and rising healthcare costs are creating ... opportunities for engineers working in the field of biomedical engineering.

a) new b) old c) blue

2. Match the word combination with the English equivalent

1. engineering	**a)** a bar or handle that moves around a fixed point, so that one end of it can be pushed or pulled in order to control the operation of a machine or move a heavy or stiff object
2. environment	**b)** a structure for carrying water across land, especially one like a high bridge with many arches that carries pipes or a canal across a valley
3. wheel	**c)** the work of an engineer
4. lever	**d)** a thin, pointed piece of metal with a raised edge twisting round along its length and a flat top with a cut in it, used to join things together, especially pieces of wood
5. pulley	**e)** a circular object connected at the centre to a bar, used for making vehicles or parts of machines move
6. aqueduct	**f)** the careful study of the structure and behaviour of the physical world, especially by watching, measuring, and doing experiments, and the development of theories to describe the results of these activities
7. wedge	**g)** the scientific study of the body and how its parts are arranged
8. screw	**h)** a piece of metal, wood, rubber, etc. with a pointed edge at one end and a wide edge at the other, either pushed between two objects to keep them still or forced into something to break pieces off it

9. science	**i)** the conditions that you live or work in and the way that they influence how you feel or how effectively you can work
10. anatomy	**j)** a piece of equipment for moving heavy objects up or down, consisting of a small wheel over which a rope or chain attached to the object can be easily raised or lowered

3. Put the words in the correct word order

1. Leonardo da Vinci / an Italian / of / was / the High Renaissance / polymath /.
2. a genius / Leonardo / to have been / is / regarded / widely /.
3. Western art / is / as one of / the greatest / Leonardo / the history / painters / in / identified / of /.
4. The Mona Lisa / is / the best known / and / is / the world's / most famous / work / individual painting / his /.
5. religious / the most reproduced / all time / The Last Supper / is / painting / of /.
6. substantial discoveries / He / in anatomy / civil / geology / engineering / hydrodynamics / made / optics /.
7. Leonardo's / the year / both married / parents / after his birth / separately /.
8. Botticelli / contemporary / Leonardo / was / a / of /.
9. Leonardo / By 1472/ at the age / the Guild of Saint Luke / of 20 / in / qualified as a master /.
10. Clos Lucé / on 2 May 1519/ Leonardo / died / at / at / the age / of 67 /.

4. Match the word combination with the English equivalent

1. биомедицинская инженерия	**a)** amazing structures
2. удивительные конструкции	**b)** simple mechanisms
3. наклонная плоскость	**c)** promising future
4. простейшие механизмы	**d)** early civilizations
5. паровой двигатель	**e)** climate change
6. новая веха	**f)** earliest human engineering inventions
7. многообещающее будущее	**g)** biomedical engineering
8. ранние цивилизации	**h)** new milestone
9. изменения климата	**i)** steam engine
10. наиболее ранние инженерные изобретения человечества	**j)** inclined plane

5. Give the English equivalents

1. одна из самых быстроразвивающихся отраслей……..…….....
2. потребность людей в преобразовании окружающей среды …….....
3. один из самых известных инженеров всех времен …….....
4. начало промышленной революции связывают …….....
5. паровые машины начали использоваться в различных отраслях экономики …….....
6. новая веха в развитии машиностроения ……....
7. время социальных преобразований ……....
8. развитие робототехники и автоматизации …….....
9. зеленые технологии …….....
10. рост расходов на здравоохранение …….....

6. Prove the following statements

1. Engineering plays an important role in people's lives.
2. Engineering changes a lot.
3. Biomedical Engineering has the promising future.

V. TRANSLATE

1. Инженерное дело – одна из самых быстроразвивающихся отраслей в мире. …...……..
……
2. Инженерное дело прошло путь от изобретения рычага и колеса до робототехники и биомедицинской инженерии.....
.....
……

3. Возникновение инженерии связано с потребностью людей в преобразовании окружающей среды.....
…….....
……
4. Самыми первыми инженерными изобретениями человека были колесо, рычаг и шкив.....
……
……
5. Ранние цивилизации строили удивительные сооружения, используя шесть классических простых механизмов: рычаг, колесо и ось, блок, наклонную плоскость, клин и винт…….....
…….....
.....
…….....
6. В Средние века достижения науки и математики начали преображать инженерное дело.....
…….....
…….
7. Леонардо да Винчи, применял принципы анатомии, физики, оптики, математики для проектирования машин и других инженерных работ
…….....
…….
8. Начало промышленной революции связывают с изобретением парового двигателя.....
……..…..
9. XIX и XX века стали временем социальных преобразований, которые были бы невозможны без достижений науки и техники.…….....
.....
.....
10. С XIX веком связано возникновение электротехники, химической и гражданской инженерии. …….....
.....
.....
11. Развитие робототехники и автоматизации приведет к революции в производстве, транспорте, здравоохранении и других отраслях.....
.....
.....
.....

12. Изменение климата и экологические проблемы стимулируют развитие возобновляемых источников энергии, экологичного транспорта и строительных материалов.....

……..…….....

.....

VI. SPEAK

1. Interview

Student A is a famous engineer.
Student B is a journalist who asks about the changes in engineering.

2. Tell your groupmates about the history of engineering.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Robotics and Automation.
2. Green Technologies.
3. Biomedical Engineering.
4. Civil Engineering.
5. Mechanical Engineering.
6. Electrical Engineering.
7. Chemical Engineering.
8. Industrial Engineering.
9. Acoustical Engineering.
10. Computer Engineering.

UNIT 2

MEASUREMENT

Preview

Answer the questions. Then talk about your answers.

1. What is measurement?

2. What do you usually use for measurement?

3. What types of measurement do you know?

I. LISTENING AND READING

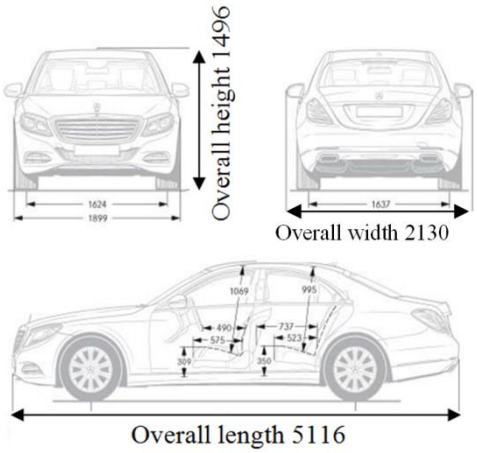
Listen to the text

Read and translate it

MEASUREMENT

Linear and angular dimensions

Dimensions are linear: length, width, height, depth, diameter, and radius; and angular – dimensions of corners. Linear dimensions are indicated on the drawing in millimeters, the unit of measurement is not indicated on the drawing. Angular dimensions shall be indicated in degrees, minutes and seconds with the unit of measurement indicated.



Mercedes Benz S 450

Overall length is the measurement of how long is the car in total. The measurement is taken between the two points that are furthest apart (the front and rear extremities), along the length of the car.

Overall width of the vehicle is determined by the distance between the side mirrors.

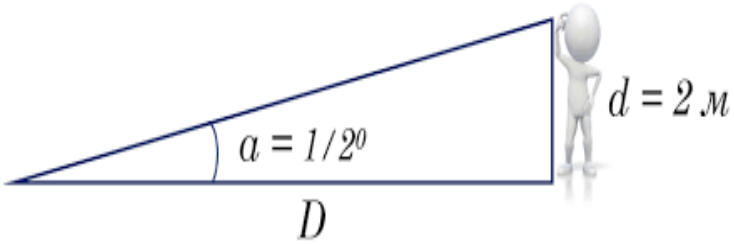
Overall height measures how tall the car is. The dimension is measured vertically between the underside of wheels and a horizontal plane through the top of the car's roof.

Depth is a linear dimension that defines the distance from the front of an object to its back.

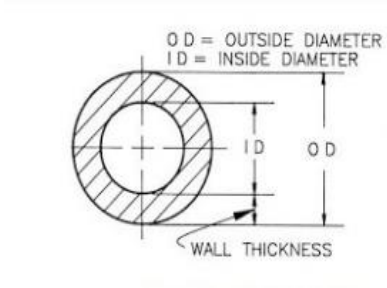
Diameter is a linear dimension that indicates the distance between two opposite points of an object passing through its center.

Radius is a segment or a distance connecting any point on a circle to its center.

Angular dimension is the angle between straight lines connecting diametrically opposite extreme points of the measured (observed) object and the observer's eye.



Pipe dimensions



Special terms are used to describe the circular dimensions of the pipe. The inside diameter of pipes is the width of the inner part. The outside diameter of pipes is the actual diameter of the pipe, taking into account the wall thickness.

[Text is adapted from URL: https://www.soliddna.com/SEHelp/ST5/EN/a_h/dim2a.htm]

II. VOCABULARY

VOCABULARY

1.	measurement [ˈmeʒəm(ə)nt] Linear dimensions are indicated on the drawing in millimeters [ˈmɪləˌmɪtəz], the unit of measurement is not indicated on the drawing.	измерение Линейные размеры указываются на чертеже в миллиметрах, единица измерения на чертеже не указывается.
2.	dimension [dɪˈmenʃ(ə)n] linear [ˈlɪnɪə] dimension angular [ˈæŋgjʊlə] dimension pipe [paɪp] dimension	размер линейный размер угловой размер размер трубы
3.	width [wɪtθ]	ширина
4.	diameter [daɪˈæmɪtə(r)] inside diameter outside diameter	диаметр внутренний диаметр внешний диаметр
5.	radius [ˈreɪdɪəs] Dimensions are linear: length, width, height [hait], depth, diameter, and radius; and angular – dimensions of corners.	радиус Размеры бывают линейными: длина, ширина, высота, глубина, диаметр и радиус; и угловыми – размеры углов.
6.	drawing [drɔːɪŋ]	рисунок
7.	to indicate [ˈɪndɪkeɪt] Angular dimensions shall be indicated in degrees, minutes and seconds.	указывать Угловые размеры указываются на чертеже в градусах, минутах или секундах.
8.	overall [ˌəʊvərˈɔːl]	полный, всеобъемлющий, габаритный

	overall length overall width overall height	габаритная длина габаритная ширина габаритная высота
9.	furthest [ˈfɜːðɪst]	самый дальний
10.	extremity [ɪkˈstremɪtɪ] front [frʌnt] extremity rear [rɪə] extremity	конечность, край, крайность крайняя передняя точка крайняя задняя точка
11.	side mirror [ˈmɪrə] Overall width of the vehicle [ˈviːɪk(ə)l] is determined by the distance between the side mirrors.	боковое зеркало Габаритная ширина автомобиля определяется расстоянием между боковыми зеркалами.
12.	vertically [ˈvɜːtɪkəlɪ] The dimension is measured vertically between the underside of wheels and a horizontal plane through the top of the car's roof.	вертикально, по вертикали Размер измеряется по вертикали между нижней частью колес и горизонтальной плоскостью, проходящей через верхнюю часть крыши автомобиля.
13.	segment [ˈsegmənt] A radius is a segment connecting any point on a circle to its center.	сегмент, отрезок, часть Радиус – это отрезок, соединяющий любую точку окружности с ее центром.
14.	straight [streɪt]	прямой
15.	circular [ˈsɜːkjʊlə] Special terms are used to describe the circular dimensions of the pipe.	круглый Для описания круговых размеров трубы используются специальные термины.
16.	inner [ɪnə] part	внутренняя часть
17.	wall thickness [ˈθɪknəs]	толщина стенки

III. READING COMPREHENSION

1. Answer the questions

1. Which dimensions are considered linear?
2. Which dimensions are considered angular?
3. What is indicated on the drawing in millimeters?
4. What isn’t indicated on the drawing?
5. What is indicated in degrees, minutes and seconds?

6. How do you determine the overall length?
7. How do you find the overall width?
8. What is diameter?
9. What terms are used to describe the circular dimensions of the pipe?
10. What is the inside diameter?
11. What is the outside diameter?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. Dimensions are linear and triangular.
2. Linear dimensions are not indicated on the drawing in millimeters.
3. Angular dimensions shall be indicated in degrees, minutes and seconds.
4. Overall width is the measurement of how short is the car in total.
5. Overall length is the measurement taken between two points that are furthest apart (the front and rear extremities), along the length of the car.
6. Overall length of the vehicle is determined by the distance between the side mirrors.
7. Overall width measures how tall the car is.
8. Depth is a linear dimension that defines the distance from the front of an object to its back.
9. Diameter is an angular dimension that indicates the distance between two opposite points of an object passing through its center.
10. A radius is a segment connecting any point on a circle to its edge.
11. Special terms are not used to describe the circular dimensions of the pipe.
12. The inside diameter of pipes is the actual diameter of the pipe, taking into account the wall thickness.

3. Complete the sentences

1. Dimensions are … .
2. Linear dimensions are … .
3. Angular dimensions shall be indicated … .
4. Overall length is … .
5. Overall width of the vehicle is … .
6. Overall height measures … .
7. Depth is … .
8. Diameter is … .
9. Radius is… .

