

ФЕДЕРАЛЬНОЕ АГЕНТСТВО ЖЕЛЕЗНОДОРОЖНОГО ТРАНСПОРТА
Федеральное государственное бюджетное образовательное учреждение
высшего образования
Иркутский государственный университет путей сообщения
Сибирский колледж транспорта и строительства

МЕТОДИЧЕСКИЕ УКАЗАНИЯ К ПРАКТИЧЕСКИМ ЗАНЯТИЯМ
(очной формы обучения)
ОГСЭ.04 Иностранный язык в профессиональной деятельности
для специальности
08.02.01 Строительство и эксплуатация зданий и сооружений.

*базовая подготовка
среднего профессионального образования
3 курс*

Иркутск 2024

Электронный документ выгружен из ЕИС ФГБОУ ВО ИргУПС и соответствует оригиналу

Подписант ФГБОУ ВО ИргУПС Трофимов Ю.А.

00920FD815CE68F8C4CA795540563D259C с 07.02.2024 05:46 по 02.05.2025 05:46 GMT+03:00

Подпись соответствует файлу документа



РАССМОТРЕНО:
Цикловой методической
комиссией гуманитарных дисциплин
Протокол № 13
Председатель ЦМК: Очинская М.В.
11 апреля 2024 года.

Разработчик: Ю.В.Чекулаева, преподаватель высшей квалификационной категории
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государственный университет путей сообщения».

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1. Пояснительная записка

Данные методические указания к практическим работам по иностранному языку предназначены для студентов 3х курсов колледжа специальности 08.02.01 Строительство и эксплуатация зданий и сооружений.

Методические указания составлены в соответствии с требованиями действующей рабочей программы по иностранному языку для специальности 08.02.01 Строительство и эксплуатация зданий и сооружений и отображают требования по выполнению следующих компетенций:

Код ОК, ПК	Умения	Знания
ОК 01. Выбирать способы решения задач профессиональной деятельности применительно к различным контекстам.	понимать общий смысл воспроизведенных высказываний в пределах литературной нормы на профессиональные темы;	- особенностей произношения интернациональных слов и правил чтения технической терминологии и лексики профессиональной направленности;
ОК 02. Использовать современные средства поиска, анализа и интерпретации информации и информационные технологии для выполнения задач профессиональной деятельности	- понимать содержание текста, как на базовые, так и на профессиональные темы;	- основных общеупотребительных глаголов профессиональной лексики;
ОК 03. Планировать и реализовывать собственное профессиональное и личностное развитие, предпринимательскую деятельность в профессиональной сфере, использовать знания по финансовой грамотности в различных жизненных ситуациях.	- осуществлять высказывания (устно и письменно) на иностранном языке на профессиональные темы;	- лексического (1000-1200 лексических единиц) минимума, относящегося к описанию предметов, средств и процессов профессиональной деятельности;
ОК 04. Эффективно взаимодействовать и работать в коллективе и команде.	- осуществлять переводы (со словарем и без словаря) иностранных текстов профессиональной направленности;	- основных грамматических правил, необходимых для построения простых и сложных предложений на профессиональные темы и перевода текстов профессиональной направленности.
ОК 05. Осуществлять устную и письменную коммуникацию на государственном языке Российской Федерации с учетом особенностей социального и культурного контекста.	- строить простые высказывания о себе и своей профессиональной деятельности;	- основных грамматических правил, необходимых для построения простых и сложных предложений на профессиональные темы и перевода текстов профессиональной направленности.
ОК 06. Проявлять гражданско-патриотическую позицию, демонстрировать осознанное поведение на основе традиционных общечеловеческих ценностей, применять стандарты антикоррупционного поведения.	- производить краткое обоснование и объяснение своих текущих и планируемых действий;	- основных грамматических правил, необходимых для построения простых и сложных предложений на профессиональные темы и перевода текстов профессиональной направленности.
ОК 07. Содействовать сохранению окружающей среды, ресурсосбережению, эффективно действовать в чрезвычайных ситуациях.	- выполнять письменные простые связные сообщения на интересующие профессиональные темы;	- основных грамматических правил, необходимых для построения простых и сложных предложений на профессиональные темы и перевода текстов профессиональной направленности.
	- разрабатывать планы к самостоятельным работам для подготовки проектов и устных сообщений;	
	- письменно переводить тексты по профессиональной	

<p>ОК 08. Использовать средства физической культуры для сохранения и укрепления здоровья в процессе профессиональной деятельности и поддержания необходимого уровня физической подготовленности.</p>	<p>тематике и техническую документацию с использованием разных типов словарей.</p>	
<p>ОК 09. Пользоваться профессиональной документацией на государственном и иностранном языках.</p>		

Практические работы разработаны для шести тем: «Строительные профессии. Building professions», «История строительства. History of building», «Здания архитектурного образца. Buildings of architectural interest», «Строительные материалы. Building materials», «Части здания. Parts of a building», «Современные строительные технологии. Modern building technologies».

Практическая работа 1. Строительные профессии. Building professions

Цель: изучить лексику по теме **Строительные профессии**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

Builder	Строитель
Carpenter	плотник
Electrician	Электрик
Painter	Маляр
Welder	Сварщик
Glazier	Стекольщик
Plumber	Сантехник, водопроводчик
Roofer	Кровельщик
Concrete finisher	Бетонщик
Bricklayer	Каменщик
Crane operator	Крановщик
Site supervisor	Начальник строительной площадки
Foreman	Прораб
Projector	Проектировщик
Architect	Архитектор
Highly-qualified	Высококвалифицированный
Consistent	Последовательный
Duty	Обязанность
Senior level job	Должность высокого уровня, руководящий пост
Middle level job	Должность среднего звена
Lower level job	Должность низкого уровня
Civil engineer	Инженер-строитель
Backhoe	Экскаватор-погрузчик
Hard-to-reach places	Труднодоступные места
Excavator	Экскаватор
Loader	Погрузчик
Trencher	Траншеекопатель
Scraper	Шабер, волокуша, скребок
Compactor	Уплотнитель, каток
Recruiting	Подбор персонала
Hiring	Наем
Training	Обучение
Restoring and conserving	Восстановление и сохранение
Welding equipment	Сварочное оборудование
Consistent	Последовательный
Well-trained	Хорошо-обученный

Highly-qualified	Высококвалифицированный
Self-disciplined	Дисциплинированный
Irresponsible	Безответственный
Ill-mannered	Невоспитанный
Jack of all trades and master of non	Неумеха (разг.)
Poor-educated	Малообразованный
Reliable	Надежный
Scaffold	Леса (строит.), подмости
Framework	Каркас
Horizontal longitudinal members	Горизонтальные продольные элементы
Trestle	Козлы
Tubular scaffolding	Трубчатые строительные леса
Suspended scaffold	Подвесные строительные леса
Ledger	Ригель
Bulldozer	Бульдозер
Grader	Грейдер

2. Read and translate the text

Top building professions in construction industry

The construction industry is one of the biggest industries after agriculture worldwide and one of the most prominent employment creators globally. The construction industry is broadly divided into the construction of buildings, heavy and civil engineering construction, and specialty trade contractor. Construction is an exciting field with all kinds of opportunities for those who possess the skills. From managing projects to doing hands-on labor, the construction industry allows workers to earn a living while making improvements to the community. From civil engineering to structural engineering, construction is a massive sector with many job roles. Here are the best jobs in the construction industry to look for.

A man who has been apprentice for some years in a building trade and has therefore enough skill to be considered a skilled worker at his trade, is called tradesman or craftsman. He may be a carpenter-and joiner, bricklayer, mason, slater-and-tiler, plumber, electrician, house painter, glazier, floor-and-wall tiler, plasterer, paper-hanger, steeplejack, hot water fitter and so on.

Bricklayer is a tradesman who builds and repairs brickwork, lays and joints salt glazed stoneware drains, sets chimney pots, manhole frames and fireplaces. A sewer and tunnel bricklayer is a specialized bricklayer.

Carpenter is a man who erects wood frames, fits joints, fixes wood floors, stairs and window frames, asbestos sheeting and other wall-board. He builds or dismantles wood or metal formwork.

Joiner is a man who makes joinery and works mainly at the bench on wood, which has been cut and shaped by the machinists. His work is finer than the carpenter's, much of it being highly finished and done in a joinery shop which is not exposed to weather.

Plasterer is a tradesman who may be a fibrous plasterer or a plasterer in solid work. The latter lays successive coats of plaster or rendering and fixes fibrous plaster such as mould cornices and wall pattern.

Plumbers are specialists who deal with the installation and maintenance of the systems used for water, gas, and sewage. Plumbers are tasked with installing, maintaining, and repairing pipes, valves, fittings, and drainage systems.

Electricians are another group of tradespeople often found on a construction site. Electricians are responsible for installing and repairing electrical wiring, diagnosing any

electrical problems, conducting tests, using power tools, and staying up to date with local building codes to ensure safety.

A construction manager, or CM, provides services similar to those of general contractor, but represents client's interest during all phases of the building process – design as well as construction. The CM may also be responsible for the safety of workers on the construction site. Typical duties of construction managers include planning, directing, and coordinating activity on construction sites, overseeing project design, hiring and supervising workers, choosing contractors, and monitoring supplies. They are also responsible for preparing budgets and estimates, reporting progress to clients, and to fulfill legal requirements.

Civil engineers are responsible for constructing buildings, highways, bridges, tunnels, dams, and other necessary facilities.

An architect is a person responsible for designing, planning, and overseeing the construction of buildings. To practice architecture means providing services in connection with the design and construction of buildings and the space within site surrounding the buildings that have human occupancy or use as their principal purpose. Similar to a civil engineer, an architect will create a computerized rendering of a building design and work alongside the rest of the construction team to bring it to life. The difference between the two professions is that an architect is more focused on the conceptual and creative elements of a building design, whereas civil engineers are more focused on the functional aspects.

The work of a BIM (Building information modeling) professional involves generating and managing digital representations of the physical and functional characteristics of places. Building information models are files (often but not always in proprietary formats containing proprietary data) that can be extracted, exchanged, or networked to support decision-making regarding a building or other built asset. Individuals use current BIM software, businesses, and government agencies that plan, design, construct, operate and maintain diverse physical infrastructures, such as water, refuse, electricity, gas, communication utilities, roads, bridges, ports, tunnels, etc.

A land surveying professional is called a land surveyor. These points are usually on the surface of the Earth, and they are often used to establish land maps and boundaries for ownership, locations like building corners or the surface location of subsurface features, or other purposes required by government or civil law such as property sales. They use total stations, robotic stations, GPS receivers, retro-reflectors, 3D scanners, radios, handheld tablets, digital levels, drones, GIS, and surveying software.

As a CAD or computer-aided design technician, you'll use software to create design plans for buildings and machinery and create a 3D display of a structure or component in solid modeling.

A civil site engineer are responsible for managing parts of construction projects, overseeing building work, undertaking surveys, ensuring projects meet agreed specifications, budgets, or timescales, liaising with clients, subcontractors, and other professional staff, checking and preparing site reports, designs, and drawings, problem-solving, ordering and negotiating the price of materials, ensuring site safety.

Project managers are responsible for the planning, procurement, and execution of a project, in any engineering domain. A project manager in construction is the person or group of people responsible for overseeing the completion of a project from start to finish.

3. Complete the following sentences from the text above

1. Construction is an _____ with all kinds of opportunities for those who possess the skills.
2. Individuals use current BIM software, businesses, and _____, such as water, refuse, electricity, gas, communication utilities, roads, _____, etc.

3. As a CAD or _____, you'll use software to create design plans for buildings and machinery and create a 3D display of a _____.
4. Similar to a _____, an architect will create a computerized rendering of a building design and work alongside _____ to bring it to life.
5. These points are usually on the surface of the Earth, and they are often used to establish land maps and _____ by government or civil law such as property sales.
6. To practice architecture _____ within site surrounding the buildings that have human occupancy or use as their principal purpose.
7. The CM may also _____ of workers on the construction site.

4. Answer the questions

1. What are the work peculiarities of a bricklayer? Carpenter? Joiner? Plasterer? CM?
2. What branches do the construction industry is broadly divided into?
3. What is the difference between carpenter and joiner?
4. What do a land surveyor use?

5. A). Translate into English

1. строительная отрасль
2. гражданское строительство
3. навыки
4. ручной труд
5. мастер, ремесленник
6. объектно-ориентированная модель
7. коммунальные услуги
8. землеустроительные работы
9. поддержание связи с клиентами
10. выполнение проекта

B). Construct your own sentences with them.

6. Match the synonyms

Build	timber
job	construct
wood	produce
assistance	work
requirement	various
manufacture	provide
apartment	ordinary
usual	flat,
different	modern
up-to-date	plant
supply	demand
entirely	completely
factory	help

7. Match the antonyms

Dismantle	reduce
useless	light

adverse	usual
unusual	useful
increase	assemble
heavy	favorable

8. Unscramble the words

terpencar, joneri, erbrilacky, onmas, sterla, pbelumr, trielecican, zigerla, erplaerst.

9. Read and translate the text

Equipment used in industrial construction

The types of construction equipment and their uses often depends on an industrial construction project's size and purpose. However, industrial construction methods for highway construction, routine road maintenance, forestry, bridge construction and erecting structures employ many of the same tools and pieces of heavy equipment and machinery. Laborers across many different industries use these heavy machines to complete their desired task — to build. Structural building sites, roadway creation and other civil engineering projects, such as sewer and pipeline projects, utilize earth-moving and excavation equipment. Excavating both earth and rock with heavy equipment and explosive blasting is important for the removal of natural obstacles from building sites. Explosives and heavy machines overcome the rough terrain of any building site and allow for the creation of our modern highways, rail lines and tunnels.

Almost all construction sites employ some excavation tools: backhoes, bulldozers, loaders and graders. Using these tools, construction teams can shape the land in ways that will provide the safest and most structurally sound area possible. Transportation methods are also a vital part of construction. Building materials, tools and waste need to be transported in and out of most work sites regularly. In many cases, dump trucks haul earth, rock and construction materials to or from building sites — depending on the needs of a project. Machines, like cranes, hoist beams, heavy pieces of equipment, materials and tools to hard-to-reach places where contractors are working.

