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АНГЛИЙСКИЙ ЯЗЫК

CIVIL ENGINEERING

Пособие

*для студентов, обучающихся по специальности
специального высшего образования
7-07-0732-01 Строительство зданий и сооружений*

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ВВЕДЕНИЕ

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«Construction», «Building Construction», «Roads», «Natural Building
Materials» «Artificial Building Materials».

Unit 1. BRIDGES

Lesson 1. WHAT IS A BRIDGE?

Pre-reading task

Exercise 1. Read the words and learn them.

Outstanding [□] –

Bridge [] –

To measure [me] – □ □

Structure [str kt] – □

Vehicle [vi k l] –

Obstacle [bst k l] – □

Canyon [kænj n] –

Ravine [r vi n] – □ □

To range [re n(d)] – □

Occurrence [k r ns] –

Earthquake [k] –

Weight [we t] – □

Railroad [re lr d] – □

Adjacent [d e s()nt] – □

Span [spæn] –

Abutment [b tm nt] –

Single-span bridge [s □ l spæn br d] –

Pier [p] –

Multi-span bridge [m lt spæn br d]

Support [s p t] – □

Take into consideration [te k nt k ns d re ()n] – □

Suitable [su t b()] –

Loads [l dz] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Translate the following sentences into Russian paying attention to the translation of the verb “have”. Decide, whether it is translated as:

иметь (I have three classes today. – У меня сегодня три пары.);

должен (I have to be there in time. – Я должен быть там вовремя.);

не переводится, а является вспомогательным глаголом во временах группы Perfect. (I have lost my key. – Я потерял свой ключ.).

1. There have been several bad accidents at this corner recently.
2. I shall have to take a local train.
3. He did not have much work to do.
4. It's a long time since I have visited that town.
5. I don't want to have any argument.
6. The papers have not yet been sent.
7. They had to walk home because the last bus had gone.
8. I shall have to come to the Institute at 8 o'clock tomorrow.
9. Did you have a lecture on philosophy yesterday?
10. We have four classes a day.

Exercise 4. Translate the following sentences into Russian paying attention to the translation of the verb in the Passive Voice.

1. These computers are made in China.
2. A lot of houses are built in our town every year.
3. Coffee is imported from Brazil.
4. English is spoken all over the world.
5. The table is made of wood.
6. I am always invited to the parties.
7. Airports are built near big cities.
8. The machines are tested for us every day.
9. These books are published in Minsk.

Exercise 5. Read and translate the text to learn more about a bridge.

WHAT IS A BRIDGE?

One of the outstanding statesmen once said in his speech, "There can be little doubt that in many ways the story of bridge-building is the story of civilization. By it we can readily measure an important part of a people's progress." Great rivers are important means of communication for in many parts of the world they have been, and still are, the chief roads. But they are also barriers to communication and people have always been concerned with finding ways to cross them.

For hundreds of years men have built bridges. A bridge is a structure used by people and vehicles to cross areas that are obstacles to travel. Engineers build bridges over lakes, rivers, canyons, and busy highways and railroad tracks. Without bridges, people would need boats to cross

waterways and would have to travel around such obstacles as canyons and ravines.

Bridges range in length from a few feet or meters to several miles or kilometers. A bridge must be strong enough to support its own weight as well as the weight of the people and vehicles that use it. It also must resist natural occurrences, including earthquakes, strong winds, and changes in temperature. Most modern bridges have a concrete, steel, or wood framework and an asphalt or concrete roadway. The roadway is the part of a bridge on which people and vehicles travel.

Most bridges are held up by at least two supports set in the ground. The distance between two adjacent supports is called a span of a bridge. The supports at each end of the bridge are called abutments, and the supports that stand between the abutments are called piers. The total length of the bridge is the distance between the abutments. Most short bridges are supported only by abutments and are known as single-span bridges. Bridges that have one or more piers in addition to the abutments are called multi-span bridges. Most long bridges are multi-span bridges. The main span is the longest span of a multi-span bridge.

A modern bridge probably demands greater skill from designer or builder than any other civil engineering project. Many things should be taken into consideration, and these may vary widely according to local conditions. In deciding what type of bridge is the most suitable the designer has to allow for the type and weight of the traffic, and width and depth of the gap to be bridged, the nature of the foundations and the method of erecting the bridge. The designer has to calculate carefully how the various loads would be distributed and to decide which building materials are more suitable for carrying these loads.

Comprehension

Exercise 6. Answer the following questions.

1. What is a bridge?
2. Who builds bridges?
3. Why do people build bridges?
4. What do most modern bridges have?
5. What is a single-span bridge?
6. What is a multi-span bridge?
7. What part of a bridge is called the roadway?

Exercise 7. Say if the sentences are true or false.

1. Engineers build bridges over such obstacles as rivers, lakes, canyons and so on.
2. Bridges can be from a few feet or metres to several kilometres or miles in length.
3. When people build bridges they also have to pay their attention to such natural occurrences as strong winds, changes in temperature, earthquakes etc.
4. The total length of the bridge is the distance between the spans and piers.
5. Most short bridges are known as multi-span bridges.
6. Most long bridges are single-span bridges.
7. People can't live without bridges.

Vocabulary and Grammar

Exercise 8. Say the same in English.

- 1) _____ 2) _____ 3) _____
- 4) _____ 5) _____
- 6) _____ ; 7) _____
- 8) _____ 9) _____ 10) _____
- 11) _____ 12) _____
- 13) _____ 14) _____ 15) _____ ;
- 16) _____ ; 17) _____ 18) _____ ; 19) _____
- 20) _____ ; 21) _____ ; 22) _____ 23) _____
- _____ ; 24) _____ 25) _____
- 26) _____
- 27) _____ 28) _____ □

Exercise 9. Match the columns.

1	Bridges range in length from...	A	... one or more piers in addition to the abutments.
2	A span of a bridge is ...	B	... to support its own weight.
3	Single-span bridges are ...	C	... a few feet or meters to several miles or kilometers.
4	Multi-span bridges are ...	D	... natural occurrences, including earthquakes, strong winds, and changes in temperature.
5	A bridge must be strong enough ...	E	... the distance between two adjacent supports.

6	The total length of a bridge is ...	F	... on which people and vehicles travel.
7	Most bridges are held up ...	G	... the distance between the abutments.
8	A bridge must resist ...	H	... by at least two supports set in the ground.
9	The roadway is the part of a bridge ...	I	... supported only by abutments.

Exercise 10. Fill in the gaps with the words from the table.

bridge	distance	vehicle	steel	length
build	travel	engineer	structure	

- In the old days people had to _____ several days, weeks and months to get to the place they needed.
- The _____ of this tunnel is 3 km.
- They are going to _____ a new bridge across the river.
- _____ is needed to produce cars, lorries, tractors, trains, etc.
- An early man probably got the idea of a _____ from a tree fallen across a stream.
- The jeep is a small light _____ with great freedom of movement especially for military use.
- The competition to design the bridge started in 1957 and was won by Riccardo Morandi, an Italian civil _____.
- The _____ between Minsk and Moscow is 718 km.
- It's difficult to imagine modern _____ without concrete.

Exercise 11. Match the words with their definitions.

1	Canyon	A	The length of something from one end to the other.
2	Bridge	B	A structure that holds the weight of something above it.
3	Span	C	A deep, narrow valley with steep sides.
4	Abutment	D	The structural frame of a building or other built asset such as a bridge, tunnel and so on.
5	Framework	E	A structure that is built over a river, road, or railway to allow people and vehicles to cross from one side to another.

Exercise 12. Make the plural.

A boat, a foot, a bridge, a river, a lake, an engineer, a span, a vehicle, an abutment, a person, a mile.

Exercise 13. Fill in the gaps with the necessary prepositions and particles.

1. Bridge is a structure used _____ people.
2. A bridge must be strong enough _____ support its own weight.
3. The roadway is the part _____ a bridge.
4. Most bridges are held _____ by at least two supports set _____ the ground.
5. The supports _____ each end of the bridge are called abutments.
6. The total length _____ the bridge is the distance _____ the abutments.
7. Bridges have one or more piers in addition _____ the abutments.
8. Most single-span bridges are supported only _____ abutments.

Exercise 14. Give the missing forms of the verbs.

	V ₁	V ₂	V ₃	Translation
1	build			
2		had		
3			been	
4		held		
5		called		
6	stand			
7			known	
8			supported	
9	travel			

Exercise 15. Translate the following sentences from Russian into English.

1.
 2.
 3.
 4.
-

5. □
6. □
7. □
8. □
9. □ □ □ □ □

Lesson 2. HISTORY OF BRIDGES

Pre-reading task

Exercise 1. Read the words and learn them.

- Log [] –
- Stream [] –
- Span [spæn] –
- Crossbeam arrangement [] –
- Pole [] –
- Well [wel] –
- Stick [] –
- Deciduous [] –
- Fibre [] –
- Arch bridge [] bridge] –
- The Arkadico Bridge –
- Antiquity [] –
- Aqueduct [] –
- Mortar [] –
- Treatise [] –
- To mention [] –
- Plaited [] –
- Military [] –
- The Zhao Zhou (djáodjou) Bridge –
- The Middle Ages [] –
- Drawbridge dr br d –
- Moat [] –

Suspension bridge [□ br d] –
 Just prior [pra] –
 Truss bridge [br d] –
 Timber [] –
 Hubert Gautier – □
 Breakthrough [] – □
 Erection [□] – □ □
 Cast iron [k st a n] –
 Wrought iron [r t a n] –
 Girder bridge [d br d] –
 Cantilever bridge [kənt li v br d] –
 Steel [] –
 Concrete [] –
 Reinforced concrete [] –
 Pre-stressed concrete [] –

Welded bridge [] –
 Cable-stayed bridge [□] –

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read the following numbers first as numbers and then as years.

1955, 2200, 1700, 1500, 2006, 1987, 1578, 1344, 2000.

Exercise 4. Study the suffixes with the help of which the following names of nationalities are formed. Translate the names of the nationalities into Russian.

-ese	Japanese, Chinese, Portuguese, Sudanese, Lebanese
-ian (-an)	Egyptian, Italian, Belarusian, American, Russian
-ish	Polish, English, Turkish, Finnish, Spanish
-i	Pakistani, Iraqi, Israeli, Saudi
others	French, Czech, Dutch, Swiss, Greek, Thai

Exercise 5. Complete the phrases using the following words.

English	German	Greek	Italian	French
Austrian	Turkish	Danish	American	Nigerian
Chinese	Kenyan	Dutch	Swiss	Polish

Example: A man from England is **English**.

1. A man from Italy is ...
2. A man from Greece is ...
3. A man from the USA is ...
4. A man from China is ...
5. A man from the Netherlands is ...
6. A man from Switzerland is ...
7. A man from Germany is ...
8. A man from Nigeria is ...
9. A man from Poland is ...
10. A man from Kenya is ...
11. A man from Denmark is ...
12. A man from France is ...
13. A man from Austria is ...
14. A man from Turkey is ...

Exercise 6. Read and translate the text to learn more about a bridge and its history.

HISTORY OF BRIDGES

The first bridges were made by nature itself – as simple as a log fallen across a stream or stones in the river. The first bridges made by humans were probably spans of cut wooden logs or eventually stones, using a simple support and crossbeam arrangement. Some Americans used trees or bamboo poles to cross small wells to get from one place to another. A common form of sticks, logs, and deciduous branches together involved the use of long fibres woven together to form a rope used for binding and holding together the materials used in early bridges.

The first bridge known to historians was an arch bridge built in Babylon about 2200 BC. The ancient Chinese, Egyptians, Greeks, and Romans also built arch bridges, using bricks and stone as building materials. The Arkadiko Bridge is one of the oldest arch bridges still in existence and use. It was built in the 13th century BC.

The greatest bridge builders of antiquity were the ancient Romans. The romans built arch bridges and aqueducts that could stand in conditions that would damage or destroy earlier designs. The Romans also used cement, which reduced the variation of strength found in natural stone. One type of cement consisted of water, lime, sand, and volcanic rock. Brick and mortar bridges were built after the Roman era, as the technology for cement was lost then later rediscovered.

An ancient Indian treatise mentions the construction of dams and bridges. The use of stronger bridges using plaited bamboo and iron chain was visible in India by about the 4th century. A number of bridges, both for military and commercial purposes, were constructed in India.

Large Chinese bridges of wooden construction existed from 476 to 221 BC. The oldest surviving stone bridge in China is the Zhao Zhou Bridge, built from 595 to 605 AD.

During the Middle Ages, moveable bridges called drawbridges were built across the moats of many castles in Europe.