10. Angular dimension is … .
11. The inside diameter of pipes is … .
12. The outside diameter of pipes is … .

IV. ANALYZE

1. Choose the correct word or word combination

1. Dimensions are linear and ….
a) angular b) triangular c) circular
2. … dimensions are indicated on the drawing in millimeters.
a) Circular b) Linear c) Triangular
3. Angular dimensions shall be indicated in …, minutes and seconds
a) degrees b) meters c) miles
4. Overall … is the measurement of how long is the car in total.
a) width b) height c) length
5. Overall height is measured … between the underside of wheels and a horizontal plane through the top of the car's roof.
a) horizontally b) vertically c) expertly
6. … is a linear dimension that defines the distance from the front of an object to its back.
a) Overall height b) Overall width c) Depth
7. … of the vehicle is determined by the distance between the side mirrors.
a) Overall height b) Overall width c) Depth
8. … is a linear dimension that indicates the distance between two opposite points of an object passing through its center.
a) Radius b) Diameter c) Depth
9. … is a segment connecting any point on a circle to its center.
a) Radius b) Diameter c) Depth
10. Special terms are used to describe the … dimensions of the pipe.
a) angular b) triangular c) circular
11. The … diameter of pipes is the width of the inner part.
a) inside b) outside c) medium

2. Match the word combination with the English equivalent

1. length	**a)** the length of a straight line through the center of an object
2. width	**b)** the longest dimension of an

		object
3.	height	**c)** a corner whether constituting a projecting part or a partially enclosed space
4.	depth	**d)** the distance from the bottom to the top of someone or something standing upright
5.	diameter	**e)** an outer side or surface
6.	radius	**f)** the horizontal measurement taken at right angles to the length
7.	vehicle	**g)** an interior or internal part or place **:** the part within
8.	angle	**h)** a means of carrying or transporting something
9.	inside	**i)** a line segment extending from the center of a circle or sphere to the circumference or bounding surface
10.	outside	**j)** the distance from the front to the back of something

3. Put the words in the correct word order

1. something / Capacity / is / much / holds / how /.
2. Capacity / usually measured / is / and / in / millilitres / litres /.
3. in a container / the amount / Volume / is / of space / liquid or gas / can take up /.
4. of matter / Mass / is / in / the amount / of / a measure / an object /.
5. grams / Mass / usually / in / is / or / kilograms / measured /.
6. the / shape / is / of / border / a / Perimeter /.
7. The perimeter / circumference / of / a / is / circle / its /.
8. a standard / with / must make / something / All measurements / a comparison / called /.
9. In English / system / the / is / a unit / inch / of / length /.
10. the / system / volume / cup / is / a unit / In English / of /.
11. In the 1790s France / measurement / developed / the / system / metric / of /.
12. The meter / length / is / unit / the / basic / of /.
13. weight / the / is / The gram / of / unit /.
14. volume / the / is / The liter / unit / of /.

4. Match the word combination with the English equivalent

1.	линейный размер	**a)**	outside diameter
2.	угловой размер	**b)**	overall length
3.	размер трубы	**c)**	linear dimension
4.	внутренний диаметр	**d)**	wall thickness
5.	внешний диаметр	**e)**	side mirror
6.	габаритная длина	**f)**	pipe dimension
7.	габаритная ширина	**g)**	overall width
8.	габаритная высота	**h)**	inside diameter
11.	боковое зеркало	**i)**	overall height
12.	толщина стенки	**j)**	angular dimension

5. Give the English equivalents

1. линейные размеры указываются на чертеже……
……..…….....
2. величина, определяющая расстояние…….
.....
3. между боковыми зеркалами……
…….....
4. единица измерения на чертеже не указывается……..
…….....
5. между нижней частью колес и горизонтальной плоскостью……
…….....
6. это фактический диаметр трубы с учетом толщины стенки……
…….....
7. расстояние от точки окружности до ее центра……..
…….....
8. верхняя часть крыши автомобиля……
…….....
9. это угол между прямыми линиями……
…….....
10. размеры указываются на чертеже в миллиметрах……..
…….....

6. Using the Internet, do some research and find at least 3 arguments to prove the following statements

1. Measurement has a long history.
2. Long ago, the idea of a universal measuring system didn't exist.

3. The names for many units of measurement were borrowed from human morphology.

V. TRANSLATE

1. Размеры бывают линейными и угловыми……
…….
…….

2. Линейные размеры указываются на чертеже в миллиметрах, единица измерения на чертеже не указывается.....
……
…….
…….

3. Угловые размеры указываются в градусах, минутах и секундах с указанием единицы измерения……..
…….
…….

4. Габаритная длина – это измерение общей длины автомобиля.....
…….
…….

5. Габаритная длина измеряется между двумя наиболее удаленными друг от друга точками (передняя и задняя конечности)……..
……...……
……

6. Габаритная ширина автомобиля определяется расстоянием между боковыми зеркалами……..
……
……

7. Габаритная высота измеряется по вертикали между нижней частью колес и горизонтальной плоскостью……
…….....
……

8. Глубина – линейная величина, определяющая расстояние от передней части объекта до его задней части…….
……

……..…

9. Диаметр – линейная величина, определяющая расстояние между двумя противоположными точками объекта, проходящее через его центр……...

……

.....

10. Радиус – это отрезок, соединяющий любую точку окружности с ее центром……..

……

.....

11. Для описания круговых размеров трубы используются специальные термины..……

.....

……

12. Внутренний диаметр труб – это ширина внутренней части……

……

.....

VI. SPEAK

1. Interview

Student A is an engineer.
Student B is a journalist who asks about the size of the new machine this engineer created.

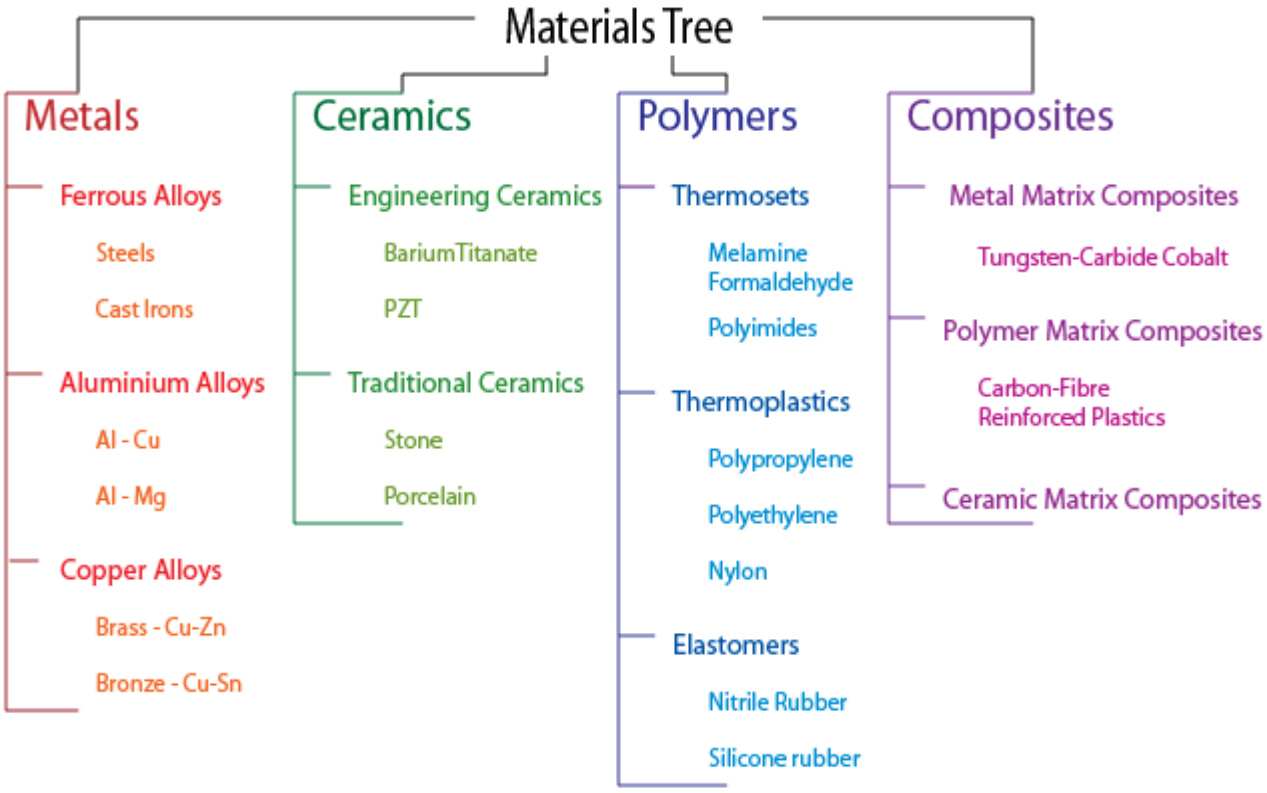
2. Tell your groupmates about measurement.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Introduction to Metrology.
2. Accuracy and Precision.
3. Basic Concepts of Metrology.
4. Industrial Metrology.
5. Scientific Metrology.

6. Mechanical Metrology.
7. Electrical Metrology.
8. Advances in Metrology (Laser).
9. Types of Metrology.
10. Necessity and Importance of Metrology.

UNIT 3



MATERIALS

Preview

Answer the questions. Then talk about your answers.

1. What kind of materials do you know?

2. What materials did ancient people use?

3. What do you know about intelligent materials?

I. LISTENING AND READING

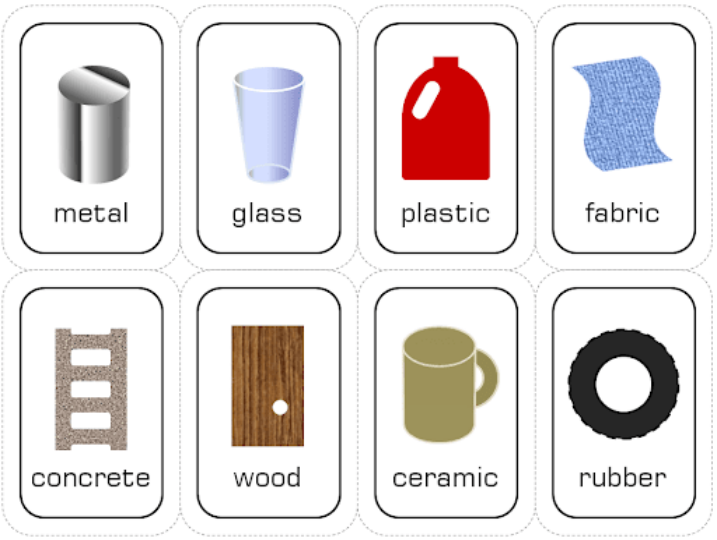
Listen to the text

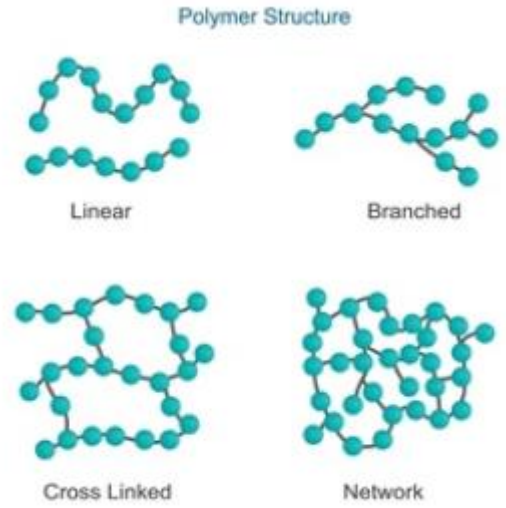
Read and translate it

MATERIALS

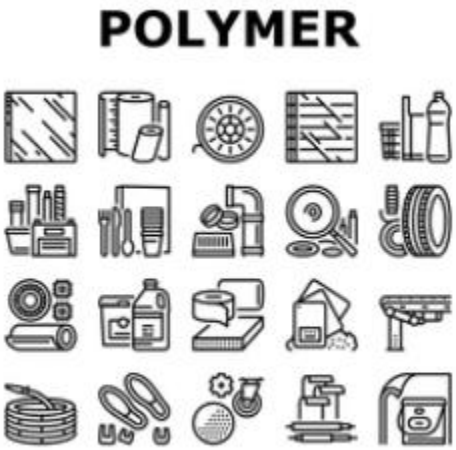
Let's remember the tale of the three piglets. Each of them wanted to build their own house to hide from the wolf. One of the piglets decided to build a house of straw. The other decided that the house would be stronger and warmer if it was built of twigs and thin rods. The third piglet picked up stones, mixed clay and built himself a sturdy house where he could shelter from wind, rain and frost. He made a heavy oak door with a dead bolt so that a wolf from the nearby forest could not get in. So, we can use wood, concrete, steel, glass, and other materials in construction.

It should be said that all materials are usually divided into metals and non-metals. Metals are simple substances in which atoms are connected by a metallic bond. Therefore, the presence of the metallic bond is a defining physical property of pure metals. Non-metals are all elements (and simple substances) that don't have any physical attributes of metals. Materials also include glass. It is a brittle, transparent substance, which is obtained in the process of melting sand.





The first composite material in history includes a building material used by the Egyptians. They added straw to clay bricks to make them stronger and prevent them from breaking. This can be called the first composite materials in history. Composite materials combine two or more components with different physical and chemical properties. They never mix or become homogeneous: there is a noticeable boundary between them. They are combined to give the final material improved properties, such as strength or resistance to negative environmental conditions. An example of a composite is reinforced concrete or glued plywood. Composites are stronger and lighter than their non-composite counterparts by combining different materials.