Some equipment includes general-purpose tools used in most construction projects. These include pneumatic hand tools, hydraulic hammers and compressed air systems used to power a variety of general-purpose tools for nailing, grinding and drilling. Other systems, such as conveyors, move heavy materials across a job site or help to remove waste efficiently. Earth, rock and clay provide unique problems for construction workers. In some cases, mountains may need to be blasted through for railroad and roadway tunnel development. Extracting precious minerals and other valuables provided by Mother Nature may require mining, drilling and excavating for miles underground. Almost any building project will need earth-moving equipment.

Excavators. The excavator represents one of the most common, and important, pieces of heavy equipment seen in construction. Excavation widely depends on these machines, also referred to as diggers, as they utilize a boom-stick and a bucket with a cab on a rotating platform. These machines provide easier access to harder-to-reach places and a full range of motion, with the ability to rotate the bucket on any side of the machine. The house sits upon an undercarriage with tracks and wheels that allow for easy transportation as well. Also, diggers are highly effective at removing large amounts of earth and other obstacles quickly and efficiently.

Bulldozers. Moving the earth at construction sites with excavators, bulldozers are common at numerous types of job sites. These pieces of heavy equipment utilize tracks and a large metal blade primarily for pushing earth at a construction site. They're considered

crawlers because of their use of tracks, which provides more ground stability through weight displacement across the entire machine. In addition, they offer incredible power for moving some of the heaviest materials at construction sites. Different models of bulldozers are available and can offer some flexibility depending on the terrain and working environment.

Loaders. Transporting materials around the job site, loading heavy materials such as asphalt, rock, debris, snow or construction waste in large quantities will require the use of another type of heavy equipment. You will see many sizes of loaders, but the main goal at any job site is to load material on or into some other piece of equipment to transport it to another location. Even large amounts of gravel, wood, logs or sand can pose a challenge for construction projects. Large quantities of any heavy material require safe handling. One of the most common types of loaders is the skid-loader, or skid-steer loader. Powered by an engine, its rigid frame sits on durable wheels, or tracks, that operate differently from other vehicles through the use of skid-steering. Skid-steer loaders have lift arms attached that are capable of being fitted with a variety of job-specific tools.

Trenchers. Digging ditches at construction sites trenchers are designed to create ditches, or trenches. Crews also refer to them as ditchers because of this function. These machines look like other excavating equipment but are optimized for the digging of trenches, typically for piping projects. You may spot two main types of trenchers at a construction site. The ladder trencher and the wheel trencher both offer incredible versatility for digging trenches and operate at much higher rates of speed than any other type of excavating equipment for the task. Depending on the operation, trenchers may be utilized to expedite the installation or maintenance of projects such as wastewater or drainage piping.

Graders. Creating level surfaces for construction with bulldozers, graders represent another vital piece of engineering equipment used to move large amounts of earth. The overall goal of graders is to finish the grade and ensure properly smoothed and flat surfaces for development. In architectural design, graders may be employed to create wider, flat areas to form the foundation for buildings and structures. In civil engineering projects such as road work and maintenance, graders help level the surface for asphalt roadways. Graders often employ six wheels and a powerful engine to power the vehicle. Like bulldozers, graders are equipped with blades.

Scrapers. Scooping and hauling on the job site with bulldozers and graders, scrapers offer unique advantages in civil engineering. Scrapers are machines equipped with a hopper that can be raised and lowered, depending on the job, with hydraulics. The hopper, or bowl, cuts into the soil with its sharp edge. Once the hopper gets full from scraping, the vehicle can transport the material to the desired site. Scrapers can transport large amounts of material easily and dump loads without the use of any additional machinery.

Compactors. Increasing earth density for a firmer foundation loose soil can pose numerous problems for building projects, so often job sites must increase the overall density of the earth through compacting. Compactors are specialized machines that can be used for soil compaction, or in some cases in landfills to save space.

Tractors. Towing equipment from place to place the tractor is one of the most versatile and common pieces of heavy machinery used in the industry. Tractors move or tow heavy equipment around the job site. With much more horsepower — your average homeowner’s contractor ranges from 20 horsepower to 60 horsepower, while diesel tractors meant for heavy construction are at least in the 200 to 600 horsepower range — industrial tractors can provide the power for nearly any earth moving task.

10. Answer the questions

1. What does the types of construction equipment and their uses often depend on?
2. Excavating both earth and rock with heavy equipment and explosive blasting is important for the removal of natural obstacles from building sites, isn’t it?

3. What excavation tools do almost all construction sites employ?
4. What are digging ditches at construction sites trenchers designed for?
5. What are the specialized machines that can be used for soil compaction, or in some cases in landfills to save space?

11. Read the following statements and say whether they are true or false. Correct the false statements

1. Industrial construction methods for highway construction, routine road maintenance, forestry, bridge construction and erecting structures employ many of the same tools and pieces of light equipment and machinery.
2. Structural building sites, roadway creation and other civil engineering projects, such as sewer and pipeline projects, utilize earth-moving and excavation equipment.
3. Machines, like cranes, hoist beams, heavy pieces of equipment, materials and tools to easy-to-reach places where contractors are working.
4. Skid-steer loaders provide easier access to harder-to-reach places and a full range of motion, with the ability to rotate the bucket on any side of the machine.
5. In civil engineering projects such as road work and maintenance, graders help level the surface for asphalt roadways.
6. One of the most common types of loaders is the diesel tractor powered by an engine.
7. The hopper, or bowl, cuts into the soil with its sharp edge.
8. Cranes look like other excavating equipment but are optimized for the digging of trenches, typically for piping projects.
9. Diesel tractors meant for heavy construction are at least in the 100 to 500 horsepower range.
10. Skid-steer loaders have lift arms attached that are capable of being fitted with a variety of job-specific tools.

12. Put the following sentences into the interrogative form

1. Bricklayer is a master who builds and repairs and joints salt glazed stoneware drains, sets, chimney pots and fireplaces.
2. A fixer or a fixer-mason or a builder mason is a mason who sets prepared stones in walls, whether the stone be only facing or to the full wall thickness.
3. Joiner's work is done in a joinery shop.
4. In some districts of Great Britain, bricklayers also fix wall and flooring tiles, and slating and lay plaster. But elsewhere these are plasterer's specialties.
5. He may be a carpenter-and-joiner, bricklayer, mason, plumber, electrician, house painter, glazier, floor-and-wall tiler, plasterer, paper-hanger, steeplejack, hot water fitter and so on.

13. Guess the profession

1. I may work under the direction of a general contractor, business owner or general manager to identify the various phases of a job. I may be involved in recruiting, hiring and training the work crews necessary to successfully complete projects. I assign duties and am responsible for monitoring the progress of a project and keep it on track from a time and budgetary standpoint. Who am I?
a). Doctor b). Painter c). Bricklayer d). Foreman
2. I work in the construction industry designing new buildings, restoring and conserving old buildings and developing new ways of using existing buildings. I am involved in construction projects from the earliest stages right through to the completion. Who am I?

a). Teacher b). Crane operator c). Architect d). Designer

3. I am responsible for operating a mobile crane to lift, move, position and reposition loads. I control crane functions by depressing buttons and foot pedals as well as manipulating levers. I will be required to unload crane accessories from trailers or support vehicles. Who am I?

a). Crane operator b). Tutor c). Plumber d). Driver

4. I take various metal components and use intense heat to fuse (соединять) them together to form a final product. I must have the strength and skills to manage welding equipment. After completing a postsecondary training program I can be employed in numerous industries including construction, steel, airspace and motor vehicles, each of which may depend on my level of expertise. Who am I?

a). Roofer b). Welder c). Singer d). Excavator operator

14. Translate and choose the appropriate adjectives to describe what kind of a person a good foreman should be. Tell why.

Example: A good foreman should be reliable because he is responsible for the workers, equipment and the project execution.

Consistent, irresponsible, responsible, shy, sociable, well-trained, ill-mannered, highly-qualified, poor-educated, skilled, jack of all trades and master of non, professional, unreliable, reliable, self-disciplined.

15. Divide these words in 3 groups: a. senior level jobs; b. middle level jobs; c. lower level jobs.

Civil engineer, welder, foreman, projector, master builder, site supervisor, bricklayer, roofer, architect.

16. Read and translate the text

Scaffold

Scaffold in building construction means temporary platform, a provisional framework used to elevate and support workers and materials during the construction, repair, or cleaning of a structure or machine. It consists of one or more planks of convenient size and length, with various methods of support, depending on the form and use.

Based on the type of construction work, the type of scaffolding may differ. Scaffolding needs to be well-built, firm and strong to support laborers and various other construction material placed on it. Scaffolding is usually made up of timber or steel.

In timber scaffolding, support for the planks is provided by a timber frame fabricated and erected at the site. The frame may consist of vertical posts, horizontal longitudinal members, called ledgers, transverse members supported by the ledgers, and longitudinal and transverse cross-bracing. The planks rest on the transverse members. Trestle supports are used for work on a large area if little or no adjustment of height is required (e.g., for plastering the ceiling of a room). The trestles may be of special design or simply wooden sawhorses of the type used by carpenters. Specially designed trestles may be adjusted to provide for working heights of from 7 to 18 feet (2 to 5 m).

Tubular scaffolding of steel or aluminum has largely replaced timber scaffolding on most construction projects. Tubular scaffolding can easily be erected in any shape, length, or height. Sections may be mounted on casters to provide a highly mobile staging. The scaffolding may be enclosed with canvas or plastic sheeting for protection against the

weather. Tubular hoisting towers may be quickly assembled from steel tubes or pipes about 3 inches (8 cm) in diameter with standard connections.

A suspended scaffold consists of two horizontal putlogs, short timbers that support the flooring of the scaffold, each attached to a drum mechanism. Cables extend from each drum to an outrigger beam attached overhead to the structure frame. Ratchet devices on the drums provide for raising or lowering the putlogs between which spanning planks form the working surface. Power scaffolding may be raised or lowered by means of an electric motor operated by the worker on the scaffold. A suspended scaffold is mostly used for repair works, paintings, and so on. With this type, with the help of wire ropes or chains, the platform can easily be suspended from roofs. It can easily be lowered or lifted to the required level.

17. Choose the correct variant and complete the sentences

1. A _____ (**tubular, suspended, timber**) scaffold consists of two horizontal putlogs, short timbers that support the flooring of the scaffold, each attached to a drum mechanism.
2. Scaffolding needs to be well-built, firm and strong to support _____ (**laborers, cranes, foremen**) and various other construction material placed on it. Scaffolding is usually made up of timber or steel.
3. It consists of one or more planks of convenient size and length, with various methods of support, depending on the _____ (**size, weight, form**) and use.
4. Specially designed trestles may be adjusted to provide for working heights of from _____ (**7 to 18, 5 to 12, 6 to 18**) feet (2 to 5 m).
5. Tubular hoisting towers may be quickly assembled from steel tubes or pipes about _____ (**3, 4, 2**) inches (8 cm) in diameter with standard connections.

18. Find the equivalents in ex.16

1. Каркас может состоять из вертикальных стоек, горизонтальных продольных элементов, называемых ригелями.
2. Электрические строительные леса могут подниматься или опускаться с помощью электродвигателя, приводимого в действие работником, находящимся на строительных лесах.
3. Строительные леса могут быть накрыты брезентом или пластиковой пленкой для защиты от непогоды.
4. В зависимости от типа строительных работ тип строительных лесов может отличаться.
5. Козлы могут быть специальной конструкции или просто деревянными козлами, которые используются плотниками.

19. Answer the questions

1. What is scaffold in building construction?
2. What building materials is scaffolding usually made up of?
3. What do the planks rest on?
4. How many meters may specially designed trestles provide for working heights?
5. What type of scaffolding can easily be erected in any shape, length, or height?
6. What do ratchet devices on the drums provide for?

20. Put the following sentences into tag questions

1. A suspended scaffold consists of two horizontal putlogs, _____?
2. The platform can easily be suspended from roofs, _____?

3. Tubular scaffolding has largely replaced timber scaffolding on most construction projects, _____?
4. The frame may consist of vertical posts, _____?
5. Scaffolding needs to be well-built, _____?
6. The planks rest on the transverse members, _____?

21. Use these clichés to retell the text ex.16

I'm going to retell
 In the beginning of
 I've known that
 It was interesting to know that
 Speaking of _____ it turned out that
 The fact that _____ was new for me.

Практическая работа 2. История строительства. The history of building

Цель: изучить лексику по теме **История строительства**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

dwell (dwelt)	жить, обитать, находиться, пребывать
cave	пещера
mud	грязь, слякоть; ил, тина
wood	дерево
stone	камень
erect	сооружать; воздвигать, строить (о здании)
temple	храм; церковь
tomb	могила; надгробие; мавзолей
commemorate	почтить память
pillar	столб, колонна; опора, стойка
dome	купол; верх, верхушка, свод (большого здания)
fusion	интеграция, объединение, слияние
trace back	выяснять происхождение, прослеживать
go ahead!	Дерзайте!
architectural faculty	архитектурный факультет
heritage of past	наследие прошлого
architectural masterpieces	архитектурные шедевры
Egyptian pyramids	Египетские пирамиды
the Parthenon	Парфенон
the Hermitage	Эрмитаж

leave their imprint on	оставить свой отпечаток на
cultural code	культурный код
shelters	укрытия
luxurious	роскошный
be looking forward to	ждать с нетерпением

2. Read and translate the text

From the history of building

Many thousands of years ago there were no houses such as people live in today. In hot countries people sometimes made their homes in the trees and used leaves to protect themselves from rain or sun. In colder countries they dwelt in caves. Later people left their caves and trees and began to build houses out of different materials such as mud, wood or stones.

Later people found out that bricks made of mud and dried in the hot sunshine became almost as hard as stones. In Ancient Egypt especially, people learned to use these sun-dried mud bricks. Some of their buildings are still standing after several thousands of years.

The Ancient Egyptians discovered how to cut stone for building purposes. They erected temples, palaces and huge tombs. The greatest tomb is the stone pyramid of Khufu, king of Egypt. The ancient Egyptians often erected their huge constructions to commemorate their kings or pharaohs.

The ancient Greeks also understood the art of building with cut stone, and their buildings were beautiful as well as useful. They often used pillars partly for supporting the roofs and partly for decoration. Parts of these ancient buildings can still be seen today in Greece.