Rope bridges, a simple type of suspension bridge, were used by the Inca civilization in the Andes Mountains of South America, just prior to European colonization in the 16th century.

Truss bridges were developed in the 1500s.

Most bridges were made of stone or wood until the late 1700s. During the 18th century, there were many innovations in the design of timber bridges. The first book on bridge engineering was written by Hubert Gautier in 1716. A major breakthrough in bridge technology came with the erection of the Iron Bridge in England in 1779. It used cast iron for the first time as arches to cross the river Severn.

Many suspension bridges that hung from wrought iron chains were built in the early 1800s.

The first plate girder bridge was completed in 1847, and the modern cantilever bridge was introduced about 1870. In the late 1800s, steel became the chief material used in bridge construction.

The first bridge made of concrete was built in 1869. A short time later, builders began using reinforced concrete for bridges. During the 1930s, pre-stressed concrete became an important material for bridge building.

In 1927 the first welded road bridge was built.

The modern cable-stayed bridge was introduced in 1955.

Comprehension

Exercise 7. Answer the following questions.

1. What were the first bridges like?
2. What did early Americans use to build bridges?
3. What is one of the oldest survived bridges?
4. Who were the most famous bridge builders?
5. What did Indians use to reinforce the structure of their bridge?
6. When was the oldest stone bridge in China build?

7. What nation started building rope bridges?
8. What innovation was introduced in the XVIII century?
9. What bridge was built in 1927?

Exercise 8. Say if the sentences are true or false.

1. Aliens built the first bridges.
2. The first bridge known to historians was a girder bridge.
3. Aqueducts and arch bridges were built by the Romans.
4. The Roman technology for cement was lost then later rediscovered.
5. Ancient Indians started building bridges and dams using bamboo and iron chains.
6. The oldest surviving bridge in China was made of wood.
7. Moveable bridges were built across the moats of many castles in Europe during the Middle Ages.
8. A rope bridge is the prototype of an arch bridge.
9. First rope bridges appeared in South America.
10. Steel became the chief material used in bridge construction in the 20th century.

Vocabulary and Grammar

Exercise 9. Give the English equivalents to the following words and word combinations.

- | | | | |
|-----|-----|-------|-------|
| 1) | 2) | 3) | ; |
| 4) | | 5) | 6) |
| 7) | 8) | 9) | 10) |
| 11) | 12) | ; 13) | ; 14) |
| 15) | | 16) | ; 17) |
| 18) | 19) | 20) | |
| 21) | 22) | ; 23) | ; 24) |

Exercise 10. Put the following words into the correct column.

Span, stick, cement, arch, destroy, pole, timber, erect, branch, aqueduct, steel, weld, cast iron, rope, suspension bridge, cut, sand, damage, volcanic rock, dam, stand, cross, mortar, log, lime, build.

Building materials	Actions	Structures

Exercise 11. When were these bridges built? Match the columns.

1	Suspension bridges	A	In the early 1800s
2	Cable-stayed bridges	B	Before the 16 th century
3	Arch bridges	C	During the Middle Ages
4	Cantilever bridges	D	In 1955
5	Welded road bridges	E	In 1847
6	Truss bridges	G	About 2200 BC
7	Girder bridges	H	In 1927
8	Drawbridges	I	In the 1500s
9	Rope bridges	J	About 1870

Exercise 12. Fill in the gaps with the necessary prepositions.

1. Rope bridges were used _____ the Inca civilization _____ the Andes Mountains of South America.

2. The first bridge made _____ concrete was built _____ 1869.

3. Some Americans used trees or bamboo poles to cross small wells to get _____ one place _____ another.

4. One type of cement consisted _____ water, lime, sand, and volcanic rock.

5. The first book _____ bridge engineering was written _____ Hubert Gautier in 1716.

6. _____ the Middle Ages drawbridges were built _____ the moats of many castles _____ Europe.

_____ the late 1800s, steel became the chief material used _____ bridge construction.

Exercise 13. Put the words in the right order.

1. As / people / used / the ancient / bricks / stone / and / materials / building.

2. Later / bridges / builders / for / began / reinforced / using / concrete.

3. People / bridges / built / many / of / castles / the moats / moveable / across.

4. Were / bridges / made / most / of / stone / wood / and.

5. Were / Greece / aqueducts / in / ancient / and / Egypt / ancient / used / ancient / Rome.

Exercise 14. Match the words with their definitions.

1	aqueduct	A	A structure, consisting of a curved top on two supports that holds the weight of something above it.
2	dam	B	A long deep hole, usually filled with water dug for defense round a castle, fort etc. in former times
3	concrete	C	A natural flow of water moving across country between banks
4	arch	D	A thick piece of tree trunk or branch, especially one cut for burning on a fire or building something
5	moat	E	A watercourse constructed to carry water from a source to a distribution point far away
6	brick	F	Building material made by mixing sand, very small stones, cement, and water
7	log	G	A barrier that stops or restricts the flow of water or underground streams
8	stream	H	A hard piece of baked clay used for building

Exercise 15. Fill in the gaps with an appropriate derivative of the word in brackets.

1. The Romans also used cement, which reduced the variation of strength found in _____ stone. (NATURE)

2. A major breakthrough in bridge technology came with the _____ of the Iron Bridge in England in 1779. (ERECT)

3. The Arkadiko Bridge is one of the oldest arch bridges still in _____ and use. (EXIST)

4. Steel became the chief material used in bridge _____ in the late 1800s. (CONSTRUCT)

5. The greatest bridge _____ of antiquity were the ancient Romans. (BUILD)

6. The Romans also used a type of cement that consisted of water, lime, sand, and _____ rock. (VOLCANO)

7. The ancient Chinese, _____, Greeks, and Romans built arch bridges, using bricks and stone as building materials. (EGYPT)

8. The first bridge known to _____ was built in Babylon about 2200 BC. (HISTORY)

Exercise 16. Give the missing forms of the adjectives.

	Positive	Comparative	Superlative
1	large		the largest
2	ancient		
3		older	
4			the most important
5		stronger	the strongest
6	high		
7		earlier	the earliest
8	simple		
9			the greatest
10		smaller	
11		more visible	
12	modern		

Exercise 17. Translate the sentences from Russian into English.

1.
2. —
3.
4.
5.
6. —
7. —

Exercise 18. Find information about:

- **An ancient bridge and describe it.**
- **A modern bridge and describe it.**

Lesson 3. THE BROOKLYN BRIDGE

Pre-reading task

Exercise 1. Read the words and learn them.

- Steel cable [□] –
Tower [] –
To hold (held, held) [] –
To hang (hung, hung) [□] –
Experience [] –
Exactly [□ □] –
Wood [] – (),
To force into [] –
Dangerous [□ □] –
Accident [□ □] –
Sick [] –
To encourage [] – ,
Pain [] –
Similar [] – ,
Cripple [□] – ,
Construction [□] –
Wonder [] –
Traffic [trəf k] –

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Answer the following questions before reading the text.

1. Have you seen any pictures of the Brooklyn Bridge?
2. Do you know where the Brooklyn Bridge is situated?
3. Can you describe what it looks like?

Exercise 4. Read and translate the text to learn more about the Brooklyn Bridge.

THE BROOKLYN BRIDGE

The Brooklyn Bridge was built in the year 1883. It is still one of the most popular places of interest in New York.

The plan for the Brooklyn Bridge was made by a man named John Roebling. This was in the year 1867.

Roebling was a German. He had come to the United State to live when

he was twenty-five years old. In 1867 Roebling was already quite famous. Years before he had invented the steel cable. Using this steel cable, he has built several bridges, one at Niagara Falls and a second across the Monongahela River at Pittsburgh. He was sure he could build this new bridge.

It was decided to give Roebling a chance. A company was organized. Roebling was head engineer. He began to work making the plans for the bridge. He sent his son Washington to Europe to study some new bridges there. Some experiments had been made with working in a large box under water.

And then the accident happened. Roebling was working near the river. A boat struck the dock on which he was standing. Two weeks later he died. Before he died he asked that his son Washington would continue his work.

W. Roebling began to work with the same interest and energy as his father. The bridge was begun. There were many problems. According to the plans, there were to be two large towers. One of these towers was to be on the Brooklyn side of the river and the other was to be on the Manhattan side. From the towers hung a system of steel cables. These steel cables were to hold the bridge.

Today engineers know how to do these things. They have had much experience. They have special machines. But at that time no one knew exactly how to do this work. The Brooklyn Bridge was the first bridge of its kind in the world. They used the new box that Washington Roebling had studied in Europe. The box was made of wood and was about the size of a house. In this box men could work under water. Air was forced into the box and the water was forced out of it. It was very dangerous. No one understood the problems of this kind of work. Men became sick. There were many accidents. Roebling himself worked with the men in the box. He tried to encourage the men.

One day a worker went down into the box. He felt perfectly well. Within half an hour he began to feel strong pains. Five minutes later he was dead. The same thing happened to other men. One day Roebling himself had a similar attack. He could not talk. He could not hear. He became paralysed. After a week or two he felt better. He went back again to work in the box. He had a second attack, more serious than the first. He could not work again. In fact, he was unable to work again during the rest of his life. He remained a cripple. Yet the work had to continue. And Washington Roebling continued to direct the construction of the bridge. His home was near the bridge. He used a telescope. He watched the work every day. His wife

helped him. Each day she went to the bridge. She carried her husband's orders to the men. She worked with the men. At night she returned to her husband. She told him about the work of the day. In this way, year after year the work continued.

In 1876 the first cable was placed from one tower to the other. In 1883 about fifteen years after it was first begun, the bridge was officially opened. Many important people, including the President of the US, took part in the ceremony. Washington Roebling watched the ceremony through his telescope.

The bridge was one of the wonders of the nineteenth century. It is still today. There is more traffic on it today than ever before. The bridge remains very strong. It also remains a monument to the two men who built it, John Roebling and his son Washington.

Comprehension

Exercise 5. Complete the sentences.

1. When John Roebling came to the United States ...
 - a) nobody knew him;
 - b) he was known for his invention;
 - c) only his friends knew about him.
2. Washington Roebling ...
 - a) was only making the plans for the bridge;
 - b) was making experiments;
 - c) began building the bridge.
3. During the construction of the bridge the people used the box ...
 - a) which was constructed by John Roebling;
 - b) which was used in Europe;
 - c) which was invented by Washington Roebling.
4. Washington Roebling became a cripple after ...
 - a) he had fallen down the bridge;
 - b) he had had an accident during the construction of the bridge at Niagara Falls;
 - c) he had worked in the box.
5. Washington Roebling ...
 - a) did not live to see the ceremony of the opening of the bridge;
 - b) could see the ceremony;
 - c) was present at the ceremony.

Exercise 6. Answer the following questions.

1. When was the Brooklyn Bridge built?
2. Where is the Brooklyn Bridge situated?
3. When was the plan for the bridge made?
4. Who made the plan for the Brooklyn Bridge construction?
5. Where did John Roebling use the steel cable before?
6. What kind of box did W. Roebling use in his work?
7. What happened to a worker one day when he went underwater in the box?
8. What accident happened to W. Roebling?
9. Who took part in the ceremony of the official opening of the bridge?

Exercise 7. Say if the sentences are true or false.

1. The Brooklyn Bridge was built in the 20th century.
2. John Roebling was born in the United States.
3. When John Roebling came to the United States he was already a well-known specialist.
4. Washington Roebling continued his father's work and began building the bridge.
5. The Brooklyn Bridge was the first bridge of its kind in the world.
6. During the construction of the bridge the people used the box which was used in Europe for work under water.
7. Washington Roebling became a cripple after he had worked on the bridge.
8. Many important people, took part in the ceremony.
9. Washington Roebling did not live to see the ceremony of the bridge opening.
10. The Brooklyn bridge remains a monument to the two men who built it, John Roebling and his son Washington.

Vocabulary and Grammar

Exercise 8. Find in the text English equivalents to the following words and word combinations.

- ; 4)
-
-
- 13) XIX □ ;
-
-

19)

Exercise 9. Fill in the gaps with the words form the box. Translate the sentences into Russian.

Project	bridges	width	cables
chain	depth	rope	brick

1. These steel _____ are necessary to hold the bridge.
2. A big engineering _____ was suggested by a group of designers.
3. The road needs widening as its _____ is not enough for the present-day traffic.
4. For hundreds of years men have built _____ over fast flowing rivers or deep and rocky canyons.
5. The two boats were linked with an iron _____.
6. The first railway bridges were built of stone _____.
7. A _____ was stretched across the street.
8. They were to measure the _____ of the river.