As for composite materials, mankind has long used polymers of natural origin without realizing it. This includes traditional materials used to sew clothes, as well as binding construction materials. Polymers are high molecular weight chemical compounds. They are made up of many repeating groups of atoms that are connected to each other. The production of polymers on an industrial scale only began in the 20th century.

II. NOTES AND VOCABULARY

Read the following notes

1.	materials [məˈtɪərɪəlz]	вещество, материалы, сырье
2.	wood [wʊd]	древесина, дерево
3.	concrete [ˈkɒŋkriːt]	бетон
4.	steel [stiːl]	сталь
5.	glass [glɑːs]	стекло
6.	metal [met(ə)l]	металл
7.	non-metal [ˌnɒnˈmet(ə)l]	неметаллический элемент
8.	composites [ˈkɒmpəzɪts]	композиты, композиционные

	материалы
9. glued [gluːd] plywood [ˈplaɪwʊd]	клеёная фанера
10. polymers [pɒlɪməz]	полимеры

VOCABULARY

1. straw [strɔː] One of the piglets decided to build a house of straw.	солома Один из поросят решил построить дом из соломы.
2. twig [twɪg]	веточка, прут
3. to pick up [pɪk ʌp]	поднимать, подбирать, собирать
4. sturdy [ˈstɜːdɪ]	крепкий, прочный
5. to shelter [ˈʃeltə] to shelter from wind, rain and frost	найти приют, укрыться укрыться от ветра, дождя, и мороза
6. dead bolt [ded bəʊlt] door with a deadbolt	дверной засов дверь с дверным засовом
7. substance [ˈsʌbst(ə)ns] brittle [ˈbrɪt(ə)l] substance	вещество хрупкое вещество
8. atom [ˈætəm]	атом
9. bond [bɒnd] metallic [mɪˈtælɪk] bond Metals are simple substances in which atoms are connected by a metallic bond.	связь металлическая связь Металлы – это простые вещества, в которых атомы соединены металлической связью.
10. therefore [ˈðeəfɔː]	поэтому, следовательно, потому
11. property [ˈprɒpətɪ] Therefore, the presence of the metallic bond is a defining physical property of pure metals.	свойство Поэтому наличие металлической связи является определяющим физическим свойством чистых металлов.
12. transparent [trænˈspær(ə)nt]	прозрачный, ясный
13. to obtain [əbˈteɪn]	получать, приобретать
14. to melt [melt]	плавить, растапливать

	melting sand It is a brittle, transparent substance which is obtained in the process of melting sand.	расплавленный песок Это хрупкое, прозрачное вещество, которое получают в процессе плавления песка.
15.	component [kəmˈpəʊnənt] Composite materials combine two or more components with different physical and chemical properties.	компонент, составная часть Композитные материалы сочетают в себе два или более компонентов с различными физическими и химическими свойствами.
16.	homogeneous [ˌhɒmə(ʊ)ˈdʒiːnɪəs] to become homogeneous	однородный, гомогенный становиться однородным
17.	boundary [ˈbaʊnd(ə)rɪ] noticeable boundary	граница заметная граница
18.	counterpart [ˈkaʊntəpɑːt] Composites are stronger and lighter than their non-composite counterparts by combining different materials.	аналог, эквивалент Композитные материалы прочнее и легче своих некомпозитных аналогов за счет сочетания различных материалов.
19.	to bind [baɪnd] This includes traditional materials used to sew clothes, as well as binding construction materials.	связывать, связать, привязывать К ним относятся традиционные материалы, используемые для пошива одежды, а также связующие строительные материалы.
20.	molecular [məˈlekjʊlə] Polymers are high molecular weight chemical compounds.	молекулярный Полимеры - это высокомолекулярные химические соединения.

III. READING COMPREHENSION

1. Answer the questions

1. What materials can we use in construction?
2. What two types of materials are commonly identified?
3. In which substance are the atoms connected by a metallic bond?

4. What is glass?
5. Who made the first composite material?
6. What was the first composite made of?
7. How many materials do composites combine?
8. What is there between different materials in composites?
9. What are the examples of composites?
10. When did the production of polymers begin?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. We can use water, sugar, and glass in construction.
2. Composites are usually divided into metals and non-metals.
3. Metals are simple substances in which atoms are not connected by a metallic bond.
4. The presence of the metallic bond is a defining physical property of pure metals.
5. Non-metals are all elements that are not polymers.
6. Steel is a brittle, transparent substance, which is obtained in the process of melting sand.
7. Egyptians added milk to clay bricks to make them stronger and prevent them from breaking.
8. Composite materials combine five or more components with different physical and chemical properties.
9. There is a noticeable boundary between components of composite materials.
10. Components of composite materials are combined to give the final material improved taste.
11. An example of a composite is reinforced concrete or glued plywood.
12. Polymers are low molecular weight chemical compounds that have a complex structure.
13. The production of polymers on an industrial scale only began in the 20th century.

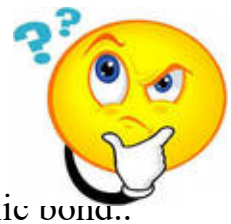
3. Complete the sentences

1. We can use wood, concrete … .
2. Materials are usually divided into … .
3. Metals are simple substances … .
4. The presence of the metallic bond is … .
5. Non-metals are … .
6. Glass is a brittle … .

7. The first composite material … .
8. Composite materials combine … .
9. Components never mix or become homogeneous … .
10. An example of a composite … .
11. Mankind has long used polymers … .
12. Polymers are … .

IV. ANALYZE

1. Choose the correct word or word combination



1. All materials are usually divided into … and non-metals.
a) glass b) metals c) air
2. … are simple substances in which atoms are connected by a metallic bond..
a) Metals b) Non-metals c) Glass
3. The presence of the metallic bond is a defining … property of pure metals.
a) biological b) physical c) psychological
4. … is brittle, transparent substance, which is obtained in the process of melting sand.
a) Steel b) Rubber c) Glass
5. The first composite material in history includes a building material used by the ….
a) Persians b) Romans c) Egyptians
6. Egyptians added … to clay bricks to make them stronger and prevent them from breaking.
a) milk b) straw c) sugar
7. Composite materials combine two or more components with different physical and … properties.
a) chemical b) psychological c) biological
8. Polymers are … molecular weight chemical compounds.
a) low b) medium c) high
9. … are made up of many repeating groups of atoms that are connected to each other.
a) Polymers b) Composites c) Metals
10. The production of polymers began in the … century.
a) 19th b) 20th c) 21st

2. Match the word combination with the English equivalent

1.	material	**a)** any of various amorphous materials formed from a melt by cooling to rigidity without crystallization
2.	concrete	**b)** a chemical compound or mixture of compounds formed by polymerization and consisting essentially of repeating structural units
3.	steel	**c)** the smallest particle of an element that can exist either alone or in combination
4.	glass	**d)** the elements, constituents, or substances of which something is composed or can be made
5.	metal	**e)** something that indicates or fixes a limit or extent
6.	composites	**f)** a solid material which is composed of two or more substances having different physical characteristics and in which each substance retains its identity while contributing desirable properties to the whole
7.	polymers	**g)** a hard strong building material made by mixing a cementing material (such as Portland cement) and a mineral aggregate (such as sand and gravel) with sufficient water to cause the cement to set and bind the entire mass
8.	atom	**h)** a quality or trait belonging and especially peculiar to an individual or thing
9.	property	**i)** any of various opaque, fusible, ductile, and typically lustrous substances that are good conductors of electricity and heat, form cations by loss of electrons, and yield basic oxides and hydroxides
10.	boundary	**j)** commercial iron that contains carbon in any amount up to about 1.7 percent as an essential alloying

constituent, is malleable when under suitable conditions, and is distinguished from cast iron by its malleability and lower carbon content

3. Put the words in the correct word order

1. The substance / material / used / something / to make / is called / a /.
2. carefully / Materials / that / have / considered / properties / have to be /.
3. artificial / may / Materials / or / natural / be /.
4. in the ground / Metals / precious gems / and / are taken / from / rocks /.
5. a mixture / Some / and / materials / are / of / nonliving / things / living /.
6. properties / can be / Materials / by / described / their /.
7. waterproof / and / Plastic / is / strong / durable /.
8. A physical property / that / a person / without / can measure / changing / is one / the material /.
9. Temperature / color / amount / properties / and / are examples / hardness / of / physical /.
10. a different substance / A chemical property / under / tells / how / will change / into / special / conditions / a material /.
11. insulators / others / are / Some materials / and / conductors / are /.

4. Match the word combination with the English equivalent

1. определяющее физическое свойство	**a)** simple substance
2. заметная граница	**b)** metallic bond
3. высокий молекулярный вес	**c)** defining physical property
4. строительный материал	**d)** transparent substance
5. прозрачное вещество	**e)** building material
6. простое вещество	**f)** prevent from breaking
7. предохранять от разрушения	**g)** chemical property
8. состояние окружающей среды	**h)** noticeable boundary
9. металлическая связь	**i)** environmental condition
10. химическое свойство	**j)** high molecular weight

5. Give the English equivalents

1. построить дом из соломы……..
……..…….....

2. построить дом из веток и тонких прутьев……
.....
3. использовать в строительстве дерево, бетон, сталь……
…….....
4. тяжелая дубовая дверь с засовом……..……..
…….....
5. материалы принято делить на ……..
…….....
6. наличие металлической связи……..……
…….....
7. процесс плавления песка……..
…….....
8. различные физические и химические свойства……
…….....
9. они не становятся однородными…….
…….....
10. устойчивость к негативным условиям окружающей среды ……..
…….....

6. Match the objects below to the materials they are made of

1.	**a)**	flip flops	**a)**	aluminum
2.	**b)**	panama hat	**b)**	brass
3.	**c)**	tie	**c)**	bronze
4.	**d)**	tube	**d)**	carbone fibre
5.	**e)**	mug	**e)**	cardboard
6.	**f)**	bridge	**f)**	clay
7.	**g)**	ceiling lamp	**g)**	concrete
8.	**h)**	cup	**h)**	copper
9.	**i)**	brooch	**i)**	cotton
10.	**j)**	bucket	**j)**	denim
11.	**k)**	bucket hat	**k)**	felt
12.	**l)**	bench	**l)**	fur
13.	**m)**	wallet	**m)**	glass
14.	**n)**	tank top	**n)**	gold
15.	**o)**	pocket watch	**o)**	iron
16.	**p)**	medal	**p)**	leather
17.	**q)**	tombstone	**q)**	marble
18.	**r)**	ball of yarn	**r)**	paper
19.	**s)**	wall	**s)**	plastic
20.	**t)**	box	**t)**	porcelain
21.	**u)**	candle	**u)**	rubber
22.	**v)**	saucepan	**v)**	sand
23.	**w)**	cannon	**w)**	silk
24.	**x)**	nail	**x)**	silver
25.	**y)**	plane	**y)**	steel
26.	**z)**	carpet	**z)**	stone
27.	**aa)**	castle	**aa)**	straw
28.	**bb)**	wire	**bb)**	wax
29.	**cc)**	ladder	**cc)**	wood
30.	**dd)**	helmet	**dd)**	wool

7. Prove the following statements

1. Polymers are applied in biological sciences.

2. Composite materials are widely used in industrial era.

3. By combining different materials, a composite is stronger and lighter than its non-composite counterparts.

V. TRANSLATE

1. В строительстве мы можем использовать дерево, бетон, сталь, стекло и другие материалы……..…….
…….
…….
2. Все материалы принято делить на металлы и неметаллы.....
…….
3. Металлы – это простые вещества, в которых атомы соединены металлической связью……..
…….
…….
4. Наличие металлической связи является определяющим физическим свойством чистых металлов.....
…….
…….
5. Стекло это хрупкое прозрачное вещество, которое получают в процессе плавления песка.…….
……...……
…….
6. К первым композитным материалам в истории относится строительный материал, который использовали египтяне.……
…….
…….
7. Композитные материалы сочетают в себе два или более компонентов с различными физическими и химическими свойствами.
…….....
…….
…….
8. Компоненты композитных материалов не смешиваются и не становятся однородными: между ними существует заметная граница……
…….
……...…
9. Примером композита может служить железобетон или клееная фанера……..
…….
.....

10. Благодаря сочетанию различных материалов композит становится прочнее и легче своих некомпозитных аналогов…….
……
.....
11. Человечество давно использует полимеры природного происхождения, даже не осознавая этого……
.....
……
12. Полимеры - это высокомолекулярные химические соединения, обладающие большим молекулярным весом…….....
……
.....
13. Полимеры состоят из множества повторяющихся групп атомов, соединенных между собой……..
……
.....
14. Производство полимеров в промышленных масштабах началось только в XX веке……...
……
.....

VI. SPEAK

1. Interview

Student A is an engineer.
Student B is a journalist who asks about materials.

2. Tell your groupmates about materials.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Ferrous Materials.
2. Non-ferrous Materials.
3. Polymers.
4. Ceramic.

5. Composites.
6. Glass.
7. Rubber.
8. Fabric.
9. Organics.
10. Leather.

UNIT 4

TOOLS

Preview

Answer the questions. Then talk about your answers.