The Romans were great bridge, harbour and road builders. In road work the Romans widely used timber piles. They also erected aqueducts, reservoirs, water tanks, etc. Some of their constructions are still used till now. It is known that the manufacture of lime is one of the oldest industries used by man. Lime is a basic building material used all over the world as today so in the ancient world. One of the Romans, Marcus Porcius Cato, gave an idea of a kiln for lime production: its shape and dimensions. Such kilns were fired with wood or coal and were extremely inefficient. There are still many remains of kilns in some places of Great Britain as well as roads and the famous Hadrian Wall, which was erected to protect Romans from the celtic tribes in the first century A.D. Britain was a province of the Roman Empire for about four centuries. There are many things today in Britain to remind the people of the Roman: towns, roads, wells and the words.

In a period of 800 to 900 years the Romans developed concrete to the position of the main structural material in the empire. It is surprising, therefore, that after the fall of the Empire, much of the great knowledge should have disappeared so completely. The knowledge of how to make durable concrete has been lost for centuries, but mention was made of it in the writings of architects from time to time.

Fusion of Roman and North European traditions in construction was reflected in many ways. Buildings combined the Roman arch and the steep peaked roof of Northern Europe. Roman traditions were continued in the architectural form known as Romanesque. London Bridge, finished in 1209, took thirty-three years to build. It consisted of nineteen irregular pointed arches with its piers resting on broad foundation, which was designed to withstand the Thames current.

The Roman period was followed by other periods each of which produced its own type of architecture and building materials. During the last hundred years many new methods of building have been discovered. One of the recent discoveries is the usefulness of steel as a building material.

Nowadays when it is necessary to have a very tall building, the frame of it is first built in steel and then the building is completed in concrete. Concrete is an artificial kind of stone, much

cheaper than brick or natural stone and much stronger than they are. The Egyptians employed it in the construction of bridges, roads and town walls. There are evidences than ancient Greeks also used concrete for the building purposes. The use of concrete by the ancient Romans can be traced back as far as 500 B.C. They were the first to use it throughout the ancient Roman Empire on a pretty large scale and many structures made of concrete remain till nowadays thus proving the long life of buildings made of concrete. Of course, it was not the concrete people use today. It consisted of mud, clay and pure lime, which were used to hold together the roughly broken stone in foundations and walls. It was so-called “pseudo-concrete”. The idea of such building material might have been borrowed from the ancient Greeks as some samples of it were found in the ruins of Pompeii.

3. Choose the correct variant and complete the sentences

1. People first lived in _____.
a) houses, b) palaces, c) trees or caves
2. Egyptian pyramids are made of _____.
a) stone, b) wood, c) bricks
3. Natural building material is _____.
a) wood, b) bricks, c) concrete
4. The ancient Greeks knew the art of building with _____.
a) steel, b) cut stone, c) concrete

4. Complete the sentences

1. The ancient Greeks used pillars for _____.
2. We usually make houses of _____.
3. Bricks are made of _____.
4. The ancient Egyptians made their homes of _____.
5. Many thousand of years ago there were no houses _____.
6. In colder countries they _____.
7. In ancient time kilns for lime production were fired by _____.
8. The knowledge of how to make durable concrete _____ for centuries.
9. After the fall of the Roman Empire Roman traditions were continued _____.
10. Buildings combined the Roman arch and _____.
11. During the last hundred years many methods of building _____.
12. One of the most recent discoveries is _____.
13. Nowadays the frame of a tall building is first _____ and then _____.

5. Answer the following questions

1. Where did people live many thousands years ago?
2. Did ancient people use wood or bricks to build their houses?
3. What kinds of buildings did the ancient Egyptians erect?
4. What did the ancient Greeks use pillars for?

6. Write from the text

1. Names of people’s dwellings.
2. Names of building’s types.
3. Names of parts of buildings.
4. Names of building materials.

7. Match English terms with their Russian equivalents

1	building purpose	A	некоторое количество, несколько
2	sun-dried mud bricks	B	основной строительный материал
3	the art of building	C	нестандартная стрельчатая арка
4	road works	D	тесаный камень
5	timber piles	E	остроконечная крыша
6	water tank	F	стальной каркас
7	a number of	G	искусственный камень
8	main structural material	H	искусство строительства
9	durable concrete	I	строительная цель
10	steep peaked roof	J	кирпичи из глины, высушенные на солнце
11	irregular pointed arch	K	дорожные работы
12	broad foundation	L	архитектурный стиль
13	type of architecture	M	высокое здание
14	steel frame	N	деревянные сваи
15	artificial stone	O	прочный бетон
16	the earliest findings	P	ранние (первые) полученные данные
17	tall building	Q	бак для воды
18	roughly broken stone	R	широкое основание
19	cut stone	S	грубый (неровный) щебень

8. Use the correct forms of adjectives

1. Brick house is _____ (warm) than a hut.
2. Cottages are _____ (comfortable) than caves.
3. Greek buildings are _____ (beautiful) Egyptian ones.
4. The builder's profession is _____ (important) in the world.
5. Wood house is _____ (cheap) than stone house.

9. Choose the correct forms of the verbs

1. During the last hundred years many new methods of building _____.
a) has been discovered, b) have been discovered, c) will has been discovered
2. One of the most recent discoveries _____ the usefulness of steel as a building material.
a) is, b) were, c) be
3. Nowadays it _____ often necessary to have a very tall building.
a) is, b) are, c) were

10. Read, translate and act the dialogue out in your class

At the lesson a teacher (T) and a group of students (S1, S2, S3) of an architectural faculty are discussing the topic about the science of architecture, its history and role in human life.

T: Dear students! At today's seminar our talk will be dedicated to one of the oldest science – Architecture. Who of us can explain this term?

S 1: Architecture is the science of building houses, it is such kind of art of building, designing structures (including their complexes), as well as the totality of buildings and structures that create a spatial environment for human life and activity, I suppose.

T: Oh, very good answer! You are absolutely right. Any engineer cannot take a form of the building without consideration of structural principles, materials, social and economic

requirements. And there's one more important thing – the heritage of past architectural masterpieces.

S 1: I know some masterpieces! They are Egyptian pyramids, the Parthenon, various castles of Middle Ages, the Hermitage and many others!

T: Young man, your knowledge is great! You are a real expert in architecture. And can you tell me in what way have all these architectural masterpieces left their imprint on history?

S 2: Maybe the value of such facilities lies in their versatility, in the fact that despite the complexity of the construction process and many years of operation, they were able to maintain their appearance, functionality and integrity.

T: A city that remembers its past can safely look to the future. Each building has a unique cultural code peculiar to a certain era and time.

S 2: Even the first men's houses?

T: Yes, of course. They are also a part of our life, our history. By the way, can you imagine building construction of the first men's houses?

S 3: They were shelters in caves at first times. Then men learnt how to use stones, ore, and brick for building. Their primitive dwellings turned into luxurious temples, cathedrals, castles.

T: And in present time we see the top of architectural art – skyscrapers erected worldwide! Isn't this a miracle? And my opinion this is not a limit of engineering thought! So, my dear students, go ahead! This world of architecture is yours. Humanity is looking forward to your fresh ideas and designs!

Практическая работа 3. Здания архитектурного образца. Buildings of architectural interest

Цель: изучить лексику по теме **Здания архитектурного образца**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

ancient wonders	древние чудеса света
pharaoh Cheops	фараон Хеопс
slave	раб
rule	править
Zeus	Зевс
the temple of Artemis	храм Артемиды
goddess of the moon	богиня Луны
barbaric	варварский
flourish	процветать
mausoleum	мавзолей
the Colossus of Rhodes	Колосс Родосский
Statue of Liberty	Статуя Свободы
lighthouse	маяк
atop	наверху

Borovitsky Hill	Боровицкий холм
a whitestone church	белокаменная церковь
Grand Prince of Moscow	Великий князь Московский
was buried	был похоронен
necropolis	некрополь
embellishment	украшение
Renaissance period	период эпохи Возрождения
byzantium	византийский
five-domed six-pillared cathedral	пятиглавый шестистолпный собор
double-tiered pilasters	двухъярусные пилястры
deep loggia	глубокая лоджия
living witness	живой свидетель
skyscraper	небоскреб
the Strasbourg Cathedral in France	Страсбургский Собор во Франции
the Petronas Towers	Башни Петронас
United Arab Emirates	Объединенные Арабские Эмираты
artificial island	искусственный остров
observation deck	обзорная площадка
spire of a church	церковный шпиль
art-deco skyscraper	небоскреб в стиле ар-деко
eventually	в итоге

2. Read and translate the text

Ancient wonders of the world

The Great Pyramid is the only one of the Seven Wonders of the Ancient World that still stands. It was built at the order of the Pharaoh Cheops, who once ruled Egypt. More than 100,000 slaves worked for twenty years to build it. They had no machines, not even carts – all the work was done by human strength alone. Yet each huge block was so well laid that the Pyramid has stood for 5,000 years.

The greatest god of the ancient Greeks was Zeus, for whom the Roman name was called Jupiter. The greatest Statue of Zeus was at Olympia, where the famous Olympic Games were held in its honor. The statue was 40 feet high – about seven times a man’s height – and was made of marble, decorated with pure gold and ivory. After 1,000 years, an earthquake tumbled it down.

The temple of Artemis is one of the most famous temples of the ancient world. It stood for 600 years in Ephesus, a great city of Syria. The temple was sacred to Artemis, also called Diana, goddess of the moon. The finest sculptors and painters of Greece decorated this beautiful building, which was destroyed by the barbaric Goths. Only a few pieces of statues columns remained. They were dug up by modern scientists.

Few remember the tiny kingdom of Caria, which once flourished in what is now southwestern Turkey. But the name of its king, Mausolus, is known because of the word "mausoleum" a massive tomb. The original Mausoleum, built in memory of this king by his widow, Queen Artemisia, was so magnificent that it was of the Wonders of the Ancient World.

Rhodes, an island near Greece, was one of the richest and busiest towns of the ancient world. Standing across the entrance to its big harbor, was a huge statue of the sun god Helios, famous as the Colossus of Rhodes. Although ships sailed beneath these giant feet, the Colossus was not as large as the American Statue of Liberty.

The most famous lighthouse in ancient times was the Pharaohs of Alexandria, in Egypt, and light atop a high tower could be seen for sixty miles. To keep the beacon the powerful electric lamps behind glass lenses used in our lighthouses were not yet.

3. Match the columns

1	The Great Pyramid	A	It is situated in southwestern Turkey and is a massive tomb, built in the memory of the king Mausolus.
2	the Hanging Gardens	B	Near it stands a huge sculptured rock called the Sphynx.
3	The Statue of Zeus	C	Standing across the entrance to a big harbor, was a huge statue of the sun god Helios.
4	The Temple of Artemis	D	It was at Olympia, where the famous Olympic Games were held in its honor. The statue was 40 feet high – about seven times a man’s height – and was made of marble, decorated with pure gold and ivory.
5	The Mausoleum	E	It was the most famous lighthouse in ancient times, in Egypt, and light atop a high tower could be seen for sixty miles.
6	The Colossus of Rhodes	F	It was built along arches and towers and looked like a wall of flowers and green shrubs.
7	The Pharos of Alexandria	G	It was one of the most famous temples of the ancient world in the name of goddess of the moon. The finest sculptors and painters of Greece decorated this beautiful building, which was destroyed by the barbaric Goths. Only a few pieces of statues columns remained.

4. Answer the following questions

1. How many slaves worked to build The Great Pyramid?
2. What was the Greek god who gave his name the greatest statue at Olympia?
3. What was the height of the statue of Zeus and what materials it was made of?
4. Who destroyed the temple of Artemis?
5. What a huge statue stands across the entrance to Rhodes big harbor?
6. What was the most famous lighthouse in ancient times?

5. Read the following statements and say whether they are true or false. Correct the false statements

1. The Great Pyramid is the only one of the Eight Wonders of the Ancient World.
2. More than 10,000 slaves worked for twenty years to build it.
3. Yet each huge block was so well laid that the Pyramid has stood for 7,000 years.
4. The greatest Statue of Zeus was at Olympia, where the famous Olympic Games were held in its honor.
5. But the name of its king, Mausolus, is known because of the word "mausoleum" a massive tomb.
6. Although ships sailed beneath these giant feet, the Colossus was as large as the American Statue of Liberty.
7. To keep the beacon the powerful electric lamps behind plexiglass lenses used in our lighthouses were not yet.

6. Unscramble the words

Pamiyrd, avsle, cieannt, atuste, heitgh, arbmle, rtheaqueak, ddegoss, usmaolmeu, arbor.

7. Read and translate the text

The Archangel Cathedral

One of the finest masterpieces of Russian architecture of the Moscow Kremlin rises at the very edge of Borovitsky Hill. This is the Archangel Cathedral. As legend goes, back in the 13th century a wooden church stood in its place, one dedicated to the Archangel Michael, the recognized patron of the Russian princes in their military affairs. In 1333, a whitestone church was erected on to become the main princely cathedral. In 1340, Grand Prince of Moscow Ivan Kalita was buried here. From that time the cathedral served as a necropolis.

In the late 15th century, Moscow underwent another round of reconstruction and embellishment. In 1505-1508, a new Archangel Cathedral replaced the old one. Its erection marked the completion of the ambitious construction project in the late 15th - early 16th century the Moscow Kremlin. Built to the design of Alevisio Novy from Italy, the Archangel Cathedral combines typical features of the architecture of Venice of the Renaissance period, Byzantium and Early Russia.

The Archangel Cathedral, a five-domed six-pillared cathedral, is built in brick, while its splendid decor is laid in white stone. It was for the first time in Russia that elements of the classical system were employed so extensively and consistently in the design of the facades. The intricately shaped cornices produce the effect of a two-storied structure, while double-tiered pilasters topped with carved capitals articulate the facades vertically. The architect paid special attention to the western wall, accenting with whitestone portals the main cathedral entrance which recedes into a deep loggia. The portals were decorated with carved ornament running over a blue painted ground. In 1980 the carved ornament was cleaned and the original color was restored.

The Archangel Cathedral had a considerable impact on the further development of Russia architecture. Many buildings were modeled on it in the 16th and 17th centuries.

The Archangel Cathedral will remain forever a living witness of the history of the Kremlin, Moscow and the Russian state and immortal evidence of the talent of its builders and artists who were able to express in architectural forms and painted images the people's love to their country.

8. Write out the text above the events which took place in the indicated period of time

1. In the 13th century
2. In 1333
3. In 1340
4. In the late 15th century
5. In 1505-1508
6. In the late 15th - early 16th century
7. During the 16th and 17th centuries
8. In 1980

9. Complete the sentences

1. As legend goes, _____ a wooden church stood in its place, one dedicated to the _____, the recognized patron of the Russian princes in _____.
2. In 1340, _____ Ivan Kalita was buried here.
3. In _____, a new Archangel Cathedral replaced the old one.
4. The architect paid special attention to _____ the main cathedral entrance which recedes into a deep loggia.
5. In _____ the carved ornament was cleaned and the _____ was restored.