Exercise 10. Odd one out.

- | | | | |
|---------------|-------------|-------------|----------------|
| a) iron | b) steel | c) concrete | d) coal |
| a) road | b) tunnel | | d) bridge |
| a) wood | b) fuel | c) stone | d) brick |
| a) method | b) designer | c) engineer | d) constructor |
| a) new | b) large | c) project | d) strong |
| a) make | b) cable | c) build | d) invent |
| a) experiment | b) work | c) accident | d) every |

Exercise 11. Find in the text the translation of the following sentences.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Exercise 12. Fill in the gaps with the necessary prepositions.

1. The Brooklyn Bridge is one _____ the most popular places of interest _____ New York.
2. The plan for the Brooklyn Bridge was made _____ John Roebling.
3. J. Roebling sent his son _____ Europe to study some new bridges there.
4. In 1876 the first cable was placed _____ one tower _____ the other.
5. The box was made _____ wood.
6. The Brooklyn Bridge was the first bridge _____ its kind _____ the world.
7. His wife told him _____ the work of the day.
8. Many important people took part _____ the ceremony.
9. The bridge was one _____ the wonders of the nineteenth century.
10. There is more traffic _____ the bridge today than ever before.

Exercise 13. Fill in the table with the degrees of comparison of the following adjectives. Translate them into Russian.

	Positive	Comparative	Superlative
1			the most popular
2	famous		
3			the largest
4		better	
5			the newest
6	strong		
7		more serious	
8	dangerous		

Unit 2. TUNNELS

Lesson 1. TUNNEL CONSTRUCTION

Pre-reading task

Exercise 1. Read the words and learn them.

Tunnel [t n()l] –

Complex [k mpleks] –

Challenge [t æl n(d)] – ,

Civil engineering [s v()l end n r] –

Tunneling [t n()l] – □

Masterpiece [m] – □

Passageway [pæs d we] – □ □ □
 Movement [()nt] – □ □ □
 Sewage [d] – □ □ □
 Rock [r k] – □ □ □
 To dig (dug, dug) [d] – □ □ □
 Quarry [kw r] – □ □ □
 To drill [dr l] – □ □ □
 Firm [f] – □ □ □
 Cut and cover [k t nd k v] – □ □ □ ;

Circular [s l] – □ □ □
 Cross-section [kr ()n] – □ □ □
 Horseshoe-shaped [h e pt] – □ □ □
 The Channel Tunnel t æn()l t n()l] – □ □ □
 The Gotthard Base Tunnel – □ □ □
 Switzerland [sw ts l nd] – □ □ □
 Folkstone – () □ □ □
 Calais – e () □ □ □
 Drive on, drive off – □ □ □

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text to learn more about a tunnel.

TUNNEL CONSTRUCTION

Constructing a tunnel is one of the most complex challenges in the field of civil engineering.

Many tunnels are considered technological masterpieces and governments have honored tunnel engineers as heroes.

Building tunnels is a large civil engineering project that could cost very high sums of money. Tunneling is a difficult and dangerous engineering work. The planning and building of a long tunnel may take many years.

A tunnel is an underground passageway, which is built through mountain ranges, under or over rivers. Some tunnels are used for cars, and others are used for trains. Sometimes, a tunnel is used for movement of ships. Some tunnels are built for communication cables and some are built for electricity cables. Tunnels can also provide underground channels for water, sewage or oil. Other tunnels are built for animals.

Tunnels are dug in different kinds of grounds, from soft sand to hard rock. The method of tunnel construction depends on such factors as the ground conditions, the ground water conditions, the length and diameter of the tunnel drive, the depth of the tunnel, the final use and shape of the tunnel. There are two additional ways of digging: quarry and “cut and cover”. In quarry, the tunnel path is drilled in a horizontal way. This system requires a deep tunnel that’s built in a firm rock. In the “cut and cover” system, a tunnel is dug in the ground and, afterwards, a roof is built above the tunnel. This system fits tunnels that are close to the ground like road tunnels and infrastructure.

Modern tunnels are often very long and deep. Some tunnels are over 50 feet in diameter. Many are circular in cross-section. Others are horseshoe-shaped, with a level floor on which it is easy to lay permanent roads and railways. The Channel Tunnel between France and England is one of the longest tunnels in the world. It is 50 km long. The longest tunnel in the world is the Gotthard Base Tunnel. It’s a railway tunnel through the Alps in Switzerland. Its length is 57 km.

The Channel Tunnel

The Channel Tunnel (often called the “Chunnel” for short) is an undersea tunnel linking southern England and northern France. It runs between Folkstone in south Kent and Calais in Northern France. A railway shuttle between Folkstone and Calais carries passengers in cars, vans and other vehicles.

The Channel Tunnel is made of three separate tunnels running parallel to each other. They are two rail tunnels and a service tunnel.

The Channel Tunnel is 50.45 km long. 37.9 km of the Channel Tunnel is under the English Channel, making it the world’s longest undersea tunnel. At its deepest, the tunnel is 75 meters below the sea level.

The idea of building a tunnel between the Continent and Britain dates from the 19th century. First attempts at building the tunnel were made in 1882, but they were soon abandoned, as there was a treaty that the French could use the tunnel for invading Britain. Then in the 70s of the 20th century, the project was resumed. But the work was stopped because of the lack of money. Finally in 1986 the government of Britain and France signed an agreement on building the tunnel and in 1994 the tunnel was opened to traffic. Now a traveller doesn’t depend on weather. He can drive his car to

the station and together with the car take the Euroshuttle train near Folkstone. In 35 minutes he and his car will be in Calais. Such a journey is called drive on, drive off service. Eurotunnel runs passenger shuttle service every 15 minutes.

Comprehension

Exercise 4. Answer the following questions.

1. Is tunneling an easy engineering work?
2. How long does it take to build a long tunnel?
3. What is a tunnel?
4. What are the purposes of tunnel construction?
5. What does the method of tunnel construction depend on?
6. How long can tunnels be?
7. What is the longest tunnel in the world?
8. What countries does the Channel Tunnel connect?
9. When were the first attempts at building the tunnel made?
10. When was the work resumed?
11. Why was it stopped?
12. When was it opened to traffic?
13. How do the passengers go?
14. For how long does the journey last?

Exercise 5. Say if the sentences are true or false.

1. Many tunnels are considered technological masterpieces.
2. Building tunnels is a cheap civil engineering project.
3. Tunnels are used only for movement of cars and trains.
4. Modern tunnels are often very long and deep.
5. The longest tunnel in the world is the Channel Tunnel.
6. The Channel Tunnel runs between Folkstone and Calais.
7. The Channel Tunnel is made of four separate tunnels.
8. The idea of building a tunnel between the Continent and Britain dates from the 20th century.

Vocabulary and Grammar

Exercise 6. Find in the text English equivalents to the following words and word combinations.

- □ □
□

- 11) ; 14) 15) , 16) ; 17)

Exercise 7. Match the synonyms.

- | | |
|----------------|-----------------|
| 1. complex | a. round |
| 2. masterpiece | b. to deepen |
| 3. passageway | c. to construct |
| 4. to drill | d. difficult |
| 5. firm | e. near |
| 6. circular | f. corridor |
| 7. to dig | g. difficulty |
| 8. challenge | h. to excavate |
| 9. close to | i. masterwork |
| 10. to build | j. strong |

Exercise 8. Match the antonyms.

- | | |
|--------------|------------|
| 1. difficult | a. ancient |
| 2. long | b. shallow |
| 3. deep | c. short |
| 4. dangerous | d. hard |
| 5. modern | e. easy |
| 6. soft | f. below |
| 7. above | g. safe |

Exercise 9. Fill in the gaps with an appropriate derivative of the word in brackets.

- The tunnel path is drilled in a _____ way. (HORIZONTAL)
- Many tunnels are considered _____ masterpieces. (TECHNOLOGY)
- Tunneling is a difficult and _____ engineering work. (DANGEROUS)
- A tunnel is sometimes used for _____ of ships. (MOVING)
- The method of tunnel _____ depends on various factors. (CONSTRUCT)
- The _____ of the Gotthard Base Tunnel is 57 km. (LONG)
- There are two _____ ways of digging: quarry and “cut and cover”. (ADD)
- Some tunnels are built for _____ cables. (COMMUNICATE)
- In 1986 the _____ of Britain and France signed an agreement on building the tunnel. (GOVERN)

Exercise 10. Match the words with their definitions.

1	Tunnel	A	A long, narrow way
2	Engineer	B	The building of something, typically a large structure
3	Passageway	C	To make something deeper
4	Rock	D	An artificial underground passage
5	Construction	E	The external form of appearance characteristic of someone or something
6	To drill	F	A solid mineral material
7	Shape	G	A person who designs, builds, or maintains engines, machines, or public works

Exercise 11. Fill in the gaps with the necessary prepositions.

1. Tunnels are dug in different kinds of grounds, _____ soft sand _____ hard rock.
2. The longest tunnel _____ the world is the Gotthard Base Tunnel.
3. Constructing a tunnel is one _____ the most complex challenges _____ the field of civil engineering
4. The method of tunnel construction depends _____ various factors.
5. A tunnel is an underground passageway, which is built _____ mountain ranges.
6. Tunnels can also provide underground channels _____ water, sewage or oil.

Exercise 12. Match the beginning of each sentence with its logical ending.

1	Tunneling is ...	A	for cars, and others are used for trains.
2	The planning and building of a long tunnel ...	B	linking southern England and northern France.
3	Some tunnels are used ...	C	dates from the 19th century.
4	The method of tunnel construction depends on such factors as ...	D	three separate tunnels running parallel to each other.
5	Modern tunnels are ...	E	a difficult and dangerous engineering work.

6	The Channel Tunnel is made of ...	F	often very long and deep.
7	The Channel Tunnel is an undersea tunnel ...	G	may take many years.
8	The idea of building a tunnel between the Continent and Britain ...	H	the ground conditions, the ground water conditions, the length and diameter of the tunnel drive, the depth of the tunnel, the final use and shape of the tunnel.

Exercise 13. Translate the sentences from Russian into English.

1. □
2. □
3. □
4. □
5. □

Exercise 14. Find information about the longest tunnel in the world.

Lesson 2. HISTORY OF TUNNELS

Pre-reading task

Exercise 1. Read the words and learn them.

- Consumption [kɒnsm(p) (ə)n] –
- Sewer [ˈseɪwə] –
- Relatively [rɪlətɪvli] –
- Stable [steɪb(ə)l] –
- Initially [ɪnɪʃ(ə)li] –
- Vicinity [vɪsɪnɪtɪ] –
- Hostile [hɒstəl] –
- March [mɑːtʃ] –
- Harsh terrain [hɑːʃteɪn] –
- Workforce [wɜːkfoːs] –
- Naples [neɪp(ə)lz] –
- Pozzuoli [pɒzuːli] –

Ventilation shaft [vent le ()n] –

Footprint [f tpr nt] – □

Tide [ta d] –

Shipping [p] –

Landscape [læn(d)ske p] –

Scenery [□)r] –

Hazard [hæz d] – □ □

To asphyxiate [s f ks e t] – □

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read these international words and try to guess their meaning.

Egypt, and improved it. With tunnels they were able to transform marches, transport water through mountains, and create pedestrian tunnels through very harsh terrains. To this day historians wonder how much workforce was involved in the construction tunnel between Naples and Pozzuoli that was created around 36 BC. This incredible structure was 4800 foot long, 25 foot wide and 30 foot high, and it even had ventilation shafts. Less than 100 years later in 41 AD, Romans used around 30,000 workers to build even larger tunnel that was 5.6 km long.

In European Middle Ages, tunnels were almost exclusively used for mining or for military. After public transportation they finally started to grow under the affluence of Renaissance and trading with distant lands. Hundreds of smaller tunnels were created between mid-1600s and 19th century, but by then new driving force of tunnel construction came – railroads. This new form of transport soon enabled spreading of tunnels across entire world.

Choice of tunnels vs. bridges

Bridges usually require a larger footprint on each shore than tunnels. In areas with expensive real estate, such as Manhattan and urban Hong Kong, this is a strong factor in tunnels' favor. Boston's Big Dig project replaced elevated roadways with a tunnel system to increase traffic capacity, hide traffic, and redecorate.

Other reasons for choosing a tunnel instead of a bridge include avoiding difficulties with tides, weather and shipping during construction, aesthetic reasons (preserving landscape and scenery).

However, there are particular hazards with tunnels, especially from vehicle fires when combustion gases can asphyxiate users, as happened at the Gotthard Road Tunnel in Switzerland in 2001.