1. Look at the picture above. Which of these tools have you used?

2. Do you use any other tools?

3. What tools can we use in the garden?

I. LISTENING AND READING

Listen to the text

Read and translate it

TOOLS

Alex Black is an auto mechanic. He is 33 years old. Five years ago he set up his own business – SERVICE STATION. He graduated from high school and then from a college. As a result of education he learned the basic functioning and maintenance of vehicles and their systems, information about engines, suspensions, transmissions, brakes, and air conditioning and heating. He knows that in order to work efficiently, an auto mechanic needs not only knowledge of technology, but also excellent tool skills. Safety, quality of work (repair, maintenance of vehicles), profitability of the service station and the salary of the specialist depend on what tools a mechanic knows how to use.

Alex uses hand tools, power tools, and diagnostic tools in his work. Alex uses ratchet wrench for fixing, clamping parts, as well as when performing assembly and disassembly (unscrewing and screwing) of threaded joints. For unscrewing and screwing fasteners, for working with bolts, nuts, screws, he uses wrenches. If Alex needs to cut a metal or plastic product, he uses wire cutters.

Like all car mechanics Alex uses a variety of power tools. These include: electric soldering irons, battery chargers, electric winches, lamps and flashlights. Also his workshop is equipped with diagnostic equipment: oscilloscope, motor tester and others.

He also uses various types of fasteners such as screws, bolts, nuts, washers, rivets, nails, and pins. Fasteners are used in a wide range of applications, from construction and manufacturing to household and automotive repairs. They are designed to provide a strong, secure connection between objects they are joining and typically require special tools for their installation and removal. Fasteners are made from a variety of materials,

including metal (carbon steel, stainless steel, aluminum, brass, copper alloys, etc.) and plastic.

Alex loves his job and is a professional at what he does. Five years ago he worked alone, but now he works with three auto mechanics in his service station.

II. NOTES AND VOCABULARY

Read the following notes

1.	mechanic [məˈkænɪk]	механик
2.	vehicle [ˈviːɪk(ə)l]	автомобиль
3.	engine [ˈendʒɪn]	двигатель, мотор
4.	suspension [səˈspenʃ(ə)n]	подвеска
5.	transmission [trænzˈmɪʃn]	коробка передач (трансмиссия)
6.	brakes [breɪks]	тормоза
7.	ratchet [ˈrætʃɪt] wrench [ren(t)ʃ]	ключ с трещоткой
8.	fastener [ˈfɑːsnə(r)]	зажим, крепёжная деталь
9.	aluminum [əˈluːmɪnəm]	алюминий
10.	brass [brɑːs]	латунь
11.	copper [ˈkɒpə] alloy [ˈælɔɪ]	медный сплав

VOCABULARY

1.	service [ˈsɜːvɪs] service station	обслуживание, сервис станция технического обслуживания (СТО)
2.	to graduate [ˈgrædʒʊeɪt] from	окончить учебное заведение
3.	maintenance [ˈmeɪnt(ə)nəns] As a result of education he learned the basic functioning and maintenance of vehicles and their systems, information about engines, suspensions, transmissions, brakes, and air conditioning and heating.	содержание и техническое обслуживание В результате обучения он изучил основы функционирования и обслуживания автомобилей и их систем, информацию о двигателях, подвесках, коробках передач, тормозах, кондиционировании и отоплении.

4.	to work efficiently [ɪˈfɪʃ(ə)ntlɪ]	работать продуктивно
5.	excellent [ˈeks(ə)l(ə)nt] excellent tool skills	отличный, превосходный отличные навыки работы с инструментом
6.	safety [ˈseɪftɪ]	безопасность
7.	profitability [ˌprɒfɪtəˈbɪlətɪ] Safety, quality of work (repair, maintenance of vehicles), profitability of the service station and the salary of the specialist depend on what tools a mechanic knows how to use.	прибыльность, рентабельность От того, какими инструментами умеет пользоваться механик, зависит безопасность, качество работы (ремонт, обслуживание автомобилей), рентабельность СТО и самого специалиста.
8.	tool [tuːl] hand tools power tools diagnostic [daɪəgˈnɒstɪk] tools	инструмент ручные инструменты электроинструменты диагностические инструменты
9.	to clamp [klæmp] Alex uses ratchet wrenches for fixing, clamping parts, as well as when performing assembly and disassembly (unscrewing and screwing) of threaded joints.	зажимать, скреплять Алекс использует ключи с трещоткой для фиксации, зажима деталей, а также при сборке и разборке (откручивании и закручивании) резьбовых соединений.
10.	screwing [ˈskruːɪŋ] unscrewing [ʌnˈskruːɪŋ]	закручивание, ввинчивание выкручивание, отвинчивание
11.	electric soldering [ˈsɒldərɪŋ] iron electric winch [wɪn(t)ʃ]	электропаяльник электрическая лебедка
12.	oscilloscope [əˈsɪləskəʊp] His workshop is equipped with diagnostic equipment: oscilloscope, motor tester and others.	осциллограф, осциллоскоп Его мастерская оснащена диагностическим оборудованием: осциллографом, мотор-тестером и др.
13.	rivet [ˈrɪvɪt] He also uses various types of fasteners such as screws, bolts, nuts, washers, rivets, nails, and pins.	заклепка Он также использует различные виды крепежа, такие как винты, болты, гайки, шайбы, заклепки, гвозди и штифты.

14.	to join [dʒɔɪn] They are designed to provide a strong, secure connection between objects they are joining and typically require special tools for their installation [ɪnstəˈleɪʃ(ə)n] and removal.	соединять Они предназначены для обеспечения прочного и надежного соединения объектов и обычно требуют специальных инструментов для их установки и снятия.
15.	steel [stiːl] carbon [ˈkɑːb(ə)n] steel stainless steel Fasteners are made from a variety of materials, including metal (carbon steel, stainless steel, aluminum, brass, copper alloys, etc.) and plastic.	сталь углеродистая сталь нержавеющая сталь Крепеж изготавливается из различных материалов, включая металл (углеродистая сталь, нержавеющая сталь, алюминий, латунь, медные сплавы и т. д.) и пластик.

III. READING COMPREHENSION

1. Answer the questions

1. What business did Alex start?
2. What did Alex learn?
3. Is knowledge of technology enough to work efficiently?
4. What determines safety and quality of a mechanic's work?
5. What types of tools does Alex use?
6. When does he use locksmith ratchets?
7. What does he use wrenches for?
8. Which power tools does Alex have?
9. Why is it important to use fasteners?
10. Does Alex work alone in his service?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. Alex Black is a doctor.
2. Ten years ago he set up his own business – a hospital.
3. As a result of education he learned a lot about food and cooking.

4. In order to work efficiently, an auto mechanic needs knowledge of technology only.
5. Alex uses nuclear tools in his work.
6. Alex uses rope for fixing, clamping parts.
7. For unscrewing and screwing fasteners, for working with bolts, nuts, screws, he uses a knife.
8. If Alex needs to cut a metal or plastic product, he uses a saw.
9. His workshop is equipped with tourist equipment: oscilloscope and motor boat.
10. Fasteners are usually made of glass and plastic.
11. Alex doesn't love his job and isn't a professional at what he does.

3. Complete the sentences

1. Alex uses hand tools … .
2. Alex uses locksmith ratchets … .
3. For unscrewing and screwing fasteners he uses… .
4. Like all car mechanics Alex uses … .
5. Fasteners are used … .
6. They are designed to provide … .
7. Fasteners are made from … .
8. Alex loves his job … .
9. Five years ago he … .
10. Now he works with three auto mechanics … .

IV. ANALYZE

1. Choose the correct word or word combination

1. Alex Black is … .
a) a doctor b) an auto mechanic c) a pilot
2. As a result of education he learned the basic functioning and maintenance of ... and their systems
a) vehicles b) planes c) bikes
3. He knows that in order to work …, an auto needs not only knowledge of technology, but also excellent tool skills.
a) efficiently b) slowly c) fast
4. Alex uses hand tools, power tools, and diagnostic tools in his ....
a) training b) study c) work
5. Alex uses .... for fixing, clamping parts

a) ratchet wrench b) hand tools c) rivet

6. If Alex needs to cut a metal or plastic product, he uses ....

a) ratchet wrench b) rivet c) wire cutters

7. Also his workshop is equipped with diagnostic equipment: ..., motor tester and others

a) ratchet wrench b) vehicles c) oscilloscope

8. Fasteners are used in a wide range of applications, from ... and manufacturing to household and automotive repairs.

a) construction b) design c) engineering

9. They are designed to provide a strong, secure connection ... objects they are joining and typically require special tools for their installation and removal

a) between b) under c) among

10. Fasteners are made from a variety of materials, including ... and plastic

a) paper b) metal c) wood

2. Match the word combination with the English equivalent

1.	vehicle	**a)** the part of a vehicle that uses energy from oil, electricity, or steam to make it move
2.	engine	**b)** a tool consisting of a metal handle and a socket, used for turning objects in one direction only
3.	suspension	**c)** the condition of not being in danger or not being dangerous
4.	transmission	**d)** something such as a car or bus that takes people from one place to another
5.	brakes	**e)** a device that represents a changing amount on a screen in the form of a line that moves up and down in curves
6.	ratchet wrench	**f)** the activity of keeping a building, vehicle, road, etc. in good condition by checking it regularly and repairing it when necessary
7.	fastener	**g)** a metal pin used to fasten flat pieces of metal or other thick materials such as leather

8.	maintenance	**h)**	the system in a car that moves power from its engine to its wheels
9.	safety	**i)**	a button, zip, or other device for temporarily joining together the parts or things
10.	rivet	**j)**	equipment that is fixed to the wheels of a vehicle in order to make it move smoothly
11.	oscilloscope	**k)**	the parts of the vehicle that make it stop or go more slowly

3. Put the words in the correct word order

1. the 12th / century / tool / The term / appeared / in / first /.
2. stone / tools / Undoubtedly / the first / were / from / made /.
3. hunting / were / Stone tools / mainly used / and / survival / for /.
4. Tool-making / developed / Age / in / process / the Bronze /.
5. in the Iron Age / It was / durable / that / tools / making / more / human started /.
6. There / a modern / and / between / saw / are / many / a stone knife / differences /.
7. the first / of creation / hand / is / tool / of / uncertain / The date /.
8. the first family / based on / Tools / vertical / are called / force / tools / of /.
9. An electric / tools / are / tools / power / drive / that / work / with /.
10. The first / tool / was / Egypt / made / power / in / ancient /.
11. modern power tool / was / The first / a combination / of / motor / an electrical drill / and / a / hand /.
12. various / About / years / ago / pneumatic / devices / invented / were / such as / the / pneumatic / 100 / mail / .
13. the first / In the 18th / compressor / century / was / reciprocating / built / .
14. to abandon / The latest / made / it / have / possible / technologies / cables / .

4. Match the word combination with the English equivalent

1.	открыть свой собственный бизнес	**a)**	to graduate from high school
2.	окончить среднюю школу	**b)**	the profitability of the service station
3.	основы функционирования и обслуживания автомобилей	**c)**	fasteners are made from a variety of materials
4.	отличное владение инструментами	**d)**	diagnostic equipment

5. рентабельность СТО
6. использовать трещоточный ключ для фиксации, зажима деталей
7. диагностическое оборудование
8. обеспечение прочного, надежного соединения
11. крепеж изготавливается из различных материалов
12. быть профессионалом в своем деле

e) excellent tool skills
f) to provide a strong, secure connection
g) to set up his own business
h) to be professional at what somebody does
i) to use ratchet wrench for fixing, clamping parts
j) the basic functioning and maintenance of vehicles

5. Give the English equivalents

1. работать продуктивно……...
2. ручные инструменты…….....
3. электроинструменты…….
4. диагностические инструменты……
5. углеродистая сталь…….
6. нержавеющая сталь……..……
7. алюминий и латунь……...
8. медный сплав…….
9. коробка передач (трансмиссия)……
10. ключ с трещоткой……
11. тормоза и подвеска……

6. Read and point the names of tools

VOCABULARY

1.	axe [æks]	топор
2.	back saw [ˈsɔː]	обратная пила
3.	saw	пила
4.	nail [neɪl]	гвоздь
5.	tool box	ящик для инструментов
6.	chain saw	цепная пила
7.	tester	тестер
8.	scissors [ˈsɪzəz]	ножницы
9.	nut [nʌt]	гайка
10.	bolt	болт

11.	screw [skru:]	винт
12.	spirit level	спиртовой уровень
13.	tape measure	рулетка
14.	hammer [ˈhæmə]	молоток
15.	corkscrew [ˈkɔ:kskru:]	штопор
16.	mallet [ˈmælɪt]	киянка
17.	step ladder [ˈlædə]	стремянка
18.	monkey wrench	гаечный ключ
19.	pipe wrench	трубный ключ
20.	nose pliers [ˈplaɪəz]	острогубцы
21.	cordless drill [drɪl]	аккумуляторная дрель
22.	spanner [ˈspænə]	гаечный ключ
23.	pliers	плоскогубцы
24.	screwdriver [skru:draɪvə]	отвёртка
25.	electric drill	электродрель

7. Prove the following statements

1. The first tools were made of stone.
2. Tool-making process developed in the Bronze Age.
3. The date of creation of the first hand tool is uncertain.