6. The Archangel Cathedral _____ of the Kremlin, Moscow and the Russian state and immortal evidence of the talent of its builders and _____ in architectural forms and painted images the people's love to their country.

10. Use the suitable tense-form of the verbs

Much time _____ (to pass) before our houses and buildings _____ (to become) as they _____ (to be) now. Specialists _____ (to divide) buildings into some groups according to the architectural styles. _____ (to let) us _____ (to list) them. They _____ (to be): rococo, neo-Renaissance, baroque, classicism, modern, gothic.

Gothic style _____ (to appear) in the second part of the 12th century. Aesthetic tasks of this style _____ (to be): the form of beauty is the expression of unit of the world. Three important assurances of gothic culture _____ (to determine) by the following words: town, knighthood, carnival. In the end of the 16th century in painting, sculpture, architecture, literature _____ (to form) a new style which _____ (to call) a new art or neo-Renaissance. It _____ (to unite) different treats: from the academicians of Baroque to the admirers of Rubens' manner in painting. One of the first artists who _____ (to offer) this principle _____ (to be) the great master – Michelangelo.

The word "rococo" _____ (to come) from French word "coquille" that _____ (to mean) "shell" fragile asymmetrical nature form. But this term _____ (to become) the name of this style only in the second half of the 19th century. The culture of that century _____ (to receive) from the last century special aesthetic consciousness in which artistic taste _____ (to be) more important than other man's qualities. The outstanding master of rococo in France _____ (to be) Juan-Antonio Vatto.

11. Read and translate the text

The highest skyscrapers in the world

The world is full of high-rises, and building the tallest structure in the world has always been our ultimate goal. As technical knowledge grew, so did the height of buildings. We have always been fascinated by tall structures, which is evident from our history of constructing them. Throughout history, it appears there has always been some sort of unofficial race to the sky.

A skyscraper is a tall continuously habitable building having multiple floors. Modern sources currently define skyscrapers as being at least 100 metres (330 ft) or 150 metres (490 ft) in height, though there is no universally accepted definition. Skyscrapers are very tall high-rise buildings.

Historically, the world's tallest man-made structure was the Great Pyramid of Giza in Egypt, which held the position for over 3800 years until the construction of Lincoln Cathedral in 1311. The Strasbourg Cathedral in France, completed in 1439, was the world's tallest building until 1874.

The first skyscraper pioneered in Chicago with the 138 ft (42.1 m) was Home Insurance Building in 1885. The United States would remain the location of the world's tallest building throughout the 20th century until 1996, when the Petronas Towers were completed. Its height is 451.9 meters (1,483 feet). The Petronas Twin Towers are the most famous landmark in Malaysia and are a symbol of Kuala Lumpur.

Since then, two other buildings have gained the title: Taipei 101 in 2004 and Burj Khalifa in 2009. Since the beginning of the 21st century, the Middle East, China, and Southeast Asia have experienced booms in skyscraper construction. Burj Khalifa is located in Dubai, United Arab Emirates and has got height 829.8 meters (2,722 feet). Burj Khalifa is not just one of the most astounding skyscrapers on the planet, it's also the tallest building in the world at the

moment. It cost approximately \$1.5 billion to construct and is part of a larger project referred to as “Downtown Dubai.”

The Burj Al Arab is a luxurious 5-star hotel since 1999 and is one of the tallest (321 meters or 1,053 feet) hotels in the world. It’s world-famous because of its shape as a sailboat and the fact that it was constructed on an artificial island, about 280 meters (920 feet) from Jumeirah Beach. It has become a symbol of Dubai, which was the exact reason it was constructed in the first place.

Another skyscraper is in Shanghai, China. It is Shanghai Tower with height 632 meters (2,073 feet) and completed in 2014. The Shanghai Tower is the second-tallest skyscraper in the world at the moment and holds the record for having the highest observation deck within a building at a height of 561.25 meters (1,841 feet). It’s part of a triple supertall skyscraper complex in Shanghai, the only one of its kind in the world.

The Shard is located in the Southward neighborhood of London and is the tallest skyscraper in the city of London and all of the United Kingdom. It was designed by the Italian architect Renzo Piano in 2012 and resembles the spire of a church rising from the River Thames. Its height is 309.6 meters (1,016 feet).



One more famous skyscraper in the UK is the Gherkin (180 meters or 591 feet) which is officially known as 30 St Mary Axe and is a commercial skyscraper in London’s main financial district. It’s famous for its futuristic design and has since its completion in 2003 become a popular landmark in the city of London. It stands on the ground of the former Baltic Exchange which was severely damaged in 1992 in the Baltic Exchange bombing.








The Transamerica Pyramid (260 meters or 853 feet) is a futuristic skyscraper and the second-tallest building in San Francisco. It was only surpassed in height in 2018 by the Salesforce Tower. It used to house the headquarters of the Transamerica Corporation, but it has moved to Baltimore, Maryland, even though the company’s logo still depicts the building.





The Chrysler Building (318.9 meters or 1,046 feet) is an art-deco skyscraper located on the East Side of Manhattan in New York City. It’s one of the most iconic skyscrapers in the city and was one of the buildings competing to become the tallest building in the world in the 1920s. It eventually became so but only for 11 months as it was quickly surpassed by the Empire State Building.

Skyscrapers come in all shapes and sizes, and in this post, we have compiled the ultimate list of famous skyscrapers, an amazing resource of some of the most amazing skyscrapers from all around the world!

12. Match skyscraper with its photo

1	Great Pyramid of Giza	A	
2	Lincoln Cathedral	B	

3	The Strasbourg Cathedral in France	C	
4	Home Insurance Building	D	
5	Petronas Towers	E	
6	Burj Khalifa	F	
7	Burj Al Arab	G	
8	Shanghai Tower	H	
9	The Shard	I	

10	the Gherkin	J	
11	The Transamerica Pyramid	K	
12	The Chrysler Building	L	
13	Empire State Building	M	

Практическая работа 4. Строительные материалы. Building materials

Цель: изучить лексику по теме **Строительные материалы**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

aggregate	заполнитель (бетона)
workability	обрабатываемость, удобоукладываемость (бетонной смеси)
surface	поверхность
to subject	подвергать
structural	строительный
stress	напряжение, нагрузка

strength	прочность, крепость
strain	деформация
specific creep	специфическая ползучесть бетона
slab	плита
sand	песок
ratio	коэффициент, пропорция
pressure	давление
fine	мелкозернистый
Portland cement	портланд- цемент
mix	смесь
maintain	поддерживать
load	нагрузка
insulation	изоляция
high alumina cement	цемент с высоким содержанием глинозема
cement	цемент
gravel	гравий
density	плотность
compaction	уплотнение
concrete	бетон
cement paste	цементное тесто
construction	строительство
crack	трескаться
binding	вяжущее
blastfurnace slag	доменный шлак
capacity	способность, производительность
cast	отливать
artificial material	искусственный материал
glass	стекло
stiffness (rigidity)	жесткость (твердость)
ductility	пластичность
toughness	прочность
burnt clay	обожженная глина
prestressed concrete	армированный бетон
transparency	прозрачность

2. Read and translate the text

Building materials

Building materials - natural and artificial material and products, used at the construction and building repair. Differences in the purpose and conditions to erecting and usages the buildings define varied requirements to the building materials and their extensive nomenclature.

Building materials are distinguished on strictly building materials and building products - ready details and elements, assembled in the building on the place of construction.

The list of building materials is extensive and varied. Alongside with traditional materials - ceramic, natural stone, glass and other - in the modern construction broadly use new building materials on the base of metal.

At the building activity and erecting it is necessary in the first place to use local building materials (sand, gravel, lime, brick and others) that shorten transport expenses, forming much of

the material cost. The greater value for cheapen building materials has a salvaging the departures of industry.

Requirements to the building material and products are kept in states information on the building material, given its determination, specified raw material application, categorization, and division by the sort and marks, methods of test, condition of keeping and transporting.

Official document for builders is also "Building rates and rules", where are kept nomenclature and sizes of main building materials, requirements to their quality, instructions upon their choice and using depending on conditions of usages of raising building standards, standard specifications and other normative documents.

3. Read the sentences from the text with the verbs in Passive Voice, paraphrase them using Active Voice

Example: This bridge *is made* of concrete.

- 1). It is the concrete bridge.
- 2). They made this bridge of concrete.

4. Write out the names of natural and artificial building materials

1. natural building materials: _____
2. artificial building materials: _____

5. Read and translate the text

Properties of materials

Density (specific weight) is the amount of mass in a unit volume. It is measured in kilogram per cubic meter. The density of water is 1000 kg/m^3 but most materials have a higher density. Aluminum alloys, with typical densities around 2800 kg/m^3 are considerably less dense than steels, which have typical densities around 7800 kg/m^3 . Density is important in any application where the material must not be heavy.

Stiffness (rigidity) is a measure of the resistance to deformation such as stretching or bending. The Young modulus is a measure of the resistance to simple stretching or compression. It is the ratio of the applied force per unit area (stress) to the fractional elastic deformation (strain). Stiffness is important when a rigid structure is to be made.

Strength is the force per unit area (stress) that a material can support without failing. The units are the same as those of stiffness, but in this case the deformation is irreversible. The yield strength is the stress at which a material first deforms plastically. For a metal the yield strength may be less than the fracture strength. It is the stress at which it breaks. Many materials have a higher strength in compression than in tension.

Ductility is the ability of a material to deform without breaking. One of the great advantages of metals is their ability to be formed into the shape that is needed, such as car body parts. Materials that are not ductile are brittle.

Toughness is the resistance of a material to breaking when there is a crack in it. For a material of given toughness, the stress at which it will fail is inversely proportional to the square root of the size of the largest form present. Toughness is different from strength. For example, the toughest steels are different from the ones with the highest tensile strength. Brittle materials

have low toughness. For example, glass can be broken along a chosen line by first scratching it with a diamond. Composites can be designed to have considerably greater toughness than their constituent materials.

Creep resistance is the resistance to a gradual permanent change of a shape, and it becomes especially important at higher temperatures. A successful research has been made in materials for machine parts that operate at high temperatures and under high tensile forces without gradually extending. For example, they can be the parts of plane engines.

6. Name all properties of materials

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. Match the following words with their Russian equivalents

1	density	a	вес
2	weight	b	количество
3	a volume	c	объем
4	an amount	d	плотность
5	stiffness	e	жесткость
6	rigidity	f	твердость
7	a force	g	сила
8	strength	h	прочность

1 ____, 2 ____, 3 ____, 4 ____, 5 ____, 6 ____, 7 ____, 8 ____.

8. Make up your own sentences with the words from above

9. Find out 8 words

x s t i f n e s s i
u d e f 0 r m s t d
w i z u r 0 0 a r g
p e e r c w z y e e
x i s t e e l 0 n h
w y 0 0 l l a z g g
s s e n h g u 0 t n
f r a c t u r e h c

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. _____
8. _____

10. Read the text and answer the following questions

1. Is density (specific weight) the amount of mass in a unit volume?
2. Is it measured in kilograms per cubic meter?
3. Is density important in any application where the material must not be heavy?
4. Is stiffness (rigidity) a measure of the resistance to deformation such as stretching or bending?
5. Is strength the force per unit area (stress) that a material can support without failing?
6. Is toughness the resistance of a material to breaking when there is a crack in it?
7. Is creep resistance the resistance to a gradual permanent change of shape?

11. Read the text again and complete the following sentences

1. Aluminum alloys, with typical densities around.....are considerably less dense than steels, which have typical densities around.....
2.is important in any application where the material must not be heavy.
3. The Young modulus is a..... to simple stretching or compression.
4. It is the ratio of the applied force per unit area (stress) to the.....
5. The yield strength is the stress at which a
6. For a metal the yield strength may be which the stress at which it breaks is; many materials have a..... tension.
7. One of the great advantages of metals is..... such as car body parts.
8. Materials that are not ductile are.....
9. Toughness is the..... of a material to breaking when there is a crack in it.
10.is a measure of the resistance to deformation such as stretching or bending.

12. Read the following statements and tell whether they are true or false. Correct all false statements

1. Density (specific weight) is not the amount of mass in a unit volume.
2. Aluminum alloys, with typical densities around 3000 kg/m^3 are considerably less dense than steels, which have typical densities around 7800 kg/m^3 .
3. Density is not important in any application where the material must not be heavy.
4. The Young modulus is a measure of the resistance to simple stretching or compression.
5. It is the ratio of the applied force per unit area (stress) to the fractional elastic deformation (strain).
6. Strength is the force per unit area (stress) that a material can support without failing.
7. Many materials have not a higher strength in compression than in tension.
8. Ductility is the ability of a material to deform without breaking.
9. Toughness is the resistance of a material to breaking when there is a crack in it.
10. It is measured in a kilogram per cubic meter.

13. Put the following sentences in negative and interrogative form

1. Density (specific weight) is the amount of mass in a unit volume.
2. Stiffness (rigidity) is a measure of the resistance to deformation such as stretching or bending.
3. Toughness is the resistance of a material to breaking when there is a crack in it.

4. Ductility is the ability of a material to deform without breaking.
5. Strength is the force per unit area (stress) that a material can support without failing.

14. Make up sentences

1. any, in , density, important, application, is
2. important, a, is, stiffness, rigid, structure, is, to, when, mad, be
3. from, toughness, is, strength, different
4. low, brittle, have, materials, toughness
5. a, many, in, materials, have, higher, strength, in, tension, than, compression.

15. Read and translate the text

Brick

A brick is best described as "a building unit". It may be made of burnt clay, of concrete, of mortar or of a composition of sawdust and other materials; in shape it is a rectangular solid and its weight is from 6 1/2 to 9 pounds.

The shape and convenient size of a brick enables a man to grip it with an easy confidence and, because of this, brick-building has been popular for many hundreds of years. The hand of the average man is large enough to take a brick and is able to handle more than 500 bricks in an eight-hour working day.

It is necessary, therefore, for the "would-be" bricklayer to practice handling a brick until he can control it with complete mastery and until he is able to place it into any desired position.

16. Answer the following questions

1. What materials is brick made of?
2. Why brick-building has been popular for many hundreds of years?
3. What is the shape of a brick?
4. What is the brick's weight?