Comprehension

Exercise 6. Answer the following questions.

1. What is a tunnel?
2. Is the length or diameter of a tunnel greater?
3. When were tunnels discovered?
4. What were tunnels initially used for?
5. Who was the first to notice the potential of tunnels?
6. What was the function of irrigation tunnels?

7. What was the function of tunnels in Middle Ages?
8. What form of transport enabled spreading of tunnels across the world?
9. What are the main reasons for choosing tunnels instead of bridges?
10. What hazards are there with tunnels?

Exercise 7. Say if the sentences are true or false.

1. A tunnel is an underground or underwater passage that is primarily vertical.
2. Greeks were the first to see the potential of large underground networks of tunnels.
3. A tunnel may be only for vehicle traffic.
4. Some tunnels are aqueducts to supply water for consumption or hydroelectric stations.
5. Tunnels were initially used for transport of goods and people.
6. Irrigation tunnels were used to transport water through deserts.
7. Due to tunnels Greeks and Romans could transform marches and create pedestrian tunnels through very harsh terrains.
8. In Middle Ages tunnels were used only for mining or military.
9. Railroads contributed to spreading of tunnels across the world.
10. Tunnels usually require a larger footprint on each shore than bridges.
11. Reasons for choosing a tunnel instead of a bridge include avoiding difficulties with tides, weather and shipping during construction, aesthetic reasons.

Vocabulary and Grammar

Exercise 8. Match the synonyms.

- | | |
|----------------|------------------|
| 1. supply | a. link |
| 2. entire | b. impact |
| 3. defensive | c. originally |
| 4. vicinity | d. unbelievable |
| 5. relatively | e. transfer |
| 6. connect | f. protective |
| 7. influence | g. deliver |
| 8. transport | h. comparatively |
| 9. initially | i. surroundings |
| 10. incredible | j. whole |

Exercise 9. Give English equivalents of the following words and word combinations.

- 5) _____ ;
 11) _____ ;
 13) _____ ;
 17) _____ ;
 19) _____ ;

Exercise 10. Choose a word to put into each gap: *combustion, underwater, to transport, ancestors, hazards, mining, to transform, military, mountains, harsh terrains.*

1. A tunnel is an underground or _____ passage that is primarily horizontal.
2. Some 3000 years ago our _____ discovered a new way of connecting _____.
3. Irrigation tunnels were used _____ water underground through deserts.
4. With tunnels, Greeks and Romans were able _____ marches, transport water through _____, and create pedestrian tunnels through very _____.
5. In European Middle Ages, tunnels were almost exclusively used for _____ or for _____.
6. There are particular _____ with tunnels, especially from vehicle fires when _____ gases can asphyxiate users.

Exercise 11. Write the derivatives of the following words.

1. Some tunnels are aqueducts to supply water for _____. (CONSUME)
2. Tunnels were initially used for _____ purposes in the vicinities of important military or royal posts. (DEFEND)
3. The tunnel between Naples and Pozzuoli was created around 36 BC and it even had _____ shafts. (VENTILATE)
4. Romans used around 30,000 _____ to build a tunnel that was 5.6 km long. (WORK)
5. _____ tunnels were used to transport water underground through deserts. (IRRIGATE)
6. In European Middle Ages, tunnels were almost _____ used for mining or for military. (EXCLUSIVE)

Exercise 12. Find information about one ancient tunnel and describe it.

Lesson 3. METHODS OF TUNNEL CONSTRUCTION

Pre-reading task

Exercise 1. Read the words and learn them.

Explosive [ɪk'splɒsɪv] –

Tunnel drive [tʌn(əl)draɪv] –

Drill and blast method [drɪlndblɑːst] –

Blast hole [blɑːsthəʊl] –

Bored tunnel [bɔːrdtʌn(əl)] – □

Cutter head [kʌtəhed] – □

Lining of the tunnel [laɪnɪŋvɔːrdtʌn(əl)] –

Rear end [rɪənd] –

Shaft [ʃɑːft] –

Shallow tunnel [ʃæləwtʌn(əl)] –

Trench [tren(t)ʃ] –

Tunnel boring machine [tʌn(əl)bɔːrɪŋmæʃɪn] –

Cut-and-cover tunnel [kʌtəndkʌvərtʌn(əl)] – ,

Shield [ʃiːld] –

Immersed tube tunnels [ɪmɜːsdtʌn(əl)z] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Method, diameter, detonator, progress, minimize, type, mixture, component, material, element, segment, transport, vertical.

Exercise 4. Before you start reading the text answer the following questions.

Do you know how a tunnel is built?

What are the purposes of tunnel construction?

Exercise 5. Read and translate the text to learn more about the ways of tunnel construction.

METHODS OF TUNNEL CONSTRUCTION

The method of tunnel construction depends on such factors as the ground conditions, the ground water conditions, the length and diameter of the tunnel drive, the depth of the tunnel, the final use and shape of the tunnel.

Drill and Blast is one of the most widely used tunneling methods. It is used when the tunnels are in rock and involves the use of explosives. Explosives and timed detonators are placed in the blast holes. Once blasting is carried out, waste rocks and soils are transported out of the tunnel before further blasting.

Bored tunneling by using a Tunnel Boring Machine (TBM) is often used for excavating long tunnels. Tunnel Boring Machine (TBM) is specially designed for constructing tunnels which could perform different functions during tunneling works. With a large rotating steel cutter head at the front of the shield, TBMs can pass through different types of soil, rock or mixture of both. The TBM can excavate and remove excavated materials and at the same time install the reinforced concrete lining of the tunnel as it progresses. The use of TBM requires relatively less works area, thus minimizing the impact to the traffic of nearby area.

A shaft is built for delivering the components of the TBM from ground level to the tunnel level for assembly. As the TBM pushes forward, the excavated materials will be transported to the rear end of the TBM for removal through the vertical shaft.

Shallow tunnels are often of the cut-and-cover type, while deep tunnels are excavated often using a tunneling shield. For intermediate levels, both methods are possible.

Cut-and-cover is a simple method of construction for shallow tunnels where a trench is excavated and roofed over to carry the load of what is to be built above the tunnel. Strong supporting beams are necessary to avoid the danger of the tunnel collapsing.

There are also several approaches to underwater tunnels, the two most common being bored tunnels or immersed tubes.

Immersed tube construction of underwater tunnels will have its elements built separately in a dry dock or shipyard. These elements are then taken to the site where a trench has already been made under the water to receive them. The segments are then immersed in the water and then joined each other to form the tunnel.

Costs for immersed tube tunnels are considerably lower than those involved in boring a tunnel beneath the water. The speed of construction is also greater, mainly because activities are simultaneously carried out for almost the entire length of the tunnel.

Comprehension

Exercise 6. Answer the following questions.

1. What are the main factors on which methods of tunnel construction depend?
2. What method is applied when tunnel is in rock?
3. What method is preferred for excavating long tunnels?
4. What does drill and blast method use?
5. What is the function of a tunnel boring machine?
6. Where is cut-and-cover method applied?
7. Why are supporting beams necessary in the case of cut-and-cover method?
8. What are the peculiarities of an immersed-tube method?

Exercise 7. Say if the sentences are true or false.

1. The two most common methods of underwater tunneling are cut-and-cover and drill and blast.
2. The elements of immersed tube construction are built in the shipyard.
3. Cut-and-cover method uses explosives in the process of tunneling.
4. Tunnel boring machines can pass through both rock and soil.
5. For intermediate level of depth cut-and-cover method is applicable.
6. The main function of a shaft is delivering the components of the tunnel-boring machine from ground level to the tunnel level.
7. Tunneling shield is used for the construction of shallow tunnels.
8. In the case of immersed tube tunnels activities are simultaneously carried out for almost the entire length of the tunnel.

Exercise 8. Discuss the methods of tunnel construction and find the examples to each method.

Vocabulary and Grammar

Exercise 9. Give English equivalents of the following words and word combinations.

- 1)
- 3)
- 12)

Exercise 10. Using the vocabulary of Text 3 match the words to get the correct word combinations.

- | | |
|-----------------|-----------------|
| 1. tunnel | a. hole |
| 2. ground | b. construction |
| 3. rear | c. drive |
| 4. nearby | d. level |
| 5. blast | e. tube |
| 6. reinforced | f. shaft |
| 7. immersed | g. water |
| 8. intermediate | h. area |
| 9. speed of | i. end |
| 10. vertical | j. concrete |

Exercise 11. Put the steps of cut-and-cover construction in the right order.

1. Services like water pipes and electricity and communication cables are moved away from the tunnel route.
2. The tunnel is opened to traffic.
3. Surveyors mark out the route the tunnel will take and, in particular, the lines the tunnel walls will take.
4. Cranes and excavators arrive on site and build the walls of the tunnel.
5. The floor of the tunnel is built, and anchored into the bedrock below.
6. Excavators remove the dirt and rock from between the walls.
7. The tunnel services are installed including lights, fire protection systems, emergency exits and ventilation fans.
8. The roof beams are installed between the walls to hold them in place.

Exercise 12. Fill in the gaps using the following words: *cut-and-cover, hard rock, blast, tunnel boring machines, trench, immersed tube tunnel, ground, shafts, underwater, sizeable.*

1. Before building a tunnel it is important to examine the conditions and type of _____ and groundwater.
2. Tunnels are dug in types of materials varying from soft clay to _____.
3. A _____ is excavated with ground support as necessary and the tunnel is constructed in it.
4. Are the main entrance in and out of the tunnel until the project _____ is completed.
5. The world's oldest _____ tunnel is _____ River in Turkey.
6. Seven _____ will be used to construct the tunnels for SCL project.

7. A 1.3km SCL cross-harbour tunnel across Victoria Harbour will be built by using _____.

8. _____ is a method of tunnel construction where a trench is excavated and roofed over.

9. The first _____ tunnel in soft ground was the Tronquoy tunnel (_____) on the St Quentin canal in France in 1803.

10. Before the advent of tunnel boring machines, drill and _____ was the only economical way of excavating long tunnels through hard rock, where digging is not possible.

Exercise 13. Translate the sentences from Russian into English using the vocabulary of Unit 2.

1. _____ □
2. _____ □
3. _____ □ □ -1830 .
4. _____ □
5. _____ □
6. _____ □
7. _____ □ □
8. _____ □
9. _____ □ □ □ □ □
10. _____ □ □ □ □ □
11. _____ □ □
12. _____ □

Unit 3. CONSTRUCTION

Lesson 1. FROM THE HISTORY OF HUMAN DWELLING

Pre-reading task

Exercise 1. Read the words and learn them.

Dwelling [dwel] –

Primitive man [pr m t v mæn] –
st r k] –

Cave [ke v] –

To shelter [elt] –

Stone [st n] –

Structure str kt] – □ □

Hut [h t] –

Branch [br n(t)] –

The Ice Age [ði a s e d] –

The Old Stone Age [ld st n e d] –

To build (built, built) [b ld] – □

Wall [w l] –

To feel a need –

Pole [p l] – □ □

Courtyard [k tj d] –

Covered walk [k v d w k] –

Pillar [p l] – □

Ceiling si l –

Quarter [k(w) t] –

Storey st r] –

Brick [br k] –

Window w nd] –

Wicker basket work [w k b sk t w k] –

To plaster pl st] –

Clay [kle] –

Hearth [h] – □

Mud [m d] –

On the other hand [n ð hænd] –

Castle [k □] – á

Huge [] –

– ,

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Modern, construction, industrial, activities, primitive, decoration, model, historic, finish, typical, column, centre, cultural, origin.

Exercise 4. These words can be used both as verbs and as nouns. Make up your own sentences to show the difference in their usage.

Branch, pole, plaster, cover, shelter, attack, paint, need, finish, walk.

Exercise 5. Read and translate the text to learn more about the history of human dwelling.

FROM THE HISTORY OF HUMAN DWELLING

Most of the time of a modern man is spent within the walls of some buildings. Houses are built for dwelling. Large buildings are constructed for industrial purposes. Theatres, museums, public and scientific institutions are built for cultural activities of the people. The purpose of modern buildings differs widely but all of them originate from the efforts of primitive men to protect themselves from stormy weather, wild animals and human enemies.

Protection was looked for everywhere. In prehistoric times men looked for protection under the branches of trees. Some covered themselves with skins of animals to protect themselves from cold and rain but others settled in caves.

When the Ice Age had passed, Europe remained very cold, at least in winter, and so the people of the Old Stone Age had to find some warm and dry place to shelter from bad weather. They chose caves, dwelling places that storm and cold could not destroy. On the walls of their caves ancient people painted pictures. Such decorated caves are found in Europe, Asia and Africa.