V. TRANSLATE

1. Алекс Блэк – автомеханик ……..……..
…….
2. Он окончил среднюю школу, а затем колледж…….
……
…….
3. В результате обучения он изучил основы функционирования и обслуживания автомобилей и их систем, информацию о двигателях, подвесках, трансмиссиях, тормозах и кондиционерах ……..
……..
……
……
4. Он знает, что для эффективной работы автомеханику необходимо не только знание технологий, но и отличное владение инструментами……
……
……
5. От того, какими инструментами механик умеет пользоваться, зависит безопасность, качество работы (ремонт, обслуживание автомобилей), рентабельность СТО и самого специалиста……
……...……
……
6. Алекс использует в своей работе ручные, электроинструменты и диагностические инструменты……..
……
……
7. Алекс использует трещоточный ключ для фиксации, зажима деталей, а также при выполнении сборки и разборки (откручивание и закручивание) резьбовых соединений…….....
……
……
8. Для откручивания и закручивания крепежа, для работы с болтами, гайками, винтами, он использует гаечные ключи. ……

……
……..…
9. К электроинструментам относятся: электрические паяльники, зарядные устройства, электрические лебедки, лампы и фонари…….
……
.....
10. Алекс использует различные виды крепежа: винты, болты, гайки, шайбы, заклепки, гвозди и штифты……
……
.....
11. Крепеж используется в самых разных областях, от строительства и производства до бытового и автомобильного ремонта…….
.....
……
12. Крепеж предназначен для обеспечения прочного, надежного соединения между предметами и, как правило, требует специальных инструментов для его установки и снятия……..
.....
……

13. Крепежи изготавливаются из различных материалов, включая металл (углеродистая сталь, нержавеющая сталь, алюминий, латунь, медные сплавы и т.д.) и пластик……..
……
.....
14. Алекс любит свою работу и является профессионалом в своем деле……..
……
.....

VI. SPEAK

1. Interview

Student A is an engineer.
Student B is a blogger who asks about tools.

.

2. Tell your groupmates about tools.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Hand Tools.
2. Measuring Tools.
3. Power Tools.
4. Fasteners.
5. Pneumatic Tools.
6. Gardening Tools.
7. Watering Tools.
8. Home Tools.
9. Painting Tools.
10. Cutting Tools.

UNIT 5

20Th CENTURY ENGINEERING

Preview

Answer the questions. Then talk about your answers.

1. What engineering inventions of 20th century do you know?

2. Did the radio and the television affect the major changes to social life?

3. How many of the 20th century's greatest engineering achievements do you use today?

I. LISTENING AND READING

Listen to the text

Read and translate it

20TH CENTURY ENGINEERING

Large Hadron Collider

Large Hadron Collider **(**LHC**)** is the world's most powerful particle accelerator. It was constructed by the European Organization for Nuclear Research (CERN) in the same 27-km (17-mile) tunnel that housed its Large Electron-Positron Collider (LEP). The tunnel is circular and is located 50–175 metres (165–575 feet) belowground on the border between France and Switzerland. The LHC ran its first test operation on September 10, 2008. It was turned off in 2018 for upgrades, and was switched on again on April 22, 2022, with higher power and double the collision rate.

[Text is adapted from URL: https://www.britannica.com/technology/Large-Hadron-Collider]

Dubai Islands

Dubai Islands are an archipelago of artificial islands. The archipelago is located in the United Arab Emirates, in the Emirate of Dubai. It includes three large islands, each shaped like a palm tree:

- Palm Jumeirah,
- Palm Jebel Ali,
- Palma Deira.

Between the islands there are also artificial archipelagos "World" and "Universe" of small islands.

Akashi Kaikyo

Akashi-Kaikyo is a suspension bridge in Japan that crosses the Akashi Strait and connects the city of Kobe on Honshu Island with the city of Awaji on Awaji Island.

It is part of one of three highways connecting Honshu and Shikoku.

The bridge is the longest suspension bridge in the world: its total length is 3911 meters, the central span is 1991 meters long, and the side spans are 960 meters long. The height of the pylons is 298 meters.

Channel Tunnel (Eurotunnel)

Channel Tunnel (Eurotunnel) is one of the biggest engineering projects ever undertaken in the UK. It was opened in May 1994 after six years of construction and it is the longest undersea tunnel in the world. It's a double-track railway tunnel, about 51 km long, of which 39 km are under the English Channel. It connects continental Europe with Great Britain by rail. Thanks to the tunnel it became possible to visit London from Paris in only 2 hours and 15 minutes; trains stay in the tunnel from 20 to 35 minutes.

II. NOTES AND VOCABULARY

Read the following notes

1.	Hadron [ˈhadrɒn] Collider [kəˈlaɪdə]	адронный коллайдер
2.	European [jʊərəˈpiːən] Organization [ɔːg(ə)naɪˈzeɪʃ(ə)n] for Nuclear [ˈnjuːklɪə] Research [ˈriːsɜːtʃ]	Европейская организация ядерных исследований
3.	Electron-Positron [ɪˈlektrɒn ˈpɒzɪtrɒn] Collider	электронно-позитронный коллайдер
4.	Dubai [d(j)uːˈbaɪ]	Дубай
5.	United Arab [ˈærəb] Emirates [ˈemərəts]	Объединенные Арабские Эмираты
6.	Palm [pɑːm] Jumeirah [dʒuˈmeira]	Пальма Джумейра

7.	Palm Jebel [ˈdʒebəl] Ali [ali]	Пальма Джебель Али
8.	Palma Deira	Пальма Дейра
9.	Akashi-Kaikyo [aˈkashi ˈkaikiəu]	Ака́си-Кайкё
10.	Kobe [ˈkəʊbɪ]	Кобе
11.	Honshu [ˈhɒnʃuː]	Хонсю
12.	Awaji [aˈwɒji]	Авадзи
13.	Shikoku [ʃɪˈkəʊkuː]	Сикоку

VOCABULARY

1.	accelerator [əkˈseləreɪtə] particle accelerator	ускоритель ускоритель заряженных частиц
2.	tunnel [ˈtʌn(ə)l] undersea tunnel double-track railway tunnel	туннель подводный туннель двухпутный железнодорожный туннель
3.	circular [ˈsɜːkjʊlə]	круговой
4.	belowground [bɪˈləʊgraʊnd]	подземный
5.	to upgrade [ˌʌpˈgreɪd]	модернизировать
6.	to switch [swɪtʃ] on	включать
7.	collision [kəˈlɪʒn] collision rate	столкновение частота столкновений
8.	archipelago [ˌɑːkɪˈpeləgəʊ]	архипелаг
9.	artificial [ɑːtɪˈfɪʃ(ə)l] Dubai Islands are an archipelago of artificial islands.	искусственный Острова Дубай – это архипелаг искусственных островов.
10.	suspension bridge [brɪdʒ] Akashi-Kaikyo is a suspension bridge.	подвесной мост Акаси-Кайкё – подвесной мост.
11.	highway [ˈhaɪweɪ] It is part of one of three highways connecting Honshu and Shikoku.	шоссе Это часть одного из трех шоссе, соединяющих Хонсю и Сикоку.
12.	pylon [ˈpaɪlən] The height of the pylons is 298 meters.	пилон Высота пилонов составляет 298 метров.
13.	to undertake [ʌndəˈteɪk] Channel Tunnel is one of the biggest engineering projects ever undertaken in the UK.	предпринять Туннель под Ла-Маншем - один из крупнейших инженерных проектов, когда-либо

	осуществлявшихся в Великобритании.
14. continental [kɒntɪˈnent(ə)l] It connects continental Europe with Great Britain by rail.	контитентальный Он соединяет континентальную Европу с Великобританией по железной дороге.

III. READING COMPREHENSION

1. Answer the questions

1. What is the world's most powerful particle accelerator?
2. When was LHC constructed?
3. Whom was LHC constructed by?
4. What is the form of the tunnel?
5. How long is the tunnel?
6. Where is the tunnel located?
7. When was the LHC switched on again?
8. Where are Dubai Islands located?
9. How many islands does archipelago encompass?
10. What is Akashi-Kaikyo?
11. Where is the longest suspension bridge located?
12. What is the height of the bridge's pylons?
13. When was Eurotunnel opened?
14. How many years did it take to construct Eurotunnel?
15. What kind of railway is there in Eurotunnel?
16. How long does it take to get to London from Paris?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. Large Hadron Collider **(**LHC**)** is the world’s most powerful particle engine.
2. The tunnel is square and is located 50–175 metres (165–575 feet) belowground on the border between France and Switzerland.
3. The LHC finished its test operation on September 10, 2008.
4. Dubai Islands are an archipelago of natural islands.
5. Dubai Islands are located in the USA.
6. The archipelago includes five large islands, each shaped like a palm tree.

7. Akashi-Kaikyo is a stringer bridge in Japan that crosses the Akashi Strait and connects the city of Kobe on Honshu Island with the city of Awaji on Awaji Island.
8. The bridge is the shortest suspension bridge in the world.
9. The diameter of the pylons is 298 meters.
10. Channel Tunnel (Eurotunnel) is one of the biggest engineering projects ever undertaken in the United Arab Emirates.
11. Eurotunnel was opened in October 2004 after six years of construction and is the longest undersea tunnel in the world.
12. Eurotunnel connects continental Europe with Great Britain by rail.
13. Alex doesn't love his job and isn't a professional at what he does.

3. Complete the sentences

1. Large Hadron Collider **(**LHC**)** is … .
2. The Large Hadron Collider (LHC) was constructed … .
3. The tunnel is circular and is located … .
4. Dubai Islands are … .
5. Archipelago is located in the … .
6. They are designed to provide … .
7. Between the islands there are … .
8. Akashi-Kaikyo is … .
9. Akashi-Kaikyo is part of one of three highways … .
10. The bridge is … .
11. Channel Tunnel (Eurotunnel) is one of the biggest … .
12. Eurotunnel was opened in May 1994 … .
13. Eurotunnel is the longest undersea … .
14. Eurotunnel connects continental Europe with … .
15. Thanks to the tunnel it … .

IV. ANALYZE

1. Choose the correct word or word combination

1. Large Hadron Collider is the world's most powerful particle ....
a) machine b) engine c) accelerator
2. The tunnel is circular and is located 50–175 metres (165–575 feet) belowground on the border between France and ....
a) Switzerland b) Austria c) Germany

3. The LHC ran its first test operation on ... 10, 2008.

a) September b) October c) November

4. Dubai Islands are an archipelago of artificial ....

a) peninsulas b) islands c) continents

5. The archipelago includes ... large islands.

a) seven b) three c) ten

6. Akashi-Kaikyo is a ... bridge in Japan

a) suspension b) stringer c) desk-cantilever

7. Akashi-Kaikyo is the ... suspension bridge in the world.

a) most beautiful b) shortest c) longest

8. Channel Tunnel is one of the biggest engineering projects ever undertaken in the ....

a) UK b) USA c) UAE

9. Channel Tunnel is the longest ... tunnel in the world.

a) underground b) undersea c) suspension

10. Channel Tunnel connects continental Europe with ... by rail.

a) South America b) North America c) Great Britain

2. Match the word combination with the English equivalent

1.	accelerator	**a)**	below the surface of the earth
2.	tunnel	**b)**	a public road, especially an important road that joins cities or towns together
3.	belowground	**c)**	equipment attached to the wheels of a vehicle that reduces the uncomfortable effects of going over road surfaces that are not even
4.	archipelago	**d)**	in physics, a machine that makes particles move very fast
5.	artificial	**e)**	usually involves running one track in each direction, compared to a single-track railway where trains in both directions share the same track
6.	suspension	**f)**	made by people, often as a copy of something natural
7.	highway	**g)**	a line that has been agreed to divide one country from another
8.	span	**h)**	a group of small islands or an area

		of sea in which there are many small islands
9.	double-track railway	**i)** the area of a bridge, etc. between two supports
10.	border	**j)** a tall, metal structure used as a support
11.	pylon	**k)** a long passage under or through the ground, especially one made by people

3. Put the words in the correct word order

1. nowadays / Power / and / available / from coal / is / oil / water / wind /.
2. running / Electricity / the factories / keeps / and / appliances / home /.
3. in / widely / Automobiles / used / the 20th / century / became /.
4. time / transportation / Automobile / changed / of / place / notions / distance / and /.
5. aeronautical engineering / Advances / oceans / in / the safety and comfort / improved / and / across / all the continents /.
6. relatively / Flying / has / of / common / become / for / millions / people /.
7. the populations / grew / Water / as / was / great / demand / in /.
8. 1948 / The transistor / invented / in / at / was / Bell Telephone / labs /.
9. led / to electronic devices / every / that have altered / aspect / of / The transistor / daily life /.
10. major / and / Radio / resulted / in / changes / to / social / television / life /.
11. sputnik / exploration / was / orbited / launched / the first / Space / spacecraft / the earth / when /.
12. developed / The network / was / scientists / originally / by / help / share / to / the military / information /.
13. World Wide Web / Now / the / / is / to / everyone / open /.
14. became / Petroleum / of / that / the century / ran / industrial / automobiles / and / machines / the fuel /.