17. Find English equivalents from the text above

1. форма и размер кирпича
2. ширина кирпича
3. строительство из кирпича
4. из обожженной глины
5. практиковаться в укладке
6. достаточно большая
7. с полным мастерством
8. лучше всего характеризуется

18. Make sentences using the words below

1. clay, a brick, of, can, made, be, burnt
2. Brick-building, popular, has, years, of, been, hundreds, for, many
3. A "would-be", a brick, must, bricklayer, until, practice, mastery, handling, control, with, he, complete can, it, able, a bricklayer, is, any, a brick, to place, position, into
4. pads, the bricklayer's, with, and, thumb, the fingers, be, protected, must, leather

19. Read and translate the text

Prestressed concrete

Prestressed concrete is not a new material. Its successful use has been developed rapidly during the last four decades, chiefly because steel of a more suitable character has been produced.

Concrete is strong in compression but weak when used for tensile stresses. If, therefore, we consider a beam made of plain concrete, it will at once be realized that the beam's own weight will cause the beam to "sag" or bend. This sagging at once puts the lower edge of the beam in tension, and if the cross-sectional area is small, causes it to break.

If, on the other hand, we use a beam of similar cross-section, but incorporate steel bars in the lower portion, the steel will resist the tensile stress derived from the sag of the beam, and thus assist in preventing it from breaking.

In prestressed concrete steel is not used as reinforcement, but as a means of producing a suitable compressive stress in the concrete. Therefore any beam (or member) made of prestressed concrete is permanently under compression, and is consequently devoid of cracks-under normal loading, or so long as the "elastic limit" is not exceeded. Prestressed concrete is not only used for beams but is now employed extensively for columns, pipes, and cylindrical water-towers, storage tanks, etc.

20. Choose correct variant and complete the sentences

1. Prestressed concrete is ...
a) a completely new building material, b) not really a new material
2. The successful use of prestressed concrete has been developed rapidly ...
a) long ago, b) during the last four decades
3. Plain concrete is ...
a) strong in compression, b) weak in compression
4. Plain concrete is ...
a) weak when used for tensile stress, b) strong when used for tensile stress
5. Prestressed concrete is used ...
a) only for beams, b) for beams, columns, pipes, etc.

21. Complete the sentences

1. Prestressed concrete has been used during _____.
2. Plain concrete is strong in _____.
3. The sagging of a beam made of plain concrete may cause it to _____.
4. Incorporated steel bars in the lower portion of a beam prevent _____.
5. A beam made of prestressed concrete is permanently under _____.
6. Prestressed concrete is now employed extensively for _____.

22. Answer the following questions

1. Is prestressed concrete a new building material?
2. How long has prestressed concrete been used in construction?
3. What disadvantages has plain concrete?
4. What is steel used in prestressed concrete for?
5. What will happen if "elastic limit" of a beam is exceeded?

6. What is prestressed concrete used for?

23. Read and translate the text

Ferrous and non-ferrous metals

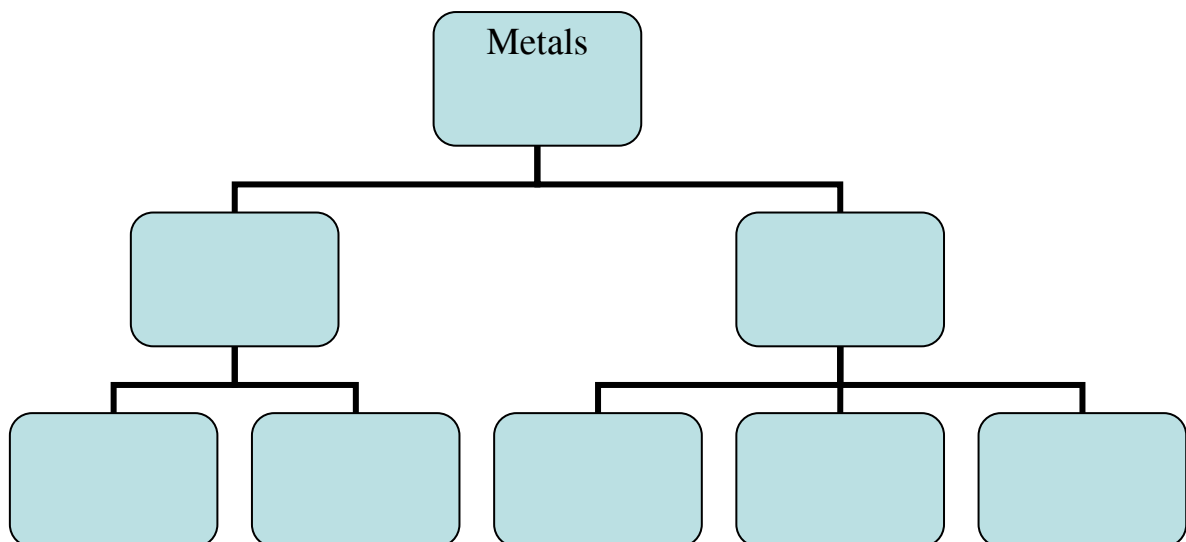
In general metals are used in various constructions and different industries. For example, thousands of miles of railway track. All metals are divided into ferrous and non-ferrous metals. Ferrous metals are iron and its alloys (steel, cast iron etc.). Especially ferrous metals are of great importance. Machine tools and machinery, steamships and locomotives, automobiles and airplanes, rails and bridges, razor blades are turned out by the steel industry.

Non-ferrous are metals and alloys the main component of which is not iron but another element. It may be copper, aluminum, and zinc. That's why copper and aluminum are belonged to as non-ferrous metals. Non-ferrous metals are extracted from minerals such as magnesite (magnesium carbonate), tinstone (tin oxides) etc. Non-ferrous metals have some characteristics. They are: high electric and heat conductivity, high corrosion resistance, non-magnetic qualities, light weight and easiness to fabrication.

24. Match the following words with their Russian equivalents

1	non-ferrous metal	a	медь
2	an alloy	b	инструмент
3	a railway	c	мост
4	a network	d	цветной металл
5	a tool	e	сплав
6	a bridge	f	железная дорога
7	copper	g	сеть

25. Read the text again and complete the spidergram



26. Complete the following sentences

1. Ferrous metals _____.
2. _____, steamships and locomotives, automobiles and aeroplanes _____.

3. _____are referred to as non-ferrous metals.
4. _____are divided into _____.
5. In general, _____.
6. _____have some characteristics.

27. Read the following statements and say whether they are right or wrong. Correct false statements

1. Thousands of miles of railway track form an intricate network of steel over the world, helping to carry daily billions of freight for different industries.
2. Copper, aluminum and some other metals are not referred to non-ferrous metals.
3. All metals are divided into ferrous and non-ferrous metals.
4. Metals in general and especially ferrous metals are of great importance in various constructions.
5. Ferrous metals are iron and its alloys.
6. Non-ferrous metals are extracted from minerals such as magnesite, tinstone etc.

28. Put the following sentences in negative and interrogative form

1. All metals are divided into ferrous and non-ferrous metals.
2. Ferrous metals are iron and its alloys.
3. Ferrous metals are of great importance in various constructions.
4. Ferrous are metals and alloys the main component of which is iron.
5. Copper, aluminum and some other metals are referred to as non-ferrous metals.

29. Specify which sentences relate to ferrous metals and which to non-ferrous metals.

Translate the sentences

1. Main component is not iron but some other element.
2. They have high electric conductivity.
3. They can be forged and melted.
4. They are used as supporting members.
5. They have light weight.
6. They are used for making different (various) ornaments.
7. They have non-magnetic qualities.
8. They are used as reinforcements for ferroconcrete structures.
9. They have high corrosion-resistance.
10. They are used for steelworks of most buildings in modern construction.
11. They are of good importance in variations (alloys).
12. They are widely used in aircraft industry because of light weight.

30. Finish the following sentences using the English equivalents

1. All metals are divided into (цветные и черные металлы).
2. Ferrous metals are (железо сталь и ее сплавы).
3. Copper, aluminum and some other metals are referred to as (цветные металлы).
4. Metals in general and especially ferrous metals (имеют большое значение в строительстве).
5. All metals have specific (металлический блеск).
6. (Сталь и чугун) are referred to the group of ferrous metals.
7. Cast iron is (самый дешевый) of ferrous metals.
8. All metals are (хорошие проводники электричества).

5. The steel framework must be carefully hidden in (стенах, полу и перегородках).
6. Alloyed steel (широко используется в строительстве).
7. All non-ferrous metals have (легкий вес).

31. Translate into English

1. Медь и алюминий относят к цветным металлам.
2. Все металлы, кроме ртути, твердые вещества.
3. Сталь широко используется в строительстве.
4. Сталь используется как арматура в железобетонных конструкциях, для стального каркаса зданий и различных металлоконструкциях.
5. Нержавеющая сталь также является стойкой к коррозии.

32. Read and translate the text

Plastics all over the world

Plastics are man-made materials that can be shaped into any form. They are one of the most useful materials ever created. Engineers have developed plastics that are as rigid as steel or as soft as cotton. They can make plastics that are any color of the rainbow - or as clear and colorless as crystal.

Plastic products often have a useful life of many years. But why are the chemists so enthusiastic about plastics? From a purely engineering viewpoint the following characteristics of plastics explain their increasing acceptance by industries and consumers alike. Plastics are rapidly becoming important synthetic materials because of their great variety, strength, durability and lightness. These characteristics are usually shared by all plastics, but there are variations between individual materials: lightweight (sometimes high strength to weight ratio); corrosion resistance; electrical and thermal insulation; ease of fabrication; transparency in some materials; ease of the increasingly successful application of plastics which take advantage of these characteristics have meant that plastics materials are now manufacturing materials in their own rights and not substitutes. The high strength to weight ratio of some plastics offers big field in the coming age of space travels and rockets. A synthetic product must necessarily be both better and cheaper in order to justify its manufacture. This is essentially true of the various plastics when compared to the material they are to replace.

Since plastics combine all the fine characteristics of a building material together with good insulating properties, and are fireproof as well, it is no wonder that the architects and engineers have turned to them to add color and attractiveness to modern homes and offices. Engineers have created hundreds of different plastics, each with its own properties. They have developed plastics that can replace metals, natural fibers, paper, wood and stone, and glass and ceramics. For example, plastic siding does not dent as easily as that made of aluminum. Plastic pipes are lightweight and easy to cut and join.

Moreover, they do not corrode like metal pipes. Plastic wall tiles, bathtubs, and sinks are less fragile, cheaper and easier to install than ceramic ones. Plastics are also used to make insulating foam that blocks the flow of heat and sound. Foamed plastics have very low compressive and tensile strength.

A lot of decorative plastics now available have brought about a revolution in interior and exterior design. They can be used between two layers of a hard surface material, such as a metal or plywood, to create a laminated sandwich panel with high stiffness. Laminated panels are used as floors, partitions and exterior walls in building. Laminate is a strong material manufactured from many layers of paper or textile impregnated with thermosetting resins. This sandwich is then pressed and subjected to heat. Laminate has been developed for both inside and outside use. It resists severe weather conditions for more than ten years without serious deformation. As a structural

material it is recommended for exterior work. Being used for surfacing, laminate gives the tough surface.

Nowadays plastics can be applied to almost every branch of building, from the laying of foundation to the final coat of paint.

33. Choose the correct variant and complete the sentences

1. Plastics can be applied _____.
a) only in radio engineering, b) to almost every branch of building
2. Decorative plastics have brought about _____.
a) some advantages, b) a revolution in interior and exterior design
3. Plastics are used _____.
a) only for decoration, b) are sufficiently rigid to stand on their own without any support
4. Laminate has been "developed for _____.
a) only inside use, b) only outside use, c) both inside and outside use
5. Laminate is impregnated with _____.
a) thermo-setting resins, b) rubber
6. The sandwich is pressed and subjected _____.
a) to cold, b) to heat
7. The laminate gives _____.
a) a mild surface, b) tough surface

34. Answer the following questions.

1. Where can plastics be applied?
2. What advantages do plastics offer?
3. What does plastic material consist of?

35. Which of these English sentences apply to wood, brick, concrete and plastic?

1. It is the most ancient building materials. 2. They were used thousands years ago. 3. Architects use it to add beauty to modern homes and offices. 4. It burns and decays. 5. Its main components are synthetic resins. 6. It is light and easy to work. 7. It is a mixture of sand, cement, crushed stone and water. 8. It is an example of artificial stone. 9. Raw materials are coal, peat, and oil. 10. It is the natural building material. 11. It has good insulating properties. 12. It has a mechanical strength and compactness. 13. It is fire resistant. 14. It is light and water resistant. 15. This material is provided by different kinds of trees. 16. Synthetic resins are the main raw material for production of this material. 17. In can be hollow, porous and lightweight. 18. It is employed as a building material in the form of boards. 19. It sets under the water. 20. It can be used for decorative purposes. 21. It is laid in place with the help of mortar. 22. Prefabricated blocks are made of it and they are employed for skeleton structures.

36. Complete the sentences

1. The basic sources of plastic are _____.
2. The characteristics of plastics, which increase its use in industry and by consumers, are _____.
3. It will be used in this age of space travels and rockets because of _____.
4. Plastics offer new shapes in building and application in exotic structures because of combination of _____.

37. Define tense and voice of the selected predicates

1. Lime is a basic building material used all over the world as today so in the ancient world.
2. The Roman period was followed by other periods each of which produced its own type of architecture and building materials.
3. The knowledge of how to make durable concrete has been lost for centuries.
4. Many structures made of concrete remain till nowadays thus proving the long life of buildings made of concrete.
5. Modern buildings have demonstrated the advantages of reinforced concrete arches, metal frames and glass walls.
6. The new material has been tested successfully and is now being used for irrigation systems, roads, pavements and other structures.
7. The use of precast (сборный) concrete has many advantages over other building materials.
8. Steel has come into general use with the development of industry.
9. Reinforced concrete houses are produced by a variety of construction methods.
10. Materials that are used for structural purposes should meet several requirements.
11. Concrete is referred to as one of the most important building materials.
12. Steel has come into general use with the development of industry.
13. The architects and engineers have turned to plastics to add beauty to modern homes and offices.
14. We use many building materials for bearing structures.
15. Timber is a name applied to the cut material derived from trees.
16. These characteristics are possessed by all metals but the metals themselves differ from one another.
17. Cast iron is chiefly used in building for compressed members of construction, as the supporting members.