When man began to build a home for himself, caves were imitated in stone structures. Trees were taken as a model for huts built of branches. Skins were raised on poles and formed tents.

Primitive stone structures, huts, and tents are the earliest types of human dwellings. They were lost in the prehistoric past but serve as prototypes for structures of later historic times.

In the country ordinary people lived in simple one-storey cottages which did not differ much from the mud and stone huts of an earlier age. The rich people in the country, on the other hand, built huge castles with thick walls

and narrow windows. These castles were built not only as dwellings, but also to stand up to enemy attack and to be strong bases in time of war.

In the days of early civilization, when men had learnt how to build simple houses for their families, they began to feel a need to have a number of different kinds of houses in one place. At first, the difference was mainly in size: the chief or leader had a large hut or tent than the rest of the people. Much later, when men began to build towns, there grew up a difference between town houses and country houses. The streets in towns were very narrow and there was not much place for building within the town walls, and therefore houses had to be built higher than they were in the country. A typical town house consisted of a shop opening on the street where the man did his work or sold his goods, with a kitchen behind and a bedroom above.

The earliest houses of which something is known are those of ancient Egypt. They were built of bricks dried in the sun. Some of them were built around a courtyard or garden with rooms opening into it.

Greek houses, too, had a courtyard in the middle and round their courtyard ran a covered walk, its ceiling supported by pillars. There were special women's quarters, usually upstairs on the second storey.

In Rome bricks were used for building and houses were often finished with plaster over bricks on both inside and outside walls. The centre of family life was a garden-courtyard, surrounded by columns and with rooms opening out into it.

The earliest houses in Britain were round, built of wood or wicker basket work plastered over with clay. In the centre of the house there was a hearth and light came in through the hole in the roof above it and through the door because there were no windows.

Comprehension

Exercise 6. Answer the following questions.

1. Where does a man spend most of the time?
2. What buildings are built for cultural activities of the people?
3. Why did primitive men build their houses?
4. Where did primitive men look for protection?
5. What was the weather like after the Ice age?
6. What was taken as a model for huts built of branches?
7. What is the earliest type of human dwelling?
8. What was lost in the prehistoric past?
9. Where did people live in the country?

10. What did rich people build in the country?
11. When did a man feel a need to have a number of different kinds of houses in one place?
12. Why was it necessary to build higher houses in towns than in countries?
13. What was a typical town house like?
14. What material did ancient people use in Egypt for building?
15. What were the houses like in Greece?
16. What materials were used in Rome?
17. Were the earliest houses in Britain small?
18. How did the light come into early English houses?

Exercise 7. Agree or disagree with the following statements?

1. Most of the time of a modern man is spent abroad.
2. Large buildings are constructed for rich people.
3. In prehistoric times men looked for protection in the open air.
4. On the walls of their caves ancient people raised skins of wild animals to be warm.
5. In the country ordinary people lived in simple one-storey cottages.
6. The rich people in the country built huge castles with thick walls and narrow windows.
7. In the days of early civilization people began to feel a need to have a number of different kinds of houses in one place.
8. People built houses higher in the towns than in the villages because they were richer.
9. A typical house was very simple with many rooms.
10. In ancient Egypt the houses were built from stone.
11. Greek houses had a courtyard in the middle and round their courtyard ran a covered walk.
12. In Rome bricks were used for building.
13. The earliest houses in Britain were round, built of stone.

Exercise 8. Complete the sentences according to the text.

1. _____ are built for cultural activities of the people.
2. In prehistoric times men looked for _____.
3. The people of the Old Stone Age had to _____ from bad weather.
4. On the walls of their caves ancient people _____.
5. _____ were taken as a model for huts built of branches.
6. Primitive stone structures, huts, and tents are _____.
7. In the days of early civilization, when men had learnt how to build simple houses for their families, _____.

Exercise 11. Make the plural.

An enemy, an animal, a picture, a man, a cave, a woman, a family, a wall, a branch, a hut, a house.

Exercise 12. Combine the words with the help of the preposition *of*. Translate these word combinations.

1	the walls	of	A	trees
2	cultural activities		B	the caves
3	the purpose		C	human dwelling
4	the efforts		D	war
5	the branches		E	some building
6	skins		F	wood
7	walls		G	primitive men
8	huts built		H	animals
9	the earliest types		I	houses
10	structures		J	the people
11	in time		K	family life
12	the days		L	modern buildings
13	different kinds		M	branches
14	the centre		N	early civilization
15	to build		O	later historic times

Exercise 13. Write the derivatives of the following words.

1. Theatres, museums, public and _____ institutions are built for _____ activities of the people. (SCIENCE, CULTURE)

2. Modern buildings _____ from the efforts of primitive men to protect themselves from _____ weather, wild animals and human enemies. (ORIGIN, STORM)

3. In _____ times men looked for _____ under the branches of trees. (HISTORY, PROTECT)

4. A _____ town house consisted of a shop opening on the street where the man did his work or sold his goods, with a kitchen behind and a bedroom above. (TYPE)

5. When men had learnt how to build simple houses for their families, they began to feel a need to have a number of _____ kinds of houses in one place. (DIFFER)

6. In Rome bricks were used for _____. (BUILD)

7. The centre of family life was a garden-courtyard, _____ by columns and with rooms opening out into it. (ROUND)

Exercise 14. Fill in the table with the degrees of comparison of the following adjectives. Translate them into Russian.

	Positive	Comparative	Superlative
1	modern		
2	wild		
3		worse	
4			the earliest
5	different		
6		richer	
7	dry		
8			the warmest

Exercise 15. Translate the following sentences from Russian into English.

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

Lesson 2. CONSTRUCTION

Pre-reading task

Exercise 1. Read the words and learn them.

To depend on [d ɪ p ɛ n d ə n] –

Convenient [k ə n v i n i ə n t] –

To remain [r me n] –
 To have something at hand –
 To be engaged [n e d d] –
 To exist [z st] –
 To serve as [s v z] –
 Flat [flæt] –
 Slanting [sl nt] –
 Improved [m pru vd] –
 To flourish [fl r] –
 Thick [k] –
 Invasion [n ve ()n] –
 To manufacture [mænʃ fækt] –
 Advanced [æd v nst] –
 To assemble [semb()l] –
 Site [sa t] –
 Residential [rez den ()l] –
 Unskilled [ld] –
 Former [f] –
 To place [ple s] –
 To hoist [h st] –
 Gantry-crane [kre n] –
 Plumber [pl m] –
 Reinforced concrete [k] –
 Precast concrete k –
 To be in great use [n –
 Prefabricated units [ke t d ts] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Climate, material, region, standard, construction, monument, sphinxes, column, pyramid, tourists, method, industrial, traditional, crane, bulldozer, excavator, decorative.

Exercise 4. These words can be used both as verbs and as nouns. Make up your own sentences to show the difference in their usage.

Part, cover, dry, place, change, manufacture, rain, paint, affect, flourish, hoist.

Exercise 5. Read and translate the text to learn more about construction.

CONSTRUCTION

Man has always been a builder. The kind of house he built in the beginning depended on the climate, on his enemies and on the building material at hand. The first houses in many parts of the world were made of wood, for in those days the greater part of the earth was covered with forests. In other regions the most convenient building material was stone. Although houses were built without cement, the remains of a few of them still exist.

The ancient Egyptians built very simple houses by present standards. Having dried the bricks in the sun they put up four walls and above these they placed a flat roof. The roof was flat because there was very little rain in Egypt. Although their buildings were simple in construction, the Egyptian art of building was very beautiful. Their pyramids and monuments, sphinxes and palaces arouse our wonder to this day.

The first lessons in the art of making columns were given to the world in ancient Egypt.

In our country architecture flourished for the first time in Kiev Russ. Unfortunately, only a few of the church buildings of that period have remained. The churches of the time were strong buildings with thick walls and small windows. They often had to serve as fortresses during enemy invasions. Tourists from all over the world come to see the famous Cathedral of St. Sophia in Polotsk the cornerstone of which was laid in 1037 to commemorate the victory over the Pechenegs.

Since then the architecture and structural materials have been greatly changed. A very advanced construction technique today is the use of precast concrete. According to this method the reinforced concrete units are manufactured at a factory and are then simply assembled at the construction site. This method helped our country to restore its economy after the Second World War, when many residential as well as industrial buildings were destroyed.

The first blocks made of prefabricated units appeared in the villages in the Volgograd and Moscow regions.

At present, the building industry is the largest in Belarus and it holds an important place in the National Economy of our country. Many highly-educated civil engineers, who are trained at Belarusian universities, skilled and unskilled workers are engaged in construction. Builders use many new materials such as reinforced concrete, precast concrete, light weight concrete, gas concrete, many decorative materials, oil paints, wall paper.

Synthetics are among them. Such traditional materials as stone, brick, wood are in great use as well. Various elements and components are assembled on the site.

Now everywhere in Belarus vibro-rolled panels are being widely used in construction. The assembly method is developing into the main method of apartment and industrial construction.

All the working processes are mechanized. Modern construction can't be imagined without building machinery. Lorries, cranes, bulldozers, excavators are available at all construction sites of Belarus. Prefabricated structures are transported by lorries and immediately hoisted into position. Finished blocks of prefabricated flats with interior decoration are assembled on many construction sites. Transport brings a complete flat to the prepared foundations of a building. A powerful gantry-crane lifts the 18–20 ton flat and carefully sets it on the foundation. After the final inspection, electricians, plumbers and gasmen can begin their work.

As a result our country builds more than any other country of the former Soviet Union. Thanks to special government's programmes thousands of Belarusian people get flats every year. Flats have all modern conveniences, such as hot and cold water supply, central heating, lifts, ventilating plants, etc.

The building industry is paid much attention in our country as it affects greatly the general level of living.

Comprehension

Exercise 6. Answer the following questions.

1. What did the kind of house depend on?
2. What materials were the first houses made of? Were they strong?
3. What country was the first to use brick to build houses?
4. What houses were built in ancient Egypt?
5. Why did Egyptians use a flat roof?
6. What arouse our wonder to this day?
7. Where were given the first lessons in the art of marking columns?
8. Where did architecture flourish for the first time in our country?
9. In what way can you describe the churches of the old time?
10. What purposes did they often serve?
11. What do tourists from all over the world come to see?
12. What new materials help to speed up the rate of building?
13. What method helped our country to restore its economy after the Second World War?

14. Who are engaged in construction nowadays?
15. What new materials are used by our builders?
16. Do they use any traditional materials?
17. What sort of panels is being widely used in construction in our country?
18. What is the main method of apartment and industrial construction?
19. What machines are used at all construction sites?
20. Where are the finished blocks of prefabricated flats with interior decoration assembled?
21. With the help of what a complete flat brings to the prepared foundations of a building?
22. What is the role of a powerful gantry-crane?
23. Who begins to work after the last inspection?
24. Why is the building industry paid great attention in our country?

Exercise 7. Say if the sentences are true or false.

1. Man has always been an inventor.
2. The kind of house he built in the beginning depended on his mood.
3. In some regions the most convenient building material was wood.
4. The ancient Egyptians built very fantastic houses.
5. The Egyptian art of building was very beautiful.
6. The first lessons in the art of marking columns were given to the world in ancient Greece.
7. The churches of the time were small buildings with thin walls and without windows.
8. These churches had to serve as dwellings for the poor people.
9. Since the old times the architecture and structural materials were not changed.
10. A very advanced construction technique today is the use of timber.
11. The first blocks made of prefabricated units appeared in the villages in the Vitebsk and Minsk regions.
12. At present, the building industry is the largest in Belarus.
13. Many highly-educated civil engineers, who are trained abroad, are engaged in construction.
14. Synthetics are greatly used in construction.
15. Various elements and components are assembled at the plants.
16. Our builders do not use such traditional materials as stone, brick and wood.
17. Prefabricated structures are transported by gantry-cranes.
18. Lorries, cranes, bulldozers, excavators are available at all construction sites of Belarus.

19. After the final inspection, engineers, electricians and architects can finish their work.

20. The building industry is not paid much attention in our country.

Exercise 8. Choose the best alternative according to the text.

1. The kind of house a man built many years ago depended on _____.

- a) the climate, on his enemies and on the building material at hand;
- b) the weather, on his family and on the building material at hand;
- c) the climate, on the surroundings and on the money he had.

2. The greater part of the earth was covered with forests that's why _____.

- a) the first houses in many parts of the world were made of wood;
- b) all the houses in many parts of the world were built in the forests;
- c) the first houses were built near these forests.