4. Match the word combination with the English equivalent

1. мощный ускоритель частиц	**a)** an archipelago of artificial islands
2. архипелаг искусственных островов	**b)** Large Hadron Collider

3. удвоенная частота столкновений	**c)** a double-track railway
4. подвесной мост в Японии	**d)** to connect continental Europe with Great Britain
5. большой адронный коллайдер	**e)** to visit London from Paris
6. длина центрального пролета	**f)** double the collision rate
7. длина боковых пролетов	**g)** the central span length
8. двухпутный железнодорожный туннель	**h)** powerful particle accelerator
9. соединять континентальную Европу с Великобританией	**i)** is a suspension bridge in Japan
10. добраться до Лондона из Парижа	**j)** the side spans length

5. Give the English equivalents

1. самый длинный подводный туннель……
……..
2. самый мощный в мире……..
…….....
3. туннель имеет круглую форму……
…….
4. первая тестовая операция…….
5. архипелаг расположен в Объединенных Арабских Эмиратах…….
…….
6. архипелаг включает в себя три больших острова……..
……..……..
7. общая длина моста…….....
8. туннель под Ла-Маншем……
…….
9. соединять Хонсю и Сикоку……..
10. пересекать пролив Акаси и соединять город Кобе с городом Авадзи
…….

6. Prove the following statements

1. The engineers are the people who used existing knowledge to make something new.

2. The electric dishwasher is the best invention of the 20th century.
3. Large Hadron Collider is the most famous **e**ngineering achievement of the 20th century.

V. TRANSLATE

1. Большой адронный коллайдер – самый мощный в мире ускоритель частиц ……...……
…….
…….

2. Большой адронный коллайдер построен Европейской организацией ядерных исследований
……..
…….
……

3. Туннель имеет круглую форму и расположен на глубине 50-175 метров (165-575 футов) под землей на границе Франции и Швейцарии..…….
……..
……

4. Дубайские острова – архипелаг искусственных островов.……
……
……

5. Архипелаг включает в себя три больших острова, каждый из которых имеет форму пальмы ……
……...……
……

6. Между островами расположены искусственные архипелаги «Мир» и «Вселенная» из небольших островов……
……..
……

7. Акаси-Кайкё - подвесной мост в Японии, который пересекает пролив Акаси и соединяет город Кобе на острове Хонсю с городом Авадзи на острове Авадзи
……
……
……

8. Акаси-Кайкё является частью одной из трех магистралей, соединяющих Хонсю и Сикоку……
……

……..…

9. Тоннель под Ла-Маншем (Евротоннель) - один из крупнейших инженерных проектов, когда-либо реализованных в Великобритании…….

……

.....

10. Евротоннель – это двухпутный железнодорожный тоннель длиной около 51 км, из которых 39 км проходят под Ла-Маншем……

……

.....

11. Евротоннель соединяет континентальную Европу с Великобританией по железной дороге……

.....

……

12. Благодаря тоннелю стало возможным добраться до Лондона из Парижа всего за 2 часа 15 минут; поезда находятся в тоннеле от 20 до 35 минут……

.....

……

VI. SPEAK

1. Interview

Student A is an engineer.
Student B is a journalist who asks about 20th century engineering.

.

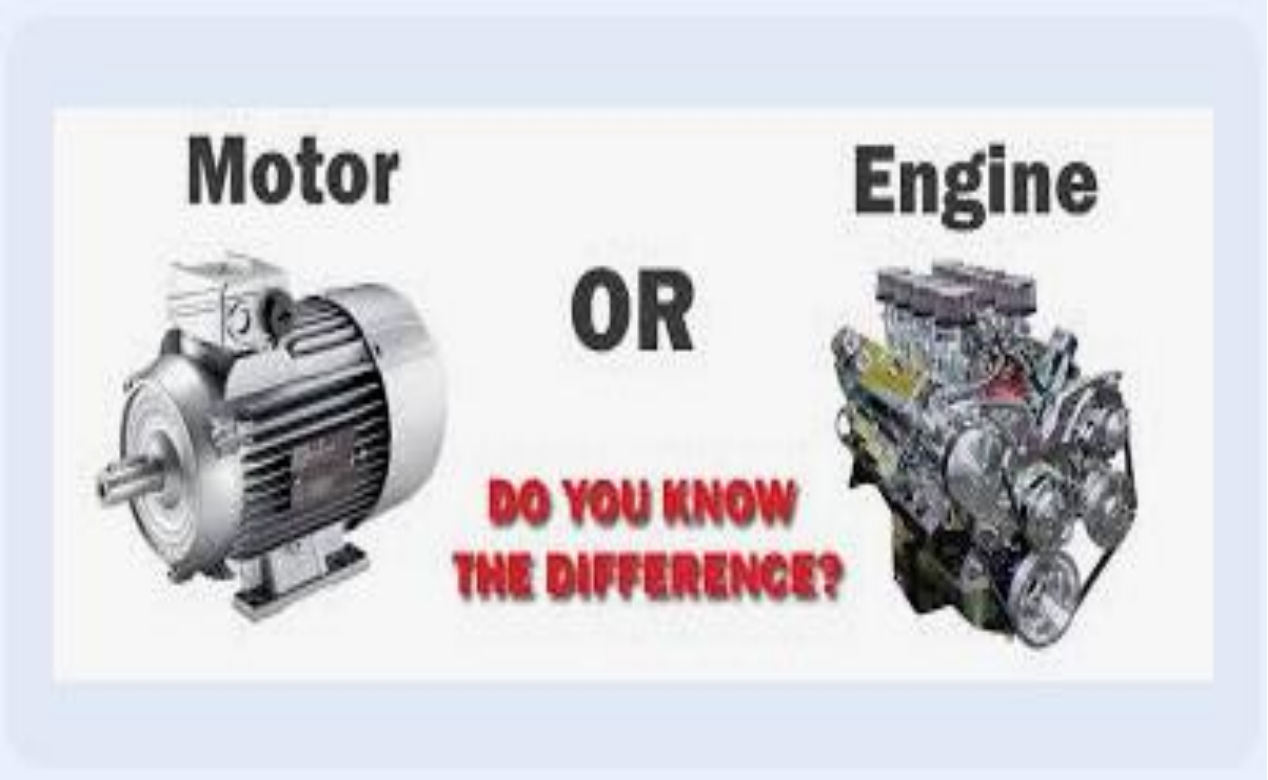
2. Tell your groupmates about 20th century engineering.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Electricity.
2. Radio and Television.
3. Agricultural Mechanization.
4. The Telephone.

5. Computers.
6. Air Conditioning.
7. Refrigeration.
8. Imaging Technology.
9. Spacecrafts.
10. Household Appliances.

UNIT 6



ENGINES AND MOTORS

Preview

Answer the questions. Then talk about your answers.

1. What is the difference between a motor and an engine?

2. What came first: a motor or an engine?

3. How do we use a motor and an engine nowadays?

I. LISTENING AND READING

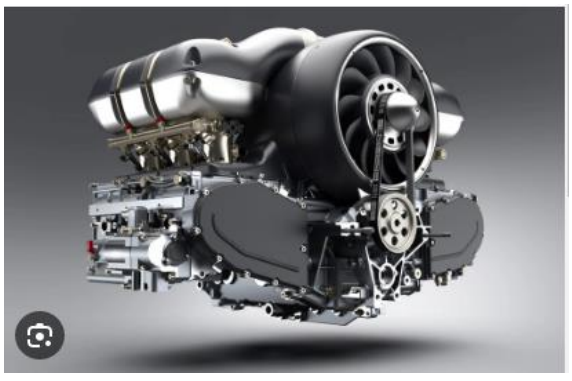
Listen to the text

Read and translate it

ENGINES AND MOTORS

What is an engine? An engine is a machine that makes energy more usable. Engines usually turn heat energy into motion. Do you know what the first engine was? It was a water wheel used for irrigation systems in the countries of the Ancient East, Egypt, China, and India. In the Middle Ages, wind turbines were widely used. Both of these engines are very economical. They do not need fuel in order to function. But they are dependent on the weather.

In the middle of the 17th century, scientists from England, France and Russia worked on the invention of the steam engine. In 1763, the Russian mechanic Ivan Ivanovich Polzunov made a stationary continuous steam machine according to his own design. Two cylinders were twinned and alternately filled with steam, eliminating the need for a water wheel. The steam engine powered all sorts of machinery, such as steamboats and steam locomotives. Steam engines were overweight and had low efficiency. They were replaced by the internal combustion engine.



The internal combustion engine is used today in automobiles, diesel locomotives and motor ships. Modern airplanes are equipped with a jet engine. It is made of very strong metal so that it does not melt, as the temperature of combustion in it reaches more than a thousand degrees.

Engines are sometimes called motors. Some people like to be more specific with the word motor. They only use the term motor to mean engines powered by electricity. Electric motors consist of two mechanical parts – a stator, or stationary part, and a rotor, or revolving part – and two sets of electrical windings – the field and the armature. Electromagnetic fields set up

across the air gap between the stator and rotor interact with each other and produce the torque, or turning force, that rotates the motor. The power output is the product of the torque and rotational speed. A motor is classified as DC (direct current) or AC (alternating current), depending on its power source.

II. NOTES AND VOCABULARY

Read the following notes

1.	Ancient [ˈeɪnʃ(ə)nt] East	древний восток
2.	Egypt [ˈiːdʒɪpt]	Египет
3.	China [ˈtʃaɪnə]	Китай
4.	India [ˈɪndɪə]	Индия

VOCABULARY

1.	motion [ˈməʊʃ(ə)n] Engines usually turn heat energy into motion.	движение Двигатели обычно превращают тепловую энергию в движение.
2.	irrigation [ɪrɪˈgeɪʃ(ə)n] irrigation systems	ирригация, орошение, полив ирригационные системы
3.	fuel [ˈfjuːəl] They do not need fuel in order to function [ˈfʌŋ(k)ʃ(ə)n].	топливо Им не нужно топливо, чтобы функционировать.
4.	scientist [ˈsaɪəntɪst]	ученый
5.	continuous [kənˈtɪnjʊəs] stationary continuous steam machine	длительный, непрерывный стационарная паровая машина непрерывного действия
6.	cylinder [ˈsɪlɪndə]	цилиндр
7.	to twin [twɪn]	сдваивать
8.	alternately [ɔːlˈtɜːnətlɪ]	попеременно
9.	to eliminate [ɪˈlɪmɪneɪt] Two cylinders were twinned and alternately filled with steam, eliminating the need for a water wheel.	устранять Два цилиндра были сдвоены и попеременно наполнялись паром, что устраняло необходимость в водяном колесе.
10.	machinery [məˈʃiːn(ə)rɪ]	машины, механизм, машинное

	оборудование
11. locomotive [ləʊkəˈməʊtɪv]	локомотив
12. combustion [kəmˈbʌstʃ(ə)n] internal combustion engine	сгорание, горение двигатель внутреннего сгорания
13. to be equipped [ɪˈkwɪpt] with smth	быть оборудованным ч-л
14. jet [ˈdʒet] engine Modern airplanes are equipped with a jet engine.	реактивный двигатель Современные самолеты оснащены реактивным двигателем.
15. motor [ˈməʊtə] Engines are sometimes called motors.	двигатель, мотор Двигатели иногда называют моторами.
16. stator [ˈsteɪtə]	статор, неподвижный направляющий аппарат
17. armature [ˈɑːmətʃə] Electric motors consist of two mechanical parts – a stator, or stationary part, and a rotor, or revolving part – and two sets of electrical windings – the field and the armature.	якорь (в электротехнике) Электродвигатели состоят из двух механических частей - статора, или неподвижной части, и ротора, или вращающейся части, – и двух наборов электрических обмоток – поля и якоря.
18. electromagnetic [ɪˌlektrə(ʊ)mægˈnetɪk] field	электромагнитное поле
19. torque [tɔːk]	вращающий момент
20. direct current (DC) alternating current (AC) A motor is classified as DC (direct current) or AC (alternating current), depending on its power source.	постоянный ток переменный ток В зависимости от источника питания двигатель классифицируется как двигатель постоянного или переменного тока.

III. READING COMPREHENSION

1. Answer the questions

1. What is an engine?

2. Where was a water wheel used?
3. What was a water wheel used for?
4. Do a water wheel and a wind engine need fuel to function?
5. Why do they depend on the weather?
6. Who made a stationary continuous steam machine?
7. What machinery did a steam engine power?
8. What was a steam engine replaced by?
9. Where is the internal combustion engine used today?
10. Why is a jet engine made of very strong metal?
11. How do some people use the term motor?
12. How many mechanical parts do electric motors consist of?
13. What is the power output?
14. How is a motor classified?

2. Read the statements and say whether they are true (T) or false (F). Correct the false ones

1. An engine is a machine that makes water usable.
2. Engines usually turn heat energy into motion.
3. In the Middle Ages, water wheels were widely used.
4. Wind engines need fuel in order to function.
5. In the middle of the 17th century, scientists worked on the invention of the steam engine.
6. In 1763, the Russian doctor Ivan Ivanovich Polzunov made a stationary continuous steam machine according to his own design.
7. The steam engine powered only certain sorts of machinery.
8. Steam engines were light and had high efficiency.
9. The internal combustion engine is used today in automobiles, diesel locomotives and motor ships.
10. Modern airplanes are equipped with a jet engine.
11. A jet engine is made of very strong wood.
12. Engines are never called motors.
13. Electric motors consist of three mechanical parts.
14. The power output is the product of the torque and rotational speed.
15. A motor is classified as HE (high efficiency) or LE (low efficiency), depending on its power source.