38. Put questions to the words in italic

1. Bricks **made of mud and dried in the hot sunshine** became almost as hard as stones.
2. **The Ancient Egyptians** discovered how to cut stone for building purposes.
3. In **road work** the Romans widely used **timber piles**.
4. Concrete is an artificial kind of stone, much **cheaper than brick or natural stone** and much stronger than they are.
5. **The most commonly used (используемые)** materials are steel, concrete, stone, wood and brick.
6. Wood is **the most ancient** structural material.
7. Stone belongs to one of **the oldest** building materials.
8. **Steel manufacture** requires special equipment and skilled labor.
9. Cast iron is **the cheapest** of the ferrous metals.
10. **Copper** is the best conductor of electricity.
11. **Concrete** is now more widely used **in construction** than all other materials together.

39. Translate the sentences into Russian, paying attention to the different functions of Participle I and Participle II

1. We use many building materials for bearing structures.
2. Timber is the name applied to the cut material derived from trees.
3. Sandstones are composed of grains of sand or quarts cemented together.
4. Cast iron is used in building for compressed members of construction as the supporting members.
5. Durability of cement depends upon the cementing material.

6. For many centuries nature has been destroying stone, changing it into sand.
7. When the concrete hardens and sets, the resulting material gains great strength.
8. Using new kinds of prefab ferro-concrete frames, builders have erected some buildings which can stand earthquakes.

40. Read and translate the text

Aluminum

Aluminum is a considerably new structural material. For a long period it was considered to be rather expensive since its production required the use of electric power. Because of its relatively high cost, aluminum was not very popular as a construction material till the middle of the twentieth century. But now the situation is absolutely different.

Aluminum and aluminum-based alloys are extremely popular and are widely used in various forms for construction purposes.

The advantages of aluminum, compared with other popular metals, are its high strength combined with lightness. High-purity aluminum (about 99% pure) is soft and ductile but its great disadvantage is that it is not strong enough. At the same time it has high corrosion resistance and is used in construction of buildings as bright foil for heat insulation, roofing, exterior and interior architectural ornamentation.

And what about aluminum alloys? They are much more advantageous than pure substance, Aluminum alloys are much harder and stronger than pure aluminum. Besides, pure aluminum is rather difficult to cast while many of its alloys are extremely easily cast. Pure aluminum is easily alloyed with other metals. And these combinations possess a great variety of usage. For example, when alloyed with copper, aluminum possesses additional strength. Unfortunately, it is much less corrosion resistive than alloys with manganese, chromium, or magnesium and silicon.

One more advantage of aluminum is that it can be easily remelted over and over again.

Aluminum combined with oxygen forms a new oxide. Its name is alumina. Alumina is a colorless crystalline substance. It is glass hard, solid and extremely durable.

It should be also noted that being an excellent conductor aluminum is widely used in power engineering. It serves for long-distance transfer of electric power.

41. Answer the following questions

1. Why was aluminum unpopular for a long period?
2. What good qualities does aluminum possess?
3. Where is aluminum in the form of bright foil used?
4. What are the advantages of aluminum alloys?
5. Can aluminum be remelted?
6. In what way is alumina produced?
7. What are its properties?
8. What does aluminum serve in power engineering for?

42. Match the noun(s) on the left with a suitable item on the right. Use each item once only

1	Mortar	A	were put down as a floor.
2	Bricks	B	depends on the material quality.
3	Steel	C	is strengthened by bars.
4	Clay	D	is used to form clay bricks.
5	The boards	E	has high tensile strength.

6	Reinforced concrete	F	is used in adhesive applications.
7	Clay	G	was pressed into steel moulds.
8	A moulding	H	acts as a cementing material
9	The brickwork strength	I	are put together to form a wall.
10	A binder	J	is plastic.

43. Match the pairs of antonyms from A and B and translate them

1	unobtainable	A	strengthen
2	straighten	B	dense
3	dispersed	C	man-made
4	end	D	concern
5	be avoided	E	bend
6	weaken	F	last
7	natural	G	occur
8	indifference	H	available

44. Match the columns

1	component	A	не поддающийся коррозии, коррозиестойчивый
2	conductor	B	черные металлы
3	corrosion-resistant	C	легкий вес
4	ferrous metals	D	легированная сталь
5	alloyed steel	E	проводник
6	light weight	F	нержавеющая сталь
7	cast iron	G	блок, деталь, составная часть
8	stainless steel	H	каменная кладка
9	stone masonry	I	чугун
10	binding materials	J	вяжущие материалы

45. Answer the following questions

1. What naturally occurring and man-made building materials do you know?
2. What areas is the use of building materials usually segmented into?
3. What is the longest lasting building material?
4. What is specific of wood used in construction?
5. What types of bricks do you know? What are the advantages of bricks?
6. What materials are bricks made from?
7. Why is concrete the predominant building material in this modern age?
8. What materials is concrete made from?
9. What type of buildings is metal used for?
10. What do you know about the use of plastics for construction purposes?

Практическая работа 5. Части здания. Parts of a building

Цель: изучить лексику по теме **Части здания**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

chimney	дымоход
shopping mall	торговый центр
transfer loads	переносить нагрузку
guard	сохранять
beam work	балочная работа
foundation	фундамент
cornice	карниз
RCC (Reinforced Carbon-Carbon)	Углерод, армированный углеродным волокном, композитный материал
permanent stability	постоянная устойчивость
masonry buildings	здания из каменной кладки
roof	крыша
superstructure	надстройка
essential materials	основные материалы
wall	стена
plinth	плинтус, цоколь
interior	внутренний, интерьер
sloping (pitched) roofs	наклонные (скатные) крыши
covering	покрытие
slate	шифер
shingles of wood	черепица из дерева
tiles of fired clay	черепица из обожженной глины
ceiling	потолок
luminous surface	светящаяся поверхность
wood joists	деревянные балки
wood rafters	деревянные стропила
steel joints	стальные соединения
sloping planes	наклонные плоскости
suspended ceilings	подвесные потолки
boards made of fibers	волокнистые плиты
acoustical ceilings	акустические потолки
high absorption of sound energy	высокое поглощение звуковой энергии
highly reflective of sound energy	высокая отражательная способность звуковой энергии
electrical installations	электрические установки
air conditioning ducts	воздуховоды для кондиционирования воздуха
water and waste piping	трубопроводы для водоснабжения и отвода сточных вод
electrical and communications wiring	электрическая и коммуникационная проводка
fume ducting	дымоходы
water piping	водопроводные трубы
compressed air lines	трубопроводы для сжатого воздуха
chemical waste piping	трубопроводы для химических отходов
vacuum piping	вакуумные трубопроводы
fuel gas lines	трубопроводы для топливных газов

external walls	наружные стены
self-supporting	самонесущий
compartments	отсеки, комнаты, помещения
timber frame (stud)	деревянный каркас (шпилька)
demountable frame	съёмный каркас
soft flooring	мягкий пол
poured-in-place floor	наливной пол
mastic	мастика
spray gun	пистолет-распылитель
nozzle	насадка

2. Read and translate the text

What is building?

Building or housing is the most fundamental needs for humankind. It gives us shelter. When we see or hear the “building” word, we imagine that a building is tall and has a roof, walls, rooms, etc. However, in a broader sense, the definition of a building is structurally constructive based on bricks, sands, types of cement, water, concrete, metal, etc.

What is building? Building is a kind of structure which is built with materials and including with foundation, plinth, walls, floors, roofs, chimneys, plumbing and building services, fixed platforms, veranda, balcony, cornice or projection, part of a building or anything affixed thereto or any wall enclosing or intended to enclose any land or space and signs and outdoor display structures. For example, houses, factories, shopping malls, hospitals, etc.

The aim of a building is giving shelter along with security. Other purposes such as buildings serve several needs of society primarily as shelter from the weather, security, living space, privacy, to store belongings, supplied electricity and to comfortably live and work.

Types of buildings. Buildings may be load bearing masonry buildings, RCC or steel framed structure buildings. There are many different types of buildings such as: residential houses, schools, colleges & universities, hospitals, factories, workshops, mosques, churches, temples, malls etc.

Basic components & parts of buildings. Building components or parts are essential materials for building construction. All buildings are built with the same components such as foundations, walls, floors, rooms, and roofs. Buildings need to decorate or renovate with paints, plasters, supplied electricity, and doors and windows fittings, fencing, and external other works to finish accurately. All these works called building service. Every building should be provided with water, electricity, ventilation and heating systems. The water supply and sewerage systems are called plumbing. A building has three basic requirements and components. They are: foundation, plinth, superstructure.

3. Complete the following sentences from the text above

1. Building is a kind of structure which is built with materials and including with _____.
2. The aim of a building is _____ security.
3. Buildings may be _____ buildings.
4. All buildings are built with the same components such as _____.
5. All these works called _____.
6. The water supply and sewerage systems are _____.
7. A building has _____ requirements and components.

4. Unscramble the words

hukinmand, dbuiling, plbinumg, omros, foatiundon, elicitectry, chchur, sructture.

5. Match columns

window	здание
paint	фундамент
building	крыша
plinth	пол
heating system	стена
ventilation	окно
plaster	краска
roof	штукатурка
plumbing	плинтус
wall	водоотведение
floor	система отопления
requirements	вентиляция
foundation	требования

6. Read and translate the text

Foundation

It is a well-known fact that every building needs permanent stability. In order to have stability, buildings should have foundations. We know that the function of a foundation is to transfer the loads of a building into the soil. Foundations keep the walls and the floors of buildings from direct contact with the soil. They guard the walls and the floors against the action of the weather- rain, snow, and wind. They also guard buildings against sinking that may cause cracks in the walls.

Foundations can be divided into two categories such as shallow and deep foundations. The words shallow and deep indicate as the depth of foundation in the soil. Shallow foundations used for small and light buildings for e.g. a small or medium size houses, small shopping centers, etc. and deep foundations used for heavy and large buildings for e.g. tall buildings, huge shopping malls, large hospitals, and universities, etc. Generally, shallow foundations can be made in depth of as little as 3ft (1m) and deep foundations made at depth of 60-200ft (20-65m). All these foundations work to make columns, walls, rooms, and living spaces. Depends on different types of foundations, workers use various amounts of building materials, for example, in beam work, workers make pile foundations.

Functions of foundations:

1. The plinth is that part of between surrounding ground surface and floor space immediately the above the ground of a building. Plinth resists entry of rainwater and insects inside the building. General plinth height is 45, 60, 75, 90, 120 cm.

2. The superstructure constructed above the underground level. The location between the underground level and the ground level is known as the plinth. In this structure, walls and rooms are constructed and transfer loads from the upper part to the substructure.

7. Answer the questions

1. What are the functions of a foundation?
2. What two categories can foundations be divided into?
3. What are shallow foundations used for?
4. What is general plinth height?

8. Put the following sentences into tag questions

1. It is a well-known fact that every building needs permanent stability.
2. The words shallow and deep indicate as the depth of foundation in the soil.
3. Walls and rooms are constructed and transfer loads from the upper part to the substructure.
4. Generally, shallow foundations can be made in depth of as little as 3ft (1m) and deep foundations made at depth of 60-200ft (20-65m).
5. Foundations keep the walls and the floors of buildings from direct contact with the soil.
6. Workers use various amounts of building materials.

9. Find English equivalents from the text above

1. хорошо-известный факт
2. постоянная стабильность
3. переносить нагрузку
4. предохранять здание от затопления
5. жилое пространство

10. Read and translate the text

Roof and ceiling

The roof is a necessary component of practically every building. It serves to protect the interior of the building from rain, snow, wind, and cold. There exist many types of roofs, the main ones being sloping (pitched) roofs and flat (or nearly flat) ones.

It is a well-known fact that every roof should have a covering. The type of covering of a roof mainly depends on the form of the roof and some other factors. The pitched roof is known to dry itself quickly of water. Therefore it can be covered with roofing materials consisting of small individual units. To these belong, for example, slate, shingles of wood, tiles of fired clay or concrete. These materials are widely used and popular as roofing coverings since they have a number of useful qualities. So if a pitched roof is manufactured of properly chosen material and is well installed, it looks beautiful and attractive. But, of course, pitched roofs have their disadvantages. Roofs of this kind should not be installed on broad and large buildings. They do not look attractive on such buildings.

The ceiling surface is an important functional component in any room. It can have a luminous surface or a richly ornamented and decorated surface. It is of importance to note that it should be constructed in such a way as to help control the spread of light and sound about the room. One more important feature of the ceiling surface is its resistance to the spread of fire. A well-designed ceiling is one of the most pleasing features of a room. Ceilings can be produced of many various materials both natural and artificial. Their colors, texture, pattern, and shape are of great importance for the visual impression of the room. They may be attached to wood joists, wood rafters, or steel joints.

A ceiling can be a simple, level plane. Or it can be two or more sloping planes. It should be noted that these planes correspond to the form of the roof construction above. Suspended ceilings can be produced of almost any materials. Among them the most widely used are gypsum, board, plaster, and various boards made of fibers. Ceilings produced of fibrous materials are classified as acoustical ceilings. Their most useful property is high absorption of sound energy. As to plaster of gypsum board ceilings, they are highly reflective of sound energy.

Nowadays suspended ceilings have become a very popular and economical feature in many types of buildings. The most numerous among these buildings are office and laboratory structures. Many of them install and maintain complex mechanical and electrical installations

above the ceiling. These installations include air conditioning ducts, water and waste piping and electrical and communications wiring. They also include such services as fume ducting, vacuum piping, fuel gas lines, compressed air lines, water piping, and chemical waste piping.

11. Read the following statements and say whether they are true or false. Correct the false statements

1. There exist few types of roofs, the main ones being sloping (pitched) roofs and flat (or nearly flat) ones.
2. These materials are widely used and popular as roofing coverings since they have a number of unuseful qualities.
3. Roofs of this kind should not be installed on broad and large buildings.
4. The ceiling surface is an unimportant functional component in any room.
5. Ceilings can be produced of many various materials both natural and artificial.
6. Among them the most rarely used are gypsum, board, plaster, and various boards made of fibers.
7. These installations don't include air conditioning ducts, water and waste piping and electrical and communications wiring.

12. Answer the following questions

1. What is a necessary component of practically every building?
2. What does the type of covering of a roof mainly depend on?
3. What are disadvantages of the pitched roofs?
4. What materials can suspended ceilings be produced of?
5. What do many office and laboratory structures install and maintain above the ceiling?