3. The ancient Egyptians put up four walls and _____.

- a) above these they placed a decorative roof;
- b) above these they placed a straight roof;
- c) above these they placed a flat roof.

4. The roof was flat because _____.

- a) there was very little rain in Egypt;
- b) it looked very nice;
- c) it was very hot in Egypt.

5. The first lessons in the art of marking columns _____.

- a) were given to the world in ancient Greece;
- b) were given to the world in ancient Egypt;
- c) were given to the world in ancient Russia.

6. The churches of that time were _____.

- a) small buildings with thin walls and round windows;
- b) strong buildings with high walls and big windows;
- c) strong buildings with thick walls and small windows.

7. The churches often had to _____.

- a) serve as fortresses during enemy invasions;
- b) serve as dwellings to poor people;
- c) serve a place for meetings.

8. A very advanced construction technique today is _____.

- a) the use of prefabricated units;
- b) the use of precast concrete;
- c) the use of a reinforced concrete and wood.

9. According to the modern method the reinforced concrete units _____.

- a) are assembled at a building plant;
- b) are manufactured at a factory;
- c) are produced at a construction site.

10. Such traditional materials as stone, brick, wood are _____.
 a) in great use nowadays;
 b) used only to build small houses;
 c) used as secondary materials.
11. Modern construction can't be imagined _____.
 a) without prefabricated units;
 b) without skillful workers;
 c) without building machinery.
12. Prefabricated structures are transported by lorries and ...
 a) immediately hoisted into position;
 b) hoisted by a big crane;
 c) hoisted into position with the help of modern mechanisms.
13. _____ electricians, plumbers and gasmen can begin their work.
 a) After the final inspection;
 b) After the house is built;
 c) After the final cleaning the territory.
14. _____ thousands of Belarusian people get flats every year.
 a) Thanks to good work of our builders;
 b) Thanks to the good usage of modern methods of building;
 c) Thanks to special government's programmes.
15. The building industry is paid much attention in our country as _____.
 a) it is of great importance for everybody;
 b) it gives possibility to get new flats for people;
 c) it affects greatly the general level of living.

Vocabulary and grammar

Exercise 9. Say the same in English.

- 1) _____ □
- 3) _____ □ ; 5) _____ □
- 9) _____ □
- 11) _____ □
- 14) _____ □
- 18) _____ - _____ □ □ ;
 □ _____ .

Exercise 10. Combine the words with the help of the preposition *of*. Translate these word combinations.

1	the kind	of	A	time
2	were made		B	Belarusian people
3	the greater part of		C	prefabricated flats
4	a few		D	wood
5	the Egyptian art		E	precast concrete
6	art		F	house
7	the churches		G	our country
8	cathedral		H	the earth
9	the use		I	making columns
10	the National Economy		J	them
11	thousands		K	living
12	the general level		L	St. Sophia
13	blocks		M	building

Exercise 11. Make up the sentences.

- Has / man / always / a / been / builder.
- Parts / in / made of wood / were / of the world / the first houses / many.
- Roof / Egypt / the / was / flat / in.
- Egyptian / the / art / building / beautiful / was / very / of.
- The / industry / building / Belarus / the largest / in / is.
- Modern / imagined / without / building / can't be / machinery construction.
- Thousands / every / of / get / Belarusian / flats / people / year.
- All / flats / nowadays / have / conveniences / modern.

Exercise 12. Write the derivatives of the following words.

- _____ pyramids and monuments, sphinxes and palaces arouse our _____ to this day. (EGYPT, WONDERFUL)
- The churches of that period were strong _____ with thick walls and small windows. (BUILD)
- In our country _____ flourished for the first time in Kiev Russ. (ARCHITECT)
- During the Second World War many _____ as well as industrial buildings were destroyed. (RESIDENT)
- Such _____ materials as stone, brick, wood are in great use as well. (TRADITION)

6. The building industry holds an important place in the ____ Economy of our country. (NATION)

7. Modern construction can't be imagined without building _____. (MACHINE)

8. Thanks to special _____'s programmes thousands of Belarusian people get flats every year. (GOVERN)

Exercise 13. Choose a word to put into each gap: *prefabricated structures, fortresses, columns, the bricks, the building industry, precast concrete, wood, unskilled, thick walls, plumbers, cement, civil, building material.*

1. The first houses in many parts of the world were made of _____.

2. In some regions the most convenient _____ was stone.

3. Although houses were built without _____, the remains of a few of them still exist.

4. Having dried _____ in the sun Egyptians put up four walls, and above these they placed a roof.

5. The first lessons in the art of marking _____ were given to the world in ancient Egypt.

6. The churches of the time were strong buildings with _____ and small windows.

7. The churches of that period often had to serve as _____ enemy invasions.

8. A very advanced construction technique today is the use of _____.

9. Many highly-educated _____ engineers, skilled and _____ workers are engaged in construction.

10. _____ are transported by lorries and immediately hoisted into position.

11. After the final inspection, electricians, _____ and gasmen can begin their work.

12. _____ is paid much attention in our country as it affects greatly the general level of living.

Exercise 14. Fill in the chart using the text.

Building Materials	Actions	Structures	Professions	Machinery

Exercise 15. Translate the following sentences from Russian into English.

1.
2.
3.
4.
5.
6.
7.
8.
9.

Lesson 3. BUILDING A HOUSE

Pre-reading task

Exercise 1. Read the words and learn them.

- To check [] –
To permit [] –
Frame [] – , ,
Footing [] –
To supervise [] –
To bolt [] – ,
Sill [] –
Joist [] –
Beam [bi m] –
Midway [m dwe] –
Plywood [pla w d] –
To nail [ne l] –
Lumber [l mb] –
Stud [st d] –
Plate [ple t] –

Carpenter [k ɒ n t] –
 To brace [bre s] –
 Sheathing [i] – □
 Fiberboard [fa b r b d] – - □
 Plasterboard [pl st b d] –
 To tack [tæk] –
 Tar paper [t pe p] –
 Siding [sa d] – □
 Slanted [sl nt d] – □
 Rafter [r ft] –
 Ridge board [r d b d] – □
 Ridge [r d] –
 Shingle [□ l] –
 Flashing [fl □] – □ □
 Chimney [t mn] –
 Slate [sle t] –
 To insulate [nsj le t] – □
 To place directly [ple s d rektl] –
 About midway [ba t m dwe] –
 Building felt [b ld felt] –

□ To prevent from [] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. These words can be used both as verbs and as nouns. Make up your own sentences to show the difference in their usage.

Nail, brace, tack, place, step, check, design, bolt, run, support, lift, weight.

Exercise 4. Read these international words and try to guess their meaning.

Architect, construction, horizontal, vertical, metal, aluminium, material, contract, asphalt, person, consult, expert, zone, specification, information, code, skeleton, idea, form, design.

Exercise 5. Translate the words into Russian.

To build – building; to buy – buyer; to know – knowledge; to construct – construction; to specify – specification; to inform – information; to found – foundation; to insulate – insulation.

Exercise 6. Read and translate the text and get ready to explain what is necessary to begin with if you want to build a house.

BUILDING A HOUSE

Planning a house. If person decides to build a house, he or she must first select a piece of land. The next step is to consult an architect or builder. This expert will check local zoning laws and electrical, building and plumbing codes. Knowledge of these codes protects the buyer in both the present and the future. For example, the zoning law in the area may permit the construction of factories near the new house. Such construction might well decrease the value of the house.

The architect then designs the house, according to the buyer's ideas. He or she makes specifications and blue prints that become the basis for the contract between the builder and the buyer. They provide information on size, materials, and how the house is to be built. The architect also supervises the construction of the house.

The frame is the skeleton around which the rest of the house is built. After the footing and foundation have been formed, workers bolt wooden sills or base plates to the foundation. The sills support the outside walls. Floor joists or support beams are attached to the sills about 16 inches (41 centimeters) apart. A joist runs from one sill and joins with another joist from the opposite sill. They meet at a main support beam or basement wall about midway between the house's sides. Floor boards or plywood nailed on top of the joists make the bottom layer of the floor. The structure then is solid enough to hold the wall frames of the house. Wall frames include vertical pieces of lumber called studs and horizontal pieces called plates. Carpenters assemble and nail together each wall frame separately before attaching it to the sill. Then they lift each frame into place and brace it temporarily. When all the outside walls have been raised, they are nailed together and braced permanently.

The sheathing or inner layer of the outside wall may be wood, fiberboard, or plasterboard nailed to the studs. Sometimes builders tack tar paper to the sheathing before adding the siding or outer layer. Siding may be aluminium, brick, stone, or wood placed directly over the sheathing or tar paper.

The roof seals the top of the house. Some roofs are flat, but most are slanted. Slanted roofs are often formed by pieces of lumber called rafters. Carpenters nail the bottom ends of the rafters to the plates at the top of the outside walls. The rafters slant from the plates and meet at the ridgeboard. A board places at the ridge, or top edge of the roof. Rafters support the weight of the roof just as joists support the weight of the floor.

After carpenters nail sheathing to the tops of the rafters, they add heavy building paper or building felt to it. Then they add the final layer of asphalt or slate shingles, or roofing asphalt. Flashings, or strips of sheet metal, placed around the chimney and other roof openings, insulate the roof from the chimney and also prevent water from leaking into the house.

Comprehension

Exercise 7. Choose the best alternative according to the text.

1. If a person decides to build a house, _____.
 - a) he or she must have enough money;
 - b) he or she must first select some partners;
 - c) he or she must first select a lot or piece of land.
2. _____, according to the buyer's ideas.
 - a) The architect fulfils all the documents;
 - b) The architect designs the house;
 - c) The lawyer chooses everything necessary.
3. The basis for the contract between the builder and the buyer are _____.
 - a) agreements for building the house;
 - b) documents selected by the lawyer;
 - c) specifications and blue prints.
4. The documents which are the basis for the contract provide information on _____.
 - a) size, materials, and how the house is to be built;
 - b) qualification of the workers who will build the house;
 - c) money which is necessary to pay.
5. The frame is the skeleton _____.
 - a) around which all the works are organized;
 - b) around which the rest of the house is built;
 - c) which is the main part of the house.
6. Workers bolt wooden sills or base plates to the foundation _____.
 - a) after the footings and foundation have been formed;
 - b) after they are asked to do this;
 - c) before the footings and foundation have been formed.
7. Floor joists or support beams are attached to the sills about _____.
 - a) 17 inches (41 centimeters) apart;
 - b) 16 inches (42 centimeters) apart;
 - c) 16 inches (41 centimeters) apart.

8. A joist runs from one sill and joins with another _____.
a) joist from the nearest sill;
b) plate from the opposite sill;
c) joist from the opposite sill.
9. Floor boards or plywood _____ make the bottom layer of the floor.
a) covered the top of the joists;
b) nailed on the top of the joists;
c) nailed on the bottom of the joists.
10. _____ separately before attaching it to the sill.
a) Carpenters assemble and nail together each wall frame;
b) Carpenters select and paste together each wall frame;
c) Builders assemble and nail together each wall frame.
11. The sheathing or inner layer of the outside wall _____ nailed to the studs.
a) may be wood, fiberboard, or plasterboard;
b) may be cement, fiberboard, or plasterboard;
c) is necessary to be wood, fiberboard, or plasterboard.
12. _____ before adding the siding or outer layer.
a) Obligatory builders tack tar paper to the sheathing;
b) Sometimes builders tack tar paper to the sheathing;
c) Sometimes builders tack clay to the sheathing.
13. Siding may be aluminium, brick, stone, or wood placed _____.
a) directly above the fiberboard or tap paper;
b) directly over the sheathing or tar paper;
c) at the sides of the walls.
14. The roof seals the top of the house, they may be _____.
a) flat, but most are slanted;
b) only slanted;
c) slanted, but most are flat.
15. Slanted roofs are often formed by _____.
a) pieces of plasterboard called sills;
b) plates of tar paper called rafters;
c) pieces of lumber called rafters.
16. Rafters support the weight of the roof just as _____.
a) beams support the weight of the whole house;
b) studs support the weight of the floor;
c) joists support the weight of the floor.
17. After carpenters nail sheathing to the tops of the rafters, _____.
a) they finish their work and declare about it to a master;

- b) they add heavy building paper or building felt to it;
- c) they add tar paper or shingle to it.

18. Flashings or trips of sheet metal, placed around the chimney and other roof openings, _____.

- a) prevent water from leaking into the house;
- b) prevent mud and clay from coming into the house;
- c) make the roof not dangerous for living.

Exercise 8. Answer the following questions.