3. Complete the sentences

1. An engine is… .
2. A water wheel used … .
3. In the middle of the 17th century … .
4. In 1763, the Russian mechanic Ivan Ivanovich Polzunov … .
5. Two cylinders were twinned … .
6. The steam engine … .
7. The internal combustion engine is … .
8. Modern airplanes are equipped … .
9. Engines are sometimes … .
10. Electric motors consist of … .
11. Electromagnetic fields set up … .
12. A motor is classified … .

IV. ANALYZE

1. Choose the correct word or word combination

1. An engine is a machine that makes … more usable
a) energy b) water c) light
2. … was used for irrigation systems in the countries of the Ancient East, Egypt, China, and India.
a) A motor b) An engine c) A water wheel
3. A water wheel and wind engines are dependent on the ….
a) weather b) Sun c) Moon
4. In the middle of the … century, scientists from England, France and Russia worked on the invention of the steam engine.
a) 15th b) 17th c) 18th
5. The steam engine powered … sorts of machinery, such as steamboats and steam locomotives.
a) all b) some c) best
6. The … combustion engine is used today in automobiles, diesel locomotives and motor ships.
a) external b) internal c) output
7. Engines are sometimes called ….
a) candles b) desks c) motors
8. Electric motors consist of … mechanical parts.
a) five b) seven c) two
9. Electromagnetic fields produce the ….
a) sound b) torque c) light

10. A motor is classified as DC (direct current) or AC (alternating current), depending on its power ….

a) source b) color c) taste

2. Match the word combination with the English equivalent

1.	motion	**a)** a substance that is used to provide heat or power, usually by being burned
2.	irrigation	**b)** a device that changes electricity or fuel into movement and makes a machine work
3.	fuel	**c)** a solid or hollow tube with long straight sides and two circular ends the same size, or an object shaped like this, often used as a container
4.	cylinder	**d)** the stationary part of a rotary system
5.	machinery	**e)** a part of a machine that spins, especially the device supporting the turning blades of a helicopter
6.	locomotive	**f)** the act or process of moving, or a particular action or movement
7.	combustion	**g)** part of a dynamo (a device hanging movement into electricity) or electric motor
8.	motor	**h)** a force that causes something to rotate
9.	stator	**i)** a movement of water, air, or electricity in a particular direction
10.	rotor	**j)** the engine of a train
11.	armature	**k)** the process of burning
12.	torque	**l)** a machine that uses the energy from liquid fuel or steam to produce movement
13.	current	**m)** the practice of supplying land with water so that crops and plants will grow
14.	engine	**n)** a group of machines, or the

movable parts of a machine

3. Put the words in the correct word order

1. between / What / is / a motor / the difference / an engine / and / ?

2. classical / in / is / rooted / the Latin / «movere» / Motor / to move / .

3. It / first / referred / to / force / motor / propulsive / .

4. Motor / to / later / the person / or / referred / moved / device / that / something / .

5. came / French / through / English / into / The word / .

6. It / used / in / was / of «initiator» / the sense / .

7. a political / could / be / A person / organization / the motor / of / .

8. Engine / is / «ingenium» / from / intellect / character / the Latin / or / .

9. in / 1380 / The related / word / was / first / «engineer» / used / .

10. In the 15th / engine / also / century / referred / physical / to / a / device / .

11.19th / of / motor / engine / and / century / had / already / begun / to / the meanings / converge / In the early / .

12. synonymous / Today / are / the words / virtually /.

4. Match the word combination with the English equivalent

1. делать энергию более полезной	**a)** an irrigation system
2. превращать тепловую энергию в движение	**b)** an internal combustion engine
3. водяное колесо	**c)** to make energy more usable
4. ирригационная система	**d)** an electromagnetic field
5. ветряной двигатель	**e)** a jet engine
6. паровой двигатель	**f)** a power output
7. стационарная паровая машина непрерывного действия	**g)** to turn heat energy into motion
8. двигатель внутреннего сгорания	**h)** a wind engine
11. реактивный двигатель	**i)** a direct current motor
12. электромагнитное поле	**j)** an alternating current motor
13. выходная мощность	**k)** a stationary continuous steam machine
14. двигатель постоянного тока	**l)** a steam engine

15. двигатель переменного тока **m)** a water wheel

5. Give the English equivalents

1. двигатель ……
……
2. двигатели превращают……
……
3. оба двигателя ……
……
4. зависеть от погоды.....
……
5. топливо для работы.....
……
6. изобретение парового двигателя …….....
……
7. изготовить по собственному проекту.....
……
8. наполняться паром.....
……
9. приводить в движение механизмы…….....
……
10. прочный металл…….....
……
11. температура горения.....
12. электромагнитное поле……
13. создавать крутящий момент.....
……
14. в зависимости от источника питания.....
……

6. Prove the following statements

1. The motor and the engine are not the same.
2. Both the motors and the engines modify and convert the energy to produce motion.

3. A lot of people do not know much about the difference between an engine and a motor.

V. TRANSLATE

1. Двигатель – это машина, которая делает энергию более полезной……..…….....
…….
…….
2. Двигатели превращают тепловую энергию в движение.
…….....
…….
…….
3. Первым двигателем было водяное колесо, которое использовалось для ирригационных систем в странах Древнего Востока, Египте, Китае и Индии...…….....
…….....
…….
4. В Средние века широко использовались ветряные двигатели..…….....
…….
…….
5. В середине XVII века ученые из Англии, Франции и России работали над изобретением парового двигателя.....…….....
……...……
……..
6. В 1763 году русский механик Иван Иванович Ползунов изготовил по собственному проекту стационарную паровую машину непрерывного действия..…….....
……....
…….
7. Два цилиндра были сдвоены и попеременно наполнялись паром, что избавляло от необходимости использовать водяное колесо.....
…….....
…….
…….
8. Паровые двигатели имели большой вес и низкий КПД…….....
…….

……..……

9. На смену паровым машинам пришел двигатель внутреннего сгорания.....
.....
……..……

10. Сегодня двигатель внутреннего сгорания используется в автомобилях, тепловозах и теплоходах. …….....
…….……
.....

11. Современные самолеты оснащены реактивным двигателем..…….....
.....
…….

12. Реактивный двигатель изготавливают из очень прочного металла, чтобы он не расплавился, ведь температура горения в нем достигает более тысячи градусов.....
…….....
.....
…….

13. Некоторые люди используют термин «мотор» только для обозначения двигателей, работающих на электричестве.....
.....
…….

14. Электродвигатели состоят из двух механических частей – статора и ротора, и двух наборов электрических обмоток – поля и якоря.....
.....
…….

15. Электромагнитные поля взаимодействуют друг с другом и создают крутящий момент, который приводит двигатель во вращение.....
.....
…….

16. Выходная мощность – это произведение крутящего момента и скорости вращения.....
.....
…….

17. В зависимости от источника питания двигатель классифицируется как двигатель постоянного (DC) или переменного (AC) тока.....
.....
…….

VI. SPEAK

1. Interview

Student A is an engineer.
Student B is a journalist who asks about the difference between an engine and a motor.

2. Tell your groupmates about the difference between a motor and an engine.

3. Choose one topic and make a presentation in Power Point (10-12 slides). Work in pairs.

1. Internal Combustion Engine
2. External Combustion Engine
3. Jet Engine
4. Electrical Engine
5. Ion Drive
6. Gas Turbine Engines
7. AC Electric Motors
8. DC Electric Motors
9. Hybrid Engine
10. Steam Engines

CONCLUSION

The content of the textbook is designed for second-year students studying Engineering, follows the organization of the textbook and covers some important language skills.

The textbook includes six units dealing with various topics related to the engineering:

– Evolution of Engineering,
– Measurement,
– Materials,
– Tools,
– 20th Century Engineering,
– Engines and Motors.

The textbook also contains an Appendix. It contains glossary, English grammar and units of measurement.

All activities in the content of this textbook are aimed to develop integrated skills. Thus, all formats of the textbook assignments: listening and reading, notes and vocabulary, reading comprehension, analyzing, translating and speaking are designed to help students improve English language skills.

APPENDIX

I

TEST ON UNITS 1-3

I. Choose the correct translation of the word or expression (30 points):

1. развиваться, эволюционировать

a) to evolve b) to include c) to find d) to support

2. изумительный, удивительный, поразительный

a) nice b) amazing c) ugly d) difficult

3. веха, этап

a) year b) month c) part d) milestone

4. указывать

a) to believe b) to learn c) to take d) to indicate

5. крайняя точка

a) extremity b) velocity c) ability d) authority

6. размер

a) interaction b) dimension c) conclusion d) illusion

7. солома

a) clay b) concrete c) sand d) straw

8. найти приют, укрыться

a) to shelter b) to pick up c) to melt d) to bind

9. плавить, растапливать

a) to shelter b) to pick up c) to melt d) to bind

10. emergence

a) явление b) фигура c) возникновение d) опасность

11. promising

a) многообещающий b) новый c) ясный d) удивительный

12. overall

a) великий b) габаритный c) красивый d) сложный

13. straight

a) простой b) природный c) финансовый d) прямой

14. sturdy

a) прозрачный b) крепкий c) очевидный d) возможный

15. substance

a) фигура b) природа c) вещество d) воздух

16. bond

a) наука b) молоток c) трава d) связь

17. transparent

a) прозрачный b) крепкий c) очевидный d) возможный

18. boundary

a) граница b) хвастовство c) прыжок d) премия

19. to obtain

a) готовить b) ходить c) получать d) сидеть

20. to bind

a) думать b) связывать c) верить d) надеяться

II. Fill in the blanks with appropriate vocabulary word (20 points):

1. Engineering is one of the … growing industries in the world.

a) fastest b) slowest c) poorest

2. In the …, advances in science and mathematics began to transform engineering.

a) Middle Ages b) Metal Age c) Ancient times

3. Leonardo da Vinci, one of the most famous … of all time.

a) teachers b) actors c) engineers

4. The beginning of the Industrial Revolution is associated with the invention of the steam engine in Great Britain in the second half of the … century.

a) 17th b) 18th c) 19th

5. The aging population and rising healthcare costs are creating ... opportunities for engineers working in the field of biomedical engineering.

a) new b) old c) unknown

6. … is a segment connecting any point on a circle to its center.

a) Radius b) Diameter c) Depth

7. Dimensions are linear and ….

a) angular b) triangular c) circular

8. All materials are usually divided into … and non-metals.

a) glass b) metals c) air

9. Composite materials combine two or more components with different physical and … properties.

a) chemical b) psychological c) biological

10. The production of polymers began in the … century.

a) 19th b) 20th c) 21st

III. Translate the sentences (30 points):

1. Engineering is one of the fastest growing industries in the world.
2. Early civilizations built amazing structures such as pyramids, aqueducts, and bridges.
3. The beginning of the Industrial Revolution is associated with the invention of the steam engine.
4. Climate change and environmental concerns are driving the development of renewable energy sources and green transportation.
5. Linear dimensions are indicated on the drawing in millimeters.
6. Overall length is the measurement of how long is the car in total.
7. The earliest human engineering inventions were the wheel, lever and pulley.
8. Metals are simple substances in which atoms are connected by a metallic bond.
9. Composite materials combine two or more components with different physical and chemical properties.
10. Polymers are high molecular weight chemical compounds.

IV. Translate the sentences (20 points):

1. Ранние цивилизации строили удивительные сооружения, используя шесть классических простых механизмов: рычаг, колесо и ось, блок, наклонную плоскость, клин и винт.
2. Развитие робототехники и автоматизации приведет к революции в производстве, транспорте, здравоохранении и других отраслях
3. Полимеры состоят из множества повторяющихся групп атомов, соединенных между собой.
4. Наличие металлической связи является определяющим физическим свойством чистых металлов.
5. Стекло это хрупкое прозрачное вещество, которое получают в процессе плавления песка.