13. Fill in the blanks using the words: *double-hung, functions, exist, be placed, ancient, climates, gable, necessary, different, standard, windows, weather, down.* Read and translate the text

Windows

The main _____ of windows are light and ventilation. Windows also serve for ornamentation of a building since _____ times. What are the _____ components of a window? To these belong glass, frames, and sashes. The area of glass in _____ of different types is determined according to the regulations. There _____ single-hung and _____ windows. Both of these types possess one or two moving sashes, securely held in tracks in the frame. Sashes can be fixed or sliding that slide up and _____ in tracks in the frame. Windows may also _____ in roofs. Roof windows may be fixed or openable. Window frame may be solid or cased.

Windows need to be made to a very high _____ of precision if they are to operate easily and maintain a high degree of _____ tightness over a period of many years. In cold _____ especially, a loosely fitted window with single glass and a frame that is highly conductive of heat will significantly increase heating fuel consumption for a building, cause noticeable discomfort to the people in the building, and create large quantities of condensate to stain and decay finish materials in and the window. There are also _____ types of windows such as: fixed, pivoted, double hung, sliding, casement, sash, louvered, metal, bay, corner window, dormer window, _____ window, lantern, skylight.

14. Read and translate the text

Walls and floor

The walls are building blocks of bricks or stones. They divide the building space into various support space slabs, into various beams and rooms. They safely transmit the loads coming on them from beams and slabs to the foundation. They provide privacy and protection against heat, cold, rain, noise, dust, winds.

Classification and design of walls are divided into two categories: external and internal construction. They possess different functions. The function of external walls is to support the upper floors and roof. The units employed for construction of walls are brick, timber, or stone masonry. As to interior walls they are mostly self-supporting. Their main function is dividing the space of the construction. They divide the gross floor area of a building into smaller units — compartments, or rooms. The constructional form for internal walls may be concrete block, timber frame, or stud, and demountable frame.

Floors belong to one of the most important functional components of a building. Floors influence the acoustics of a room: it depends on whether hard or soft flooring is used. They are also subject to the action of feet and the load of furniture. They should also be designed so as to deal with the structural loads they will place on the frame of the building. One should strictly follow the job practice for making poured-in-place floors. The measured materials for making the mastic must be put into the concrete mixer in the strictly correct order. The water and the emulsion should be carefully mixed till the mastic becomes homogeneous. When making a poured-in-place floor, mastic is applied with a spray gun and its nozzle must be kept away from the floor surface.

15. Read the following statements and say whether they are true or false. Correct the false statements

1. Walls divide the building space into various support subspace slabs, into various beams and rooms.
2. They don't provide privacy and protection against heat, cold, rain, noise, dust, winds.
3. Classification and design of walls are divided into three categories.
4. The units employed for construction of walls are brick, timber, or stone masonry.
5. The constructional form for internal walls may not be concrete block, timber frame, or stud, and demountable frame.
6. Floors influence the acoustics of a roof.
7. The water and the emulsion should be carefully mixed till the mastic becomes homogeneous.

16. Answer the following questions

1. What are the walls?
2. What must the measured materials for making the mastic be put into?
3. What are two categories of walls?
4. What is mastic applied with when making a poured-in-place floor?
5. Should the water and the emulsion be carefully mixed till the mastic becomes homogeneous?

Modern building technologies

Цель: изучить лексику по теме **Современные строительные технологии**, повторить грамматический материал.

Содержание работы: тексты для чтения по данной теме, упражнения на усвоение и закрепление лексико-грамматического материала.

Задание: прочитать, перевести тексты, выписать и выучить новые лексические единицы, выполнить ряд предложенных упражнений на закрепление лексики и грамматического материала.

1. Study the vocabulary

cloud-based project management	облачное управление проектами
streamline processes	оптимизированные процессы
manufacturing equipment	производственное оборудование
digital revolution	цифровая революция
advancements	достижения
modular construction	модульное строительство
augmented reality	дополненная реальность
thin joint masonry	тонкая каменная кладка
self-healing concrete	самовосстанавливающийся бетон
sustainable construction	устойчивое строительство
glimpse	бросить взгляд, проблеск
robotic swarm construction	роботизированное роевое строительство
a see-through metal	прозрачный металл
bullet-proof	пуленепробиваемый металл
scalable	масштабируемый
construction costs	затраты на строительство
space-saving	сохраняющий пространство
emerging innovations	появляющиеся инновации
cross-laminated timber	многослойная древесина
biomimetic materials	биомиметические материалы
carbon fiber	углеродное волокно
graphene	графен
interoperability	совместимость
crucial role	решающая роль
sustainability	устойчивость
facility management	управление объектами
implications	последствия
post-construction	после завершения строительства
prefabricated building components	быстровозводимых строительных компонентов
Precast Flat Panel System	система сборных плоских панелей
double-walled polystyrene panels	панели из пенополистирола с двойными стенками
raised floor panels	фальшполы
3D volumetric construction	трехмерное объемное строительство
three-dimensional units	трехмерные элементы
in-situ construction	конструкции на месте
lattice girders	решетчатые балки

reinforcement techniques	методы усиления
join through	соединять с помощью
off-site facilities	оборудование за пределами площадки

2. Read and translate the definitions

Modern building technology, or modern methods of construction (MMC), are modern building techniques used by construction professionals that streamline the construction process with the help of cutting-edge software and manufacturing equipment.

Building techniques are the construction methods associated with various materials, procedures, and applications involved in various construction projects.

3. Read and translate the text

Modern construction technologies transforming the industry

It's no secret that technology is revolutionizing literally every aspect of modern day life. The digital revolution is reshaping industries, and the construction technology sector is no exception. The construction industry, continually being updated and upgraded with the latest technology, is one such example of this. This transformation involves adopting emerging construction technologies that streamline processes, reduce waste, and enhance efficiencies.

Technology in construction comes with devising innovative new ways of constructing and whilst the changing future of construction is largely unknown, there are some construction technology trends that are paving the way for certain futuristic construction technology. We no longer rely solely on bricks and mortar – modern construction technologies have unlocked a world of possibilities. From digital tools and software integrations to robotics, these advancements revolutionize how we build and design structures.

So, what can we definitely expect the future to hold for construction? Here are ten futuristic construction technologies of the future for you to have a gander at.

What are the latest technologies in construction? The latest technologies transforming construction include Building Information Modeling (BIM), cloud-based project management, robotics, drones, innovative materials like self-healing concrete and thin joint masonry, 3D printing, augmented reality (AR), modular construction, and mobile technologies.

Different types of modern constructions involve traditional methods enhanced by tech advancements such as green buildings using sustainable practices, prefabricated or modular structures built off-site, smart homes integrated with IoT devices, lean constructions reducing waste, and micro-homes maximizing small spaces.

Self-healing concrete. Millions of pounds are invested in maintaining, fixing and restoring roads, buildings, tunnels and bridges annually. This is because all concrete eventually cracks and needs to be restored. Self healing concrete would add years to a building's life and be an enormous help time-wise and financially. The science behind this technological marvel shows itself when water enters a crack. This reactivates the bacteria that were mixed in during the mixing process. When the bacteria are activated, it excretes calcite which then heals the crack.

Transparent aluminum. Transparent aluminum is a bullet-proof new state of matter that is almost as strong as steel. Despite its herculean strength, it looks like glass which is four times weaker and shatters easily. Transparent aluminum is a new material and a see-through metal that is just breaking through the construction industry and adds a futuristic feel to buildings. This new material is such advanced construction technology that it is made out of aluminum oxynitride (AION) and is created through the use of laser technology.

Aero gel insulation. Sometimes known as 'frozen smoke', aerogel is semi-transparent and is produced by removing the liquid from a gel, leaving behind the silica structure which is 90% air. Despite being almost weightless, aero gel holds its shape and can be used to create thin

sheets of aerogel fabric. Aero gel fabric is beginning to be used within the construction industry, due to its incredible insulation properties. Aero gel insulation makes it extremely difficult for heat or cold to pass through and has up to four times the power of fiberglass or foam insulation.

Robotic swarm construction. Developed by researchers at Harvard, robotic swarm construction was designed based on how termites work. Termites work together like a ‘swarm’ and construction robotics are programmed to work together in this manner. Four-wheeled robots are programmed in each instance to build a certain design and come with sensors to detect the presence of other robots, so that they can work together.

3D printed houses. 3D printed houses are a glimpse into the future of construction. 3D printing homes will involve creating parts off-site and constructing the building on another occasion. It was pioneered by Apis Cor and based on San Francisco recently proved that they can 3D-print walls out of concrete in a relatively short space of time. The ‘printer’, which is similar in look to a small-scale crane, sets layers of concrete mixtures. 3D printed homes could be a great solution for quickly covering the housing needs of people who have been affected by physical disasters such as tsunamis, hurricanes and earthquakes or for those in poverty.

Smart roads. Also known as smart highways, smart roads are the future of transport and involve using sensors and IoT technology to make driving safer and greener. They give drivers real-time information regarding traffic information (congestion and parking availability for example) and weather conditions. This innovative technology can generate energy, charging electric vehicles on the move, as well as for street lights.

Bamboo cities. Bamboo cities are cities made from innovative modular bamboo structures that interlock. It’s a form of sustainable construction and a renewable resource that is stronger than steel and more resilient than concrete. The purpose is to hold a new community in the trees and as the number of inhabitants increases, the structure will extend to accommodate this. As the structure extends to accommodate the number of people, it grows in strength. Modular structures are incredibly scalable and can grow in any direction, making it perfect for a city in the trees. Another added bonus – they can resist earthquake tremors due to bamboo’s high flexibility.

Smart bricks. Smart bricks are modular connecting bricks and are similar to ‘Lego’. Made out of high strength concrete and developed by ‘Kite Bricks’, smart bricks are versatile and come with substantial thermal energy control and a reduction in construction costs. As they are modularly designed, they are easy to connect and have space for insulation, electricity and plumbing.

Vertical cities. Vertical cities may soon become reality as the world’s population grows and land increasingly becomes scarce. They are tetris-like buildings of towers for thousands of people to inhabit. Supporting a blooming population, vertical cities are a space-saving solution to preserve land for food, nature and production.

Pollution fighting buildings. Also known as ‘vertical forests’, they are high-rise forest buildings designed to tackle air pollution. Pollution fighting buildings will be home to over 1,000 trees and 2,500 shrubs to absorb pollution in the air and to help filter it to make the air cleaner. Trees are highly productive in absorbing carbon dioxide, making this a cost-effective construction innovation.

There you have it – 10 futuristic construction technologies of the future. Construction technology trends will always follow a typical pattern – how to build quicker and smarter, how to be more environmentally friendly and how to house people in different ways. Construction inventions and construction materials will always advance – who knows what the future holds?

4. List and describe the emerging construction technologies mentioned in the text, including their benefits and potential applications.

5. a. Identify and discuss the innovative materials and practices used in sustainable construction, such as self-healing concrete, aero gel insulation, and bamboo cities.

b. Based on current trends and emerging technologies, predict the future directions of construction technology.

6. Match the following terms with their definitions

1	BIM	A	a process that reduces waste in construction
2	AR	B	a building technique using pre-fabricated units
3	IoT	C	a lightweight material with high insulation properties
4	modular construction	D	a mineral excreted by bacteria in self-healing concrete
5	lean construction	E	a compound used in transparent aluminum
6	aerogel	F	a technology that overlays digital information onto the real world
7	calcite	G	a system of interconnected devices
8	oxynitride	H	a digital representation of a building used for planning and management

7. Complete the sentences with the appropriate vocabulary words from the text

1. The use of _____ allows construction teams to collaborate and access project information remotely.
2. _____ is a revolutionary technology that could significantly reduce the need for concrete repairs.
3. _____ are transforming the way we design and construct buildings by providing real-time visualizations.
4. _____ construction aims to minimize waste and maximize efficiency.
5. _____ offer a sustainable solution for housing growing populations in urban areas.

8. Find from the text

- a. synonyms for the following words: *enhance, streamline, resilient, scarce, innovative.*
- b. antonyms for the following words: *traditional, advanced, strong, temporary, expensive.*

9. Use the suffixes -tion, -able, -ly, and -ness to create new words from the following words: *construct, sustain, strong, efficient.*

10. Group the following terms into categories based on their function or purpose

Terms	Possible categories
drones	a. construction materials
robotics	b. digital tools
3D printing	c. construction methods
AR	
BIM	
smart bricks	
aero gel	
self-healing concrete	
transparent aluminum	

11. Answer the following questions

1. How will these futuristic construction technologies impact the environment?
2. What are the potential challenges and limitations of these technologies?

3. Which technology do you find most exciting and why?
4. How do you think these technologies will change the way we live in the future?

12. Read and translate the text

Innovative materials: a game changer in the construction industry

When it comes to innovative materials, the construction industry is certainly not lagging behind. As traditional materials give way to more advanced alternatives, we are witnessing a transformative phase in this sector.

The most impressive of these emerging innovations has been self-healing concrete. This ingenious material utilizes bacteria for the automatic repair of cracks that appear over time – a common issue with conventional concrete. In addition to self-healing concrete, there are several innovative materials shaping the construction industry:

1. *Transparent aluminum*. This new material, also known as aluminum oxynitride, is remarkably strong and is almost as transparent as glass. Its potential applications in construction include bulletproof windows or even transparent structural components. The characteristics of transparent aluminum are excellent optical transparency, clarity, the total absence of birefringence, outstanding hardness and high strength, a wide variety of sizes, shapes, thicknesses, produced using proven ceramic forming processes, cost-effective advanced material, applicable to a wide variety of industries including aerospace, security, defense and semiconductor, energy, and consumer products.

2. *Carbon fiber*. Known for its high tensile strength and low weight, carbon fiber is increasingly being used in the construction industry. It is commonly used as a reinforcing material, especially in bridge construction and retrofitting of older structures. Carbon fiber is a material that is extremely strong and light-weighted. The carbon fiber material is 5 times as strong as steel, two times as stiff, yet weighs about two-thirds less. These fibers are made up of carbon strands that are thinner than a human hair. The carbon strands can be woven together, like cloth, and then they can be molded to any shape you might want. In addition, carbon fibers are strong as well as flexible, so it's the perfect material for construction projects in areas that are exposed to hurricanes and tornados.

3. *Aero gel insulation*. Often termed 'frozen smoke', aero gel is an extremely light material that provides impressive insulation. Deploying aero gel in building insulation can significantly reduce energy costs over the building's lifetime.