1. What is necessary to do first if you decide to build a house?
2. Whom is necessary to consult with?
3. Why is it necessary to consult with an expert?
4. What protects the buyer in both the present and the future?
5. Who designs the house, according to the buyer's ideas?
6. Why is it important to sign the contract between the builder and the buyer?
7. Who supervises the construction of the house?
8. What is the frame?
9. When do workers bolt wooden sills or base plates to the foundation?
10. What supports the outside walls?
11. What runs from one sill?
12. What is called studs?
13. What do carpenters do?
14. What materials are used sheathing or inner layer of the outside wall?
15. What materials re used for siding?
16. What seals the top of the house?
17. What is the form of the roofs?
18. Where do carpenters nail the bottom ends of the rafters?
19. What supports the weight of the roof and the floor?
20. What is placed around the chimney and other roof openings?

Exercise 9. Say if the sentences are true or false?

1. If person decides to build a house, it is necessary to have money.
2. The next step is to consult an architect or builder.
3. The architect designs the house, according to the buyer's ideas.
4. The architect also supervises the construction of the house.
5. The sill is the skeleton around which the rest of the house is built.
6. The sills support the outside walls.
7. Carpenters assemble all parts of the house.
8. Sometimes builders tack decorative paper to the sheathing before adding the siding or outer layer.

Exercise 12. Use the derivatives of the following words.

1. The _____ designs the house, according to the buyer's ideas. (ARCHITECTURE)
2. The expert will check local zoning laws and _____, building and plumbing codes. (ELECTRICITY)
3. _____ of these codes protects the buyer in both the present and the future. (KNOW)
4. The architect makes specifications and blue prints that become the basis for the contract between the builder and the _____. (BUY)
5. All the outside walls are nailed together and braced _____. (PERMANENT)
6. _____, or strips of sheet metal, insulate the roof from the chimney and also prevent water from leaking into the house. (FLASH)
7. The zoning law in the area may permit the _____ of factories near the new house. (CONSTRUCT)
8. Carpenters add the final layer of asphalt or slate shingles, or _____ asphalt. (ROOF)

Exercise 13. Choose a word to put into each gap.

Insulate	frame	joists	walls	prevent	solid
architect	vertical	slanted	horizontal	tar paper	
roof	support				

1. The _____ supervises the construction of the house.
2. The _____ is the skeleton around which the rest of the house is built.
3. The sills support the outside _____.
4. The structure is _____ enough to hold the wall frames of the house.
5. Wall frames include _____ pieces of lumber called studs and _____ pieces called plates.
6. Sometimes builders tack _____ to the sheathing before adding the siding or outer layer.
7. The _____ seals the top of the house.
8. _____ roofs are often formed by pieces of lumber called rafters.
9. Rafters _____ the weight of the roof.
10. _____ support the weight of the floor.
11. Flashings _____ the roof from the chimney and also _____ water from leaking into the house.

Exercise 14. Give the missing forms of the verbs. Translate the verbs.

	V ₁	V ₂	V ₃	Translation
1			made	
2		built		
3	support			
4		protected		
5		became		
6	hold			
7			run	
8		met		
9			checked	

Exercise 15. Make the plural.

An inch, a roof, a wall, a house, a piece, an expert, an idea, a worker, a factory, a layer, a beam, a plate, a chimney.

Exercise 16. Translate the following sentences from Russian into English.

1.

□

2.

□

3.

□

□

4.

□

□

5.

□

□

6.

□

□

□

□

7.

□

□

8.

□

□

Unit 4. BUILDING CONSTRUCTION

Lesson 1. FOUNDATIONS

Pre-reading task

Exercise 1. Read the words and learn them.

To lean [] –

Sinking [s] –

Unevenly [] –

To topple [t p()l] –

To entail [] –

Trial [tra l] –

Pit [p t] –

Undisturbed [nd st – , –

To forecast (forecast, forecast) –

Shift [ft] –

Hollow [l] –

Pile [pa l] –

Load [l d] –

Shaft [ft] –

To float [fl t] –

To grip [] –

To bore [b] –

Ironstone [a nst n] – □

Flotation [fl te ()n] –

Plant [pl nt] –

Chamber [t e mb] –

Basement [be sm()nt] – □

Slab [slæb] –

Filler [f l] –

To lay the foundation [fa ()n] of smth –

To press down [pres da n] – □

To begin with [b w ð] –

By examining [zæm n smth – -

To come to the decision [d s ()n] –

Moistureproof paper [m st pe p] –

()

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Press, engineer, structure, perpendicular, balance, mechanics, problem, construction, column, garage, granite, bulldozer.

Exercise 4. These words can be used both as verbs and as nouns. Make up your own sentences to show the difference in their usage.

Lean, press, shift, weigh, sink, design, balance, compress, load, bore, study, bear, pit, aim, plant.

Exercise 5. Read and translate the text and try to explain the problem of foundations.

FOUNDATIONS

Why does the Leaning Tower of Pisa lean? The answer is that its foundations were not soundly laid. From the earliest times, architects and engineers have been aware of the problems involved in laying a building's foundations. But they have not always realized what extent the earth can be pressed down by the weight of a building. Too little allowance has sometimes been made for the possibility of a heavy structure's sinking unevenly. (Though the Leaning Tower is 14 feet out of the perpendicular, it has never toppled. As the building began to lean over, the builders altered the design of the upper storeys to balance it. At the same time as one side of it sank into the ground, the earth beneath was compressed until it became dense enough to prevent further movement.)

The foundation supports a house. If the earth is stable, laying the foundations of small buildings possess few problems. But in a tall modern structure the load may be very heavy indeed. That's why the foundation engineer has an extremely important job to do. To begin with, he must have a thorough understanding of soil mechanics, which entails a scientific study of the ground to see what load it can bear without dangerous movement.

First construction workers begin excavating, or digging holes or trenches for the footings, the lowest part of the foundation. Trial pits are dug, or holes are bored, in order to collect undisturbed samples of earth from various depths. By examining these, the engineer can forecast the probable shifts in the earth during and after building, according to the sort of foundation he designs. Thus he comes to the most important decision of all in the building's construction: he decides whether the earth is of the type that can best support each column on a separate solid block, or whether he must aim at lightness and, as it were, "float" the building on hollow foundations.

The footings support each wall load. They are made by pouring concrete into wood or steel forms that workers place below the frost line or the depth to which the ground freezes. This is done so that the footings will not freeze and shift. Footings usually extend from 1 to 6 feet (30 to 180 centimeters) beneath ground level. Builders generally use concrete or concrete block for the house's foundation. The foundation may extend from 8 inches to 3 feet (20 to 91 centimeters) above the ground.

If firm ground has been found only at great depth, the foundation engineer may use piles. These are solid shafts made either by driving reinforced, precast concrete deep into the ground, or by boring holes in the earth and pouring in the concrete. Each pile supports its load in one or both of two ways. It may serve as a column with its foot driven into solid earth or rock or it may stand firm because friction along its sides "grips" the column and prevents it from sinking.

The area within the foundation below the first story is the basement. Basements add to the cost of building a house, but they provide extra room. In other words, when it is a question of floating a building, the foundations take the form of a vast, hollow concrete box. This box is divided into separate chambers for the home's heating unit, ventilating plants and laundry equipment, and for storage space for the building. Some basements also have a recreation room.

Only about 40 per cent of the houses, built today, have basements. In many low or damp regions, houses are raised above the ground on concrete piers, or supports.

Sometimes a slab foundation is laid directly on the ground, especially if the earth beneath a house is hard. The ground must first be leveled. Workers then spread a filler, usually stone, and cover it with a moistureproof paper. The filler and the paper prevent moisture from coming through the slab that is made by pouring concrete, about 4 inches (10 centimeters) thick, directly on top of the paper.

Luckiest of all are those foundation engineers whose buildings stand on hard rock like granite or ironstone. For them neither piles nor flotation need to be used.

Comprehension

Exercise 6. Answer the following questions.

1. Were the foundations of the Tower of Pisa soundly laid?
2. What were the problems of a building's foundations from the earliest

times? What was difficult to realize for architects and engineers at that time?

3. What has been done to prevent the Leaning Tower of Pisa from this?
4. Why is it difficult to lay foundation of a tall modern structure?
5. What supports a house?
6. What is most important for the foundation engineer to know?
7. What must engineer learn before deciding what type of foundation is necessary for that soil?
8. What is the most important decision of all in the building's construction?
9. What are the footings made by?
10. Why do workers place the footings below the frost line?
11. What is used for the house's foundation?
12. What are piles?
13. What is a basement?
14. When do the foundations take the form of a vast, hollow concrete box?
15. Why is this box divided into chambers?
16. When a filler is used?
17. What prevents moisture from coming through the slab?

Exercise 7. Say if the sentences are true or false.

1. The foundation of the Tower of Pisa is very properly done.
2. The Tower of Pisa can topple at any moment.
3. If the earth is stable, laying the foundations of small buildings possess a lot of problems.
4. The foundation engineer has an extremely important job to do if the load is very heavy.
5. First construction workers begin excavating, or digging holes or trenches for the footings, the highest part of the foundation.
6. To collect undisturbed samples of earth from various depths it is necessary to use bulldozers.
7. It is difficult for the engineer to forecast the probable shifts in the earth during and after building.
8. The footings are made by pouring water into iron and steel forms.
9. Footings usually extend from 1 to 8 feet above ground level.
10. Builders generally use cement or cement block for the house's foundation.
11. Piles are light shafts.
12. Each pile supports its load in one or both of two ways.

13. A pile may serve as a support.
14. The area within the foundation below the second story is the basement.
15. Basement is very cheap.
16. When it is a question of floating a building, the foundations take the form of a vast, hollow concrete box.
17. This box is divided into sections.
18. Each section has its own function.
19. Garage and storage space are placed under a building.
20. The best variant for buildings to stand on hard rock like granite or ironstone.

Exercise 8. Complete the sentences according to the text.

1. The Leaning Tower of Pisa lean because _____.
2. Laying a building's foundation was a problem for _____.
3. _____ the foundations of small buildings possess few problems.
4. First construction workers begin excavating, _____.
5. In order to collect undisturbed samples of earth from various depths it is necessary _____.
6. _____ that workers place below the frost line or the depth to which the ground freezes.
7. Footings usually extend from _____.
8. The foundation engineer may use piles if _____.
9. A pile may stand firm because _____.
10. _____, but they provide extra room.
11. _____ above the ground on concrete piers, or supports.
12. _____ especially if the earth beneath a house is hard.
13. Workers then spread a filler, _____, and cover it with a moistureproof paper.
14. Neither piles nor flotation need to be used if _____.

Vocabulary and Grammar

Exercise 9. Say the same in English.

- 1) _____ ; 2) _____ ; 3) _____
- _____ ; 4) _____ ; 5) _____ ; 10) _____
- _____
- 15) _____
- 17) _____

Exercise 10. Choose a word to put into each gap: *soil mechanics, above the ground, stable, the footings, hard rock, building, the load, the foundation.*

1. Architects and engineers have not always realized what extent the earth can be pressed down by the weight of _____.
2. If the earth is _____, laying the foundations of small buildings possess few problems.
3. In a tall modern structure _____ may be very heavy indeed.
4. The foundation engineer must have a thorough understanding of _____, which entails a scientific study of the ground to see what load it, can bear without dangerous movement.
5. First construction workers begin excavating, or digging holes or trenches for the footings, the lowest part of _____.
6. _____ are made by pouring concrete into wood or steel forms that workers place below the frost line or the depth to which the ground freezes.
7. In many low or damp regions, houses are _____ on concrete piers, or supports.
8. Luckiest of all are those foundation engineers whose buildings stand on _____ like granite or ironstone.

Exercise 11. Combine the words with the help of the preposition *of*. Translate these words.