FINAL TEST

I. Choose the correct translation of the word or expression (30 points):

1. автомобиль

a) wheel b) velocity c) vehicle d) plate

2. тормоза

a) bread b) brakes c) thing d) smile

3. отличный, превосходный

a) excellent b) expensive c) ugly d) extent

4. топор

a) saw b) axe c) nut d) screw

5. винт

a) saw b) axe c) nut d) screw

6. предпринять

a) to switch b) to undertake c) to upgrade d) to twin

7. движение

a) armature b) motion c) motor d) straw

8. полив

a) intervention b) interpretation c) isolation d) irrigation

9. топливо

a) face b) fuel c) fire d) fur

10. maintenance

a) содержание b) фигура c) возникновение d) безопасность

11. to join

a) вырезать b) определять c) плавить d) соединять

12. rivet

a) заклепка b) болт c) шайба d) гвоздь

13. to clamp

a) отдыхать b) освобождать c) соединять d) зажимать

14. accelerator

a) тормоз b) двигатель c) аксессуар d) ускоритель

15. collision

a) столкновение b) падение c) колебание d) смирение

16. bond

a) наука b) молоток c) трава d) связь

17. continuous

a) прозрачный b) крепкий c) длительный d) возможный

18. boundary

a) граница b) хвастовство c) прыжок d) премия

19. to eliminate

a) готовить b) ходить c) устранять d) сидеть

20. combustion

a) горение b) оборудование c) квалификация d) оптимизация

II. Match the word combination with English equivalent (20 points):

WORD	DEFINITION
1. accelerator	**a)** the parts of the vehicle that make it stop or go more slowly
2. angle	**b)** the smallest particle of an element that can exist either alone or in combination
3. artificial	**c)** a line that has been agreed to divide one country from another
4. atom	**d)** in physics, a machine that makes particles move very fast
5. belowground	**e)** a corner whether constituting a projecting part or a partially enclosed space
6. border	**f)** a hard strong building material
7. brakes	**g)** made by people, often as a copy of something natural
8. combustion	**h)** below the surface of the earth
9. concrete	**i)** a solid or hollow tube with long straight sides and two circular ends the same size
10. cylinder	**j)** the process of burning

III. Put the words in the correct order (30 points):

1. Leonardo da Vinci / an Italian / of / was / the High Renaissance / polymath /.
2. Botticelli / contemporary / Leonardo / was / a / of /.
3. Clos Lucé / on 2 May 1519/ Leonardo / died / at / at / the age / of 67 /.
4. something / Capacity / is / much / holds / how /.
5. the / shape / is / of / border / a / Perimeter /.
6. The meter / length / is / unit / the / basic / of /.
7. weight / the / is / The gram / of / unit /.
8. artificial / may / Materials / or / natural / be /.

9. properties / be / Materials / can / by / described / their /.
10. Temperature / color / amount / properties / and / the examples / hardness / of / are / physical /.

IV. Translate the sentences (20 points):

1. Крепеж предназначен для обеспечения прочного, надежного соединения между предметами.
2. Алекс любит свою работу и является профессионалом в своем деле.
3. Большой адронный коллайдер это самый мощный в мире ускоритель частиц.
4. Большой адронный коллайдер построен Европейской организацией ядерных исследований.
5. Современные самолеты оснащены реактивным двигателем.

II

GLOSSARY

WORD	DEFINITION	TRANSLATION
1. accelerator	in physics, a machine that makes	ускоритель

		particles move very fast	
2.	anatomy	the scientific study of the body and how its parts are arranged	анатомия
3.	angle	a corner whether constituting a projecting part or a partially enclosed space	угол
4.	archipelago	a group of small islands or an area of sea in which there are many small islands	архипелаг
5.	armature	part of a dynamo (a device hanging movement into electricity) or electric motor	арматура
6.	artificial	made by people, often as a copy of something natural	искусственный
7.	aqueduct	a structure for carrying water across land, especially one like a high bridge with many arches that carries pipes or a canal across a valley	акведук
8.	atom	the smallest particle of an element that can exist either alone or in combination	атом
9.	belowground	below the surface of the earth	подземный
10.	border	a line that has been agreed to divide one country from another	граница
11.	boundary	something that indicates or fixes a limit or extent	граница
12.	brakes	the parts of the vehicle that make it stop or go more slowly	тормоза
13.	combustion	the process of burning	горение
14.	composites	a solid material which is composed of two or more substances having different physical characteristics and in which each substance retains its identity while contributing desirable properties to the whole	композиты
15.	concrete	a hard strong building material made by mixing a cementing	бетон

		material (such as Portland cement) and a mineral aggregate (such as sand and gravel) with sufficient water to cause the cement to set and bind the entire mass	
16.	current	a movement of water, air, or electricity in a particular direction	текущий
17.	cylinder	a solid or hollow tube with long straight sides and two circular ends the same size, or an object shaped like this, often used as a container	цилиндр
18.	depth	part that is far from the outside or surface	глубина
19.	diameter	the length of a straight line through the center of an object or space	диаметр
20.	double-track railway	usually involves running one track in each direction, compared to a single-track railway where trains in both directions share the same track	двухпутная железная дорога
21.	engine	the part of a vehicle that uses energy from oil, electricity, or steam to make it move	двигатель
22.	engineering	the work of an engineer	машиностроение
23.	environment	the conditions that you live or work in and the way that they influence how you feel or how effectively you can work	окружающая среда
24.	fastener	a button, zip, or other device for temporarily joining together the parts or things	крепеж
25.	fuel	a substance that is used to provide heat or power, usually by being burned	топливо
26.	glass	any of various amorphous materials formed from a melt by cooling to rigidity without crystallization	стекло
27.	highway	a public road, especially an important road that joins cities or	шоссе

		towns together	
28.	height	the distance from the bottom to the top of someone or something standing upright	высота
29.	inside	an interior or internal part or place **:** the part within	внутри
30.	irrigation	the practice of supplying land with water so that crops and plants will grow	орошение
31.	length	the longer or longest dimension of an object	длина
32.	lever	a piece of equipment for moving heavy objects up or down, consisting of a small wheel over which a rope or chain attached to the object can be easily raised or lowered	рычаг
33.	locomotive	the engine of a train	локомотив
34.	machinery	a group of machines, or the movable parts of a machine	оборудование
35.	maintenance	the activity of keeping a building, vehicle, road, etc. in good condition by checking it regularly and repairing it when necessary	обслуживание
36.	material	the elements, constituents, or substances of which something is composed or can be made	материал
37.	metal	any of various opaque, fusible, ductile, and typically lustrous substances that are good conductors of electricity and heat, form cations by loss of electrons, and yield basic oxides and hydroxides	металл
38.	motion	the act or process of moving, or a particular action or movement	движение
39.	motor	a device that changes electricity or fuel into movement and makes a machine work	мотор

40.	oscilloscope	a device that represents a changing amount on a screen in the form of a line that moves up and down in curves	осциллограф
41.	outside	an outer side or surface	снаружи
42.	polymers	a chemical compound or mixture of compounds formed by polymerization and consisting essentially of repeating structural units	полимеры
43.	property	a quality or trait belonging and especially peculiar to an individual or thing	свойство
44.	pulley	a bar or handle that moves around a fixed point, so that one end of it can be pushed or pulled in order to control the operation of a machine or move a heavy or stiff object	шкив
45.	pylon	a tall, metal structure used as a support	пилон
46.	ratchet wrench	a tool consisting of a metal handle and a socket, used for turning objects in one direction only	ключ с трещеткой (храповый ключ)
47.	radius	a line segment extending from the center of a circle or sphere to the circumference or bounding surface	радиус
48.	rivet	a metal pin used to fasten flat pieces of metal or other thick materials such as leather	заклепка
49.	rotor	a part of a machine that spins, especially the device supporting the turning blades of a helicopter	ротор
50.	safety	the condition of not being in danger or not being dangerous	безопасность
51.	science	the careful study of the structure and behaviour of the physical world, especially by watching, measuring, and doing experiments,	наука

		and the development of theories to describe the results of these activities	
52.	screw	a thin, pointed piece of metal with a raised edge twisting round along its length and a flat top with a cut in it, used to join things together, especially pieces of wood	винт
53.	span	the area of a bridge, etc. between two supports	пролет
54.	stator	the stationary part of a rotary system	статор
55.	steel	commercial iron that contains carbon in any amount up to about 1.7 percent as an essential alloying constituent, is malleable when under suitable conditions, and is distinguished from cast iron by its malleability and lower carbon content	сталь
56.	suspension	equipment that is fixed to the wheels of a vehicle in order to make it move smoothly	подвеска
57.	torque	a force that causes something to rotate	крутящий момент
58.	transmission	the system in a car that moves power from its engine to its wheels	передача
59.	tunnel	a long passage under or through the ground, especially one made by people	туннель
60.	vehicle	a means of carrying or transporting something	автомобиль
61.	wedge	a piece of metal, wood, rubber, etc. with a pointed edge at one end and a wide edge at the other, either pushed between two objects to keep them still or forced into something to break pieces off it	клин

62.	wheel	a circular object connected at the centre to a bar, used for making vehicles or parts of machines move	колесо
63.	width	the horizontal measurement taken at right angles to the length	ширина

III

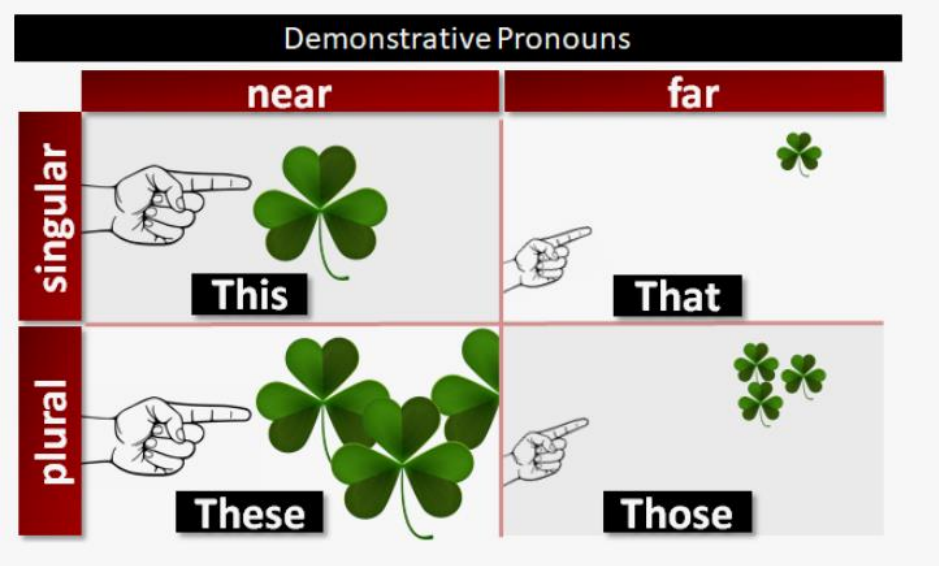
ENGLISH GRAMMAR. READ AND REMEMBER

1. ENGLISH TENSES

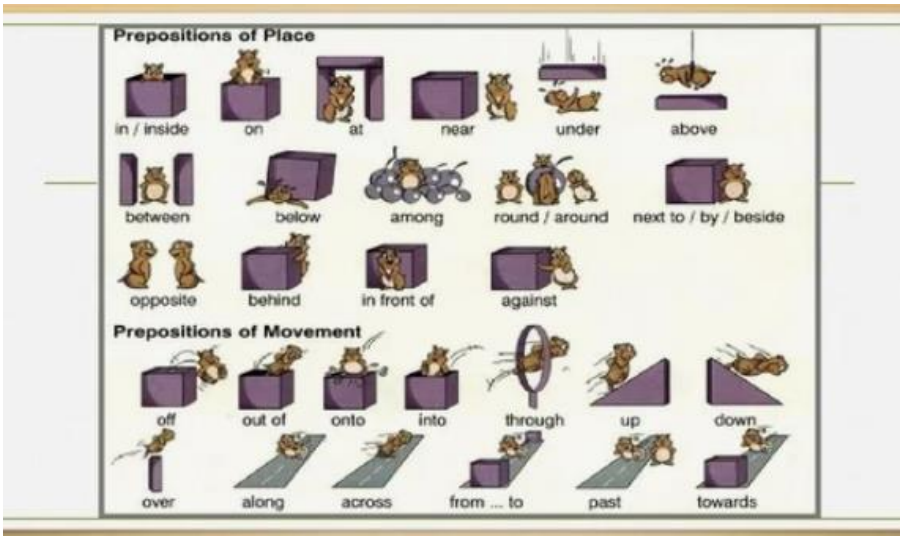
2. ENGLISH PRONOUNS

Personal Pronouns	Possessive Adjectives	Possessive Pronouns	Object Pronouns	Reflexive Pronouns
I	My	Mine	Me	Myself
You	Your	Yours	You	Yourself
He	His	His	Him	Himself

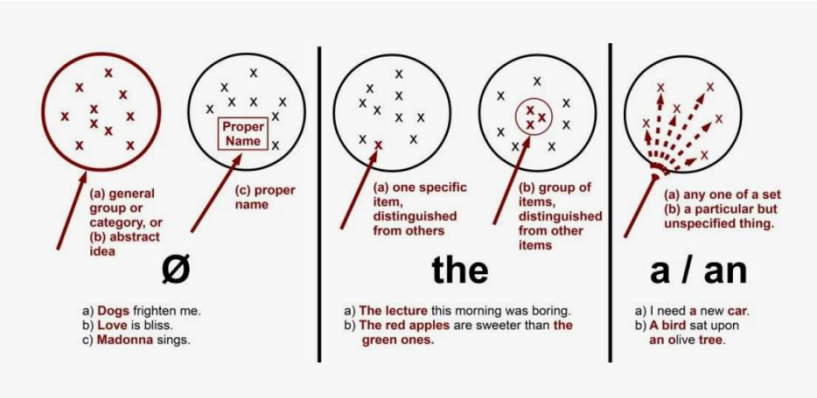
She	Her	Her	Her	Herself
It	Its	Its	It	Itself
We	Our	Ours	Us	Ourselves
You	Your	Yours	You	Yourselves
They	Their	Theirs	Them	Themselves



3. ENGLISH PREPOSITIONS



4. ENGLISH ARTICLES



IV

MEASUREMENT

QUANTITY	UNIT	ABBREVIATION
Length	meter	m
Mass	kilogram	kg
Time	second	s
Temperature	Celsius	^{o}C
Electric Current	ampere	A
Amount of substance	mole	mol

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Images

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