4. *Cross-laminated timber (CLT)*. Offering a sustainable alternative to traditional building materials, CLT has similar strength characteristics to concrete but is significantly lighter. This makes it an excellent choice for environmentally-conscious construction projects.

5. *Graphene*. Touted as a 'wonder material', graphene is incredibly strong yet light and flexible. While its use in construction is still in its infancy, potential applications include creating stronger, lighter structures and even assisting with water filtration.

6. *Biomimetic materials*. Inspired by nature, these materials mimic the physical or chemical characteristics of natural materials. A primary example is seashell concrete, a material that mimics the strength and durability of seashells.

7. *Translucent concrete*. The concrete structure is known more for its stability than its great lighting. That was until translucent concrete started to make its way onto the market—this best innovation in construction materials for decorating purposes. Translucent concrete is manufactured by using glass fiber optical strands, which create a solid but sheer block. LitraCon, known as transparent concrete can be used in flooring and pavement. From Research and testing of transparent concrete, it is clear that the optical fibers make up only 4 percent of the mixture. So it shows that concrete blocks made from this material still have the ability to support load-bearing walls.

8. *Electrified wood.* Now you may never have to deal with the Bunch of wires that you need to handle while lighting for home decoration purposes. The Wood European manufacturing company has materials that can incorporate a source of electricity directly into tables and chairs. In that system they inserted two metal layers pressed between the wood of the furniture, making it possible to pass an electrical current through the whole thing. The power is supplied by 12-volt power fed to the metal layers via one connector, and lamps and other devices can be connected via the other. But there is a doubt that if this furniture will work with all electrical outlets, but we're for any piece of furniture that means we don't have to find a way to tie all our wires together.

9. *Pollution absorbing brick.* These bricks are porous concrete blocks designed faceted for directing airflow to a system. And also this brick is cheap compared to a mechanical filtration system, and the main upside is that does not require skilled labor for construction and uses lesser energy.

10. *Wool brick.* This wool brick is made up of clay, combines wool, and natural polymer, and uses naturally available materials, manufacturing wool brick is an excellent step towards sustainable construction, because it has a zero carbon product.

11. *Hydro ceramic.* Recently the researchers developed a new prototype material called hydrodynamics, and it can reduce the internal temperature by as much as 5 degree Celsius compared to the outer temperature. This cooling effect of hydro ceramic comes from the presence of hydro gel in its structure which absorbs the water up to 500 times its weight and this type of innovative cooling system despite being cost-effective and cheaper. Also, it reduces the air conditioning bills by 28% age.

12. *Liquid granite.* According to its inventor, liquid granite has the ability to completely replace cement in concrete. Liquid granite is lightweight and has the same load-bearing capacity as cement, but is made of recycled materials. This material has none of the environmental impacts that cement and concrete do. Liquid granite is made up of between 30 and 70 percent recycled material and uses less than one-third of the cement used in precast concrete. So it can greatly reduce carbon footprint and liquid granite is also fire resistant. It can handle temperatures of up to 1,100 degrees Celsius while still maintaining its structural properties. It does not explode in high temperatures like concrete.

These materials, along with many others still in development, signal a new era for the construction industry, where sustainability, efficiency, and innovative design will become the norm. In line with global efforts towards achieving sustainability goals, using recyclable materials within building projects has become increasingly prevalent. With their innovative approaches and sustainable practices, they are paving the way for a greener and more sustainable future.

13. Answer the following questions

1. What was the most impressive of the emerging innovations at first?
2. What qualities does carbon fiber have?
3. Can you give another name of aero gel?
4. What modern artificial materials can mimic the physical or chemical characteristics of natural materials?
5. What effect of hydro ceramic comes from the presence of hydro gel in its structure?

14. Complete the sentences

1. _____ structure is known more for its _____ than its great lighting.

2. Liquid Granite is made up of _____ and uses less than one-third of the cement used in precast concrete.
3. This _____ brick is made up of clay, _____, and uses naturally available materials.
4. Recently the _____ a new prototype material called _____, and it can reduce the internal temperature by as much as _____ Celsius compared to the outer temperature.
5. _____ bricks are porous concrete blocks designed faceted for directing airflow to a system.

15. Read the following statements and say whether they are true or false. Correct the false statements

1. The characteristics of liquid granite are excellent optical transparency, clarity, the total absence of birefringence, shapes, thicknesses, produced using proven ceramic forming processes, cost-effective advanced material etc.
2. These materials don't signal a new era for the construction industry, where sustainability, efficiency, and innovative design will become the norm.
3. This cooling effect of hydro ceramic comes from the presence of hydro gel in its structure which absorbs the water up to 500 times its weight.
4. Liquid Granite is made up of between 50 and 80 percent recycled material.
5. It can handle temperatures of up to 1,500 degrees Celsius.
6. Also, it reduces the air conditioning bills by 27% age.

16. Define Tense and Voice of the selected predicates

1. It comes to innovative materials.
2. Innovative design will become the norm.
3. Using recyclable materials within building projects has become increasingly prevalent.
4. They are paving the way for a greener and more sustainable future.
5. Liquid granite has the ability to completely replace cement in concrete.
6. Recently the researchers developed a new prototype material called hydrodynamics.
7. The power is supplied by 12-volt power fed to the metal layers via one connector.

17. Read and translate the text

Building Information Modeling

BIM is another fast-rising innovative technology in construction across the globe. It is a crucial tool for modern architectural, engineering and building processes. With good interoperability, this technology allows for the creation of one or more precise digital models of buildings. With its applications to projects in levels and dimensions, it's a new technology backed by the governmentally approved ISO19650 standard.

BIM software enabling interoperability in 2022 includes Revit, Navisworks, Tekla, BIM Collab, Plannerly and Autodesk BIM 360. BIM covers a wide range of dimensions and levels. It has been used on several projects. John Sisk & Son applied BIM in the Quintain Wembley project in London through its Digital Project Delivery (DPD) approach. It was also applied with Revit to model the NHS Nightingale Hospital, East London.

The construction industry is undergoing a transformation, with digital technologies such as BIM playing a crucial role. BIM goes beyond creating visually stunning 3D models; it streamlines decision-making processes at every stage of a project. This emerging construction technology provides an accurate digital representation of both the physical and functional aspects of a facility.

This invaluable tool allows architects, engineers, and contractors to anticipate potential issues before they become costly problems. It also helps to reduce waste and increase sustainability by tracking the entire lifecycle of a project from design to post-construction. The implications are far-reaching, with BIM being used for everything from infrastructure planning and facility management to safety planning and fire prevention.

18. Find English equivalents from the text above

1. информационное моделирование зданий
2. бесценный инструмент
3. сократить количество отходов
4. цифровые технологии
5. Реализация цифрового проекта
6. утвержденный правительством стандарт

19. Put questions to the words in italic

1. The construction industry is undergoing a transformation, with **digital technologies such as BIM playing a crucial role.**
2. BIM software enabling interoperability in **2022** includes **Revit, Navisworks, Tekla, BIM Collab, Plannerly and Autodesk BIM 360.**
3. **BIM** is another fast-rising innovative technology in construction across the globe.
4. This emerging construction technology provides **an accurate digital representation of both the physical and functional aspects of a facility.**
5. It also **helps to reduce waste and increase sustainability by tracking the entire lifecycle of a project from design to post-construction.**

20. Read the following statements and say whether they are true or false. Correct the false statements

1. It's a new technology backed by the governmentally approved ISO18660 standard.
2. BIM software enabling interoperability in 2023 includes Revit, Navisworks, etc.
3. DPD goes beyond creating visually stunning 3D models.
4. It was also applied with Revit to model the NHS Nightingale Hospital, East London.
5. With good interoperability, this technology allows for the creation of one or more precise digital models of buildings.

21. Correct the mistakes

Sooftwae, teknology, bilding, visialy, infrastractare, strimlaine, arkitektural, indastry, inoveitife.

22. Read and translate the text

The future is here – meet Modern Methods of Construction!

Modern methods of construction (MMC) are innovative building construction techniques used by construction professionals that streamline the construction process. From comprehensive digital design to prefabricated building components, modern construction methods help lower costs and reduce construction time while driving sustainability. Modern construction methods involve both onsite and offsite techniques, and the specific MMCs used by a construction

company will vary depending on the nature of the project. There are a wide variety of innovative modern construction techniques being used by construction professionals today that you should know about.

Pre-engineered/Precast Flat Panel System. In a precast flat panel system, floor and wall units are produced off-site in a specialized facility. The pre-engineered panels are then installed on-site to create structures with minimal construction time. This method is especially useful for projects that involve a repetitive cellular design.

Insulating Concrete Formwork (ICF) Technique. With an insulating concrete formwork (ICF) approach, builders use double-walled polystyrene panels as the basis for the walls of a building. The empty panels are filled with construction-grade ready-mixed concrete to ensure a strong, durable structure. Airtight ICF systems provide excellent insulation for both heat and sound and help buildings to maintain steady thermal mass energy.

Augmented Reality-Assisted Building. Augmented reality (AR) has been touted as one of the most innovative technologies adopted in the construction industry, and for good reason. Leveraging building information modeling (BIM) and wearable AR equipment, developers can explore fully-rendered and completely accurate 3D renderings of particular structures. This is incredibly useful for pre construction planning as well as determining specific materials required for construction in a new building system.

Raised Access Flooring. Raised access flooring is a modular construction method that uses modular floor panels installed over an existing floor surface. The raised floor panels are suspended over the existing floor to create empty space that can be used to channel plumbing, electrical wiring, or HVAC systems rather than installing them in ceiling space. Repairs and maintenance can be much more easily performed through raised access floor panels compared to overhead systems.

3D Volumetric Construction. In 3D volumetric construction, three-dimensional units are produced in a specialized facility and then transported to relevant job sites for assembly. 3D modules can be made with varying degrees of complexity. Some units may be a bare structure while others can come with external finishes and internal features already installed.

Hybrid Concrete Construction. As the name suggests, hybrid concrete construction is a combination of construction methods. Specifically, hybrid concrete construction uses cast-in-place concrete with other precast materials like steel or concrete units. A hybrid method using both in-situ construction and precast materials helps to accelerate facility construction and lower project costs while controlling the overall quality of the building process.

Precast Concrete Foundation. Every building needs a solid foundation but constructing a traditional concrete foundation can be an exhaustive process. With precast concrete foundations the building components are produced in a specialized facility, and then assembled on-site. This method mainly involves the use of concrete piles connected together to form a cohesive foundation system. Precast concrete foundations are ideal for extreme climates or other hazardous construction situations where speed and efficiency are crucial.

Twin-Wall Technology. Twin-wall technology allows for streamlined construction using both precast and in-situ concrete. Two concrete slabs are separated by a cast in lattice girders and then joined through reinforcement techniques. The space between the twin walls is filled with concrete to ensure structural integrity. This construction method is most often used in combination with precast flooring.

Flat Slab Construction. This method uses flat slabs of concrete reinforced with concrete columns. Flat slab construction is a method that eliminates the need for support beams and offers flexibility in the layout of the structure since there are no restrictions on height between floors. As with many modern building techniques, flat slab construction reduces overall time needed for installation and construction.

Modern methods of construction offer tremendous benefits for construction professionals and their clients. But that's not to say that there aren't some challenges with current MMCs. Material availability and labor shortages can impact the progress of construction. But with a

reputable homebuilding partner, these potential problems are not usually a concern. As we've seen from the examples provided above, modern building techniques accelerate project timelines and help to reduce construction costs. But there are other tangible benefits of using modern building methods:

- Eco-friendly. MMCs generally have less environmental impact than traditional construction methods. The MMC production process generates lower emissions compared to conventional material manufacturing, assembly, and installation. Not to mention, the energy-saving insulation of many MMCs can help to reduce carbon footprints.
- Energy-efficient. New construction techniques leverage ultra-efficient insulation, and less energy is required to heat or cool interior space. As energy costs rise around the world, MMCs offer more sustainable energy solutions built-in to every construction project.
- Less risk. Because MMCs are produced in a controlled manufacturing environment and pre-planned using advanced software, there is far less risk in the construction process. Builders don't usually need to work from elevated positions, so the risk of falls and injury is greatly reduced. Hazards like live construction vehicles are also eliminated.
- Higher quality. Traditional construction is subject to delays and unforeseen complications. MMC products made in off-site facilities are standardized and consistent, resulting in higher-quality construction on a shorter timeline.
- Comfortable. Most of all, buildings constructed using MMCs are comfortable and structurally sound. With airtight insulation, indoor temperatures stay cooler in the summer and warmer in the winter.

23. Match abbreviation with the suitable decryption

1	MMC	A	Augmented reality
2	HVAC	B	three-dimensional
3	AR	C	Modern methods of construction
4	ICF	D	building information modeling
5	3D	E	Insulating Concrete Formwork
6	BIM	F	Heating, Ventilating, and Air Conditioning

24. Answer the following questions

1. MMCs generally have less environmental impact than traditional construction methods, don't they?
2. What can impact the progress of construction?
3. What does twin-wall technology allow?
4. Is less energy required to heat or cool interior space when new construction techniques leverage ultra-efficient insulation?
5. What method uses flat slabs of concrete reinforced with concrete columns?
6. In what technology are three-dimensional units produced in a specialized facility and then transported to relevant job sites for assembly?

25. Retell the text above using introductory words and words combinations

I'm going to retell
 In the beginning of
 I've known that
 It was interesting to know that
 Speaking of ____ it turned out that
 The fact that _____ was new for me
 It goes without saying that

Moreover (Furthermore)
To sum up
In conclusion
However

Литература

Основная литература:

1. Афанасьева О.В. Английский язык: 11 класс: базовый уровень/ О.В.Афанасьева, И.В. Михеева, К.М. Баранова. -8-е изд., стереотип. – М.: Просвещение, 2023.-199, (1)с.: ил. - (Rainbow English). 30 шт + ЭБС Знаниум

Дополнительная литература:

1. Маньковская З.В. Английский язык: учебное пособие/ З.В. Маньковская. - Москва: ИНФРА – М. 2024 – 200 с. (среднее профессиональное образование). ЭБС Знаниум

2. Английский язык в сфере строительства (English for students of Civil Engineering and Construction): учебник/ О.Н.Анюшенкова.- Москва: ИНФРА-М, 2024.-371 с.-(Среднее профессиональное образование). ЭБС Знаниум