1	the weight	of	A	the upper storeys
2	the possibility		B	the ground
3	14 feet out		C	a heavy structure's sinking
4	the design		D	floating a building
5	one side		E	earth
6	the foundations		F	a building
7	a thorough understanding		G	all
8	a scientific study		H	the perpendicular
9	undistributed samples		I	foundation
10	the sort		J	two ways
11	important decision		K	small buildings
12	in one or both		L	a vast, hollow concrete box
13	a question		M	soil mechanics
14	the form		N	the Tower

Snugly [sn ɪ] –
 Nail head [ne ɪ hed] –
 Hardwoods [hɑːd wuːdz] –
 Maple [me p(ə)l] –
 Oak [ɔːk] –
 To sand [sænd] – ,
 To seal [siːl] – ,
 Filler [fɪl] –
 Wax [wæks] –
 Shellac [ʃelæk] – □
 Varnish [vɑːnɪʃ] – □ □
 Vinyl [vaɪn(ə)l] –
 Tile [taɪl] –
 Covering [kʌv(ə)rɪŋ] –
 Partition [pɑːtɪ(ə)n] – □
 Girder [ɡɪdə] –
 Lath [læθ] – □
 Lumber mill [lʌmbəml] – □
 Pulley [pʊli] – □
 Sash [sæʃ] – □
 Ready-made [redimeɪd] – □
 To swing [swɪŋ] – □ □
 Rug [rʌɡ] – □
 Threshold [θrəʃhəʊld] –
 Outlet [aʊtlet] –
 Appliance [əplɑːns] – □
 Furnace [fɜːns] – □
 Fuse [fjuːz] –
 Circuit breaker [sɪkətbreɪk] – □

To cut in the proper size [pɹɒpəsaɪz] –

To be made of –

Lightweight steel [laɪtweɪtstɪl] –

To be high enough [haɪnəf] –

Water heater [wɔːtəheɪtə] –

Heavy-duty [heɪvɪdʒi] – ,

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Metal, horizontally, finish, plastic, linoleum, asphalt, electrician, standard, volt, centimeter, aluminium, lamp, conditioning system.

Exercise 4. These words can be used both as verbs and as nouns.

Make up your own sentences to show the difference in their usage.

Slot, sand, seal, wax, finish, varnish, partition, lath, rug, start, fuse, part.

Exercise 5. Read and translate the text.

INTERIOR CONSTRUCTION OF A HOUSE

Interior construction of the house includes floors, walls, windows, and doors.

Floors have two layers. The lower layer lies at an angle across the floor joists. The upper, finished layer is made from tongue and groove boards. One side of each board has a tongue, or lip, and the other side has a groove or slot. The tongue of one board fits snugly into the groove of another board. Carpenters drive nails through the groove side so that the nail heads can't be seen on the finished floor. Most finished floors are made of hardwoods, such as maple or oak, which have been finely sanded and later sealed with wood filler. The wood may then be finished with wax, shellac, varnish, or plastic. Other floors have such coverings as linoleum or rubber, vinyl or asphalt tile.

Walls. Rooms are made by building inside walls after the outside walls have been attached to the foundation. Inside walls, also called partitions, are really small-sized frames like the outside walls. They have studs and must be supported by plates, joists and girders.

If plaster is to be applied, the interior walls must first be covered with lath, or strips of wood, metal, or plasterboard. The lath is set horizontally about 3 inches (8 centimeters) apart. Wallboard, plasterboard, or plywood may be used in place of plaster.

Windows. Most parts of a window come from a lumber mill, already cut in the proper sizes. Carpenters leave space in the frame for windows and window pulleys, weights and sashes. Window sashes are made of wood or metal, usually either aluminium or lightweight steel.

Doors. Both doors and door frames may usually be bought ready-made. Carpenters attach the doors high enough to swing over rugs or carpets. A threshold fills in the space under an outside door.

Electricity. Electrical wiring provides lighting and furnishes outlets for lamps, washing machines, and other appliances. In some houses, electricity also provides heat. Before construction starts, the builder determines the

location and type of wiring. Wires vary in size, depending on the equipment in the house and how far the current must travel. Standard wiring is designed for 110-volt current. But builders often specify heavy-duty, 220-volt wiring if large electrical appliances, such as a stove and a water heater, or an air conditioning system are installed.

Electricians install wiring while carpenters build the frame. Wiring is done in series of circuits. Each set of wires has several outlets. Electricians often place the wiring for a furnace on a separate circuit breaks down.

Wires become hot and can cause fires if they are overloaded, so electricians install a fuse for each electrical. A fuse box usually holds all the fuses. If too much current passes through a circuit, the wire in the fuse melts or 'blows'. Electricians often install another protective device called a circuit breaker, instead of a fuse box. If the circuit becomes overloaded, the circuit breaker automatically cuts off the current.

Comprehension

Exercise 6. Answer the following questions.

1. What does interior construction of a house include?
2. How many layers do floors have?
3. What is the upper, finished layer made from?
4. Who drives nails through the groove side?
5. What are most finished floors made of?
6. What materials are used to finish wood?
7. When are rooms made?
8. What is called partitions?
9. Where do most parts of a window come from?
10. Who attaches the doors high enough to swing over rugs or carpets?
11. What fills in the space under an outside door?
12. What provides lightning and furnishes outlets for lamps, washing machines, and other appliances?
13. Who does this?
14. What does a builder determine before construction starts?
15. Why do builders specify heavy-duty, 220-volt wiring?
16. Who installs wiring?
17. What can cause fires?
18. In what case does the wire in the fuse melt?
19. What do electricians often install instead of a fuse box?

Exercise 7. Agree or disagree with the following statements.

1. Floors have three layers.

2. The upper, finished layer is made from wood.
3. Most finished floors are made of plastics.
4. Floors have such coverings as paper, plasterboard, or plywood.
5. Inside walls, also called partitions, are really small-sized frames like the outside walls.
6. The interior walls must first be covered with paint or oil.
7. The lath is set vertically about 2 inches (6 centimeters) apart.
8. Most parts of a window come from factories.
9. Window sashes are made of gypsum or cement.
10. Both doors and door frames is necessary to produce in carpenters' workshops.
11. Electricity never provides heat.
12. Before construction starts, the builder determines the location and type of wiring.
13. Standard wiring is designed for 120-volt current.
14. Carpenters install wiring while electricians build the frame.
15. Each set of wires has only one outlet.
16. Electricians often place the wiring for a furnace on the whole circuit.
17. Wires become cold and can cause fires if they are overloaded.
18. It is impossible for electricians to install another protective device called a circuit breaker.

Exercise 8. Find out from your partner:

- ✓ if he knows why floors have two layers;
- ✓ why most finished floors are made of hardwoods.

Exercise 9. Prove that:

- ✓ it is necessary to finish floors with covering;
- ✓ it is convenient when most parts of windows come from a lumber mill.

Exercise 10. Comment on:

- ✓ work of a carpenter;
- ✓ work of an electrician.

Vocabulary and Grammar

Exercise 11. Give the English equivalents to the following words and word combinations.

- 1)
- 5)

- 15) _____ ; _____ ;
 19) _____ ; 20) _____ .

Exercise 12. Complete the sentences according to the text.

1. The lower layer of a floor lies at _____.
2. _____ into the groove of another board.
3. Carpenters drive nails _____ so that the nail heads _____ on the finished floor.
4. _____ such as maple or oak.
5. The wood may then be finished with _____.
6. Other floors have such coverings as _____.
7. Inside walls, _____, are really small-sized frames _____.
8. They have studs and _____.
9. _____ may be used in place of plaster.
10. Most parts of a window _____, already cut in the proper sizes.
11. _____ of wood or metal.
12. Carpenters attach the doors high enough _____.
13. Electrical wiring provides _____, washing machines, etc.
14. _____ and how far the current must travel.
15. Builders often specify _____ if large electrical appliances, such as _____ are installed.
16. Electricians often place the wiring for _____.
17. Wires become hot and can cause fires if _____.
18. _____, the circuit breaker automatically cuts off the current.

Exercise 13. Combine the words with the help of the preposition *of*.

Translate these word combinations.

1	the tongue	of	A	a fuse box
2	strips		B	hardwoods
3	place		C	a window
4	most parts		D	wires
5	sashes are made		E	metal or plasterboard
6	floors		F	circuits
7	type		G	one board
8	a series		H	wood or metal
9	each		I	wiring
10	instead		J	plaster

Exercise 14. Give the three forms of the following verbs. Translate the verbs.

	V ₁	V ₂	V ₃	Translation
1	to apply			
2	to see			
3	to make			
4	to finish			
5	to use			
6	to install			
7	to do			
8	to buy			

Exercise 15. Use the derivatives of the following words.

1. Interior _____ of the house includes floors, walls, windows, and doors. (CONSTRUCT)

2. The outside walls have been attached to the _____. (FOUND)

3. The lath is set _____ about 3 inches apart. (HORIZON)

4. _____ install wiring. (ELECTRICAL)

5. Wires vary in size, depending on the _____ in the house and how far the current must travel. (EQUIP)

6. Electricians often install another _____ device called a circuit breaker, instead of a fuse box. (PROTECT)

7. The circuit breaker _____ cuts off the current. (AUTOMAT)

Exercise 16. Translate the following sentences from Russian into English.

1.
2.
3.
4.
5.
6.
7.

Lesson 3. THE LAST STEPS IN FINISHING A HOUSE

Pre-reading task

Exercise 1. Read the words and learn them.

Plumber [pl m] – ()

Pipe [pa p] –

Disposal pipe [d sp z()l pa p] –

Fixture [f kst] – □

Sink [s k] –

Trap [træp] – □

Sewage [su d] – □

Washbasin [w be s()n] – □

Drain [dre n] – □

Tip [t p] –

To leak [li k] – □

Cast-iron [k st □ n] –

To dissolve [d z lv] – □

Sludge [sl d] – □

Insulation [nsj le ()n] –

Perlite [p la t] – □

Fiberglass [fæ b l s] –

Flaky [fle k] – □ □

Vermiculite [v m kj la t] – □ □

Crumb [kr m] –

Loose [lu s] – □

Fan [fæn] –

To hire [ha] –

To preserve [pr z v] – □

To keep out [ki p a t] – □

Dead-air space [ded e spe s] –

Rock wool [r k w l] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read these international words and try to guess their meaning.

Metal, horizontally, finish, plastic, linoleum, asphalt, electrician, standard, volt, centimetre, aluminium, lamp, conditioning system.

Exercise 4. These words can be used both as verbs and as nouns. Make up your own sentences to show the difference in their usage.

Waste, sink, leak, crumb, fan, function, form, paint, step, heat.

Exercise 5. Translate the words into Russian.

To construct – construction, to fix – fixture, to ventilate – ventilation, to circulate – circulation, to build – building, to heat – heating, to decorate – decoration, to furnish – furnishing.

Exercise 6. Read the text and get ready to speak about the last steps in finishing the house.

THE LAST STEPS IN FINIHING A HOUSE

Plumbing. During construction, plumbers install the pipes that will supply gas and water, and carry away waste. They install bathroom fixtures and sinks just before other workers add the finishing touches to the house. Plumbers also install traps to keep out sewages. The trap used for bathroom washbasins, for example a P-shaped pipe, locates directly below the drain. Water settles in the lower part of the pipe and prevents sewages from backing tip and leaking into the room. To function properly, traps must have outside ventilation of the air.

A cast-iron waste disposal pipe runs from inside the house to about 5 feet (1,5 meters) outside, where it connects with a pipe of another material, usually clay. This pipe connects home-disposal pipe with the sewerage system of the city. In areas without a city sewerage system, a septic tank near the house holds sewage until it dissolves. Water from the sewage flows through pipes into the ground. The sludge, remaining in the tank, must be removed at intervals.

Insulation reduces the amount of heat or cold that passes through walls, floors, and ceilings of a house. When the air around the house is warmer or colder than the air inside, heat passes from the warm air to the cold air. This means that in winter the heat will pass to the outside, and the house will become cold. In summer the heat outside passes into the house. Insulation fills the air spaces in walls, floors and ceilings and creates dead-air space. This helps to prevent heat from passing through. Insulation can save fuel costs in heating a house.

Insulation is made from many materials, including cellulose, rock wool, a glassy lava called perlite, gypsum, certain plastics, fiberglass, and a flaky mineral called vermiculite. Insulation comes as blankets, boards, paper and sheathing. It is also available in a loose, crumb like form. The type of

insulation used depends on the climate and on whether it insulates floors, ceilings or walls.

Heating and air conditioning. Most houses have central heating systems. One furnace or heating unit, supplies heat for the entire house. Such houses are heated by warm air, steam, or hot water. In hot-air heating a fan, connected to the furnace, blows warm air through pipes into the rooms. In steam or hot-water heating the steam or hot water passes through radiators that stand throughout the house. In radiant heating, hot-water pipes run under the floors or in the ceilings or walls.

Air-conditioning units may be used to cool and heat houses. An air conditioner takes warm air from the house, cools it, removes moisture, and recirculates cool air. It also may warm cold air, add moisture and recirculate warm air.

Interior decoration. In a new house, builders usually paints the rooms and finish the floors as a part of the contract with the homeowner. The owner generally selects, buys and arranges the furnishings. But sometimes the owner hires a professional interior decorator to do this job.

Landscaping is the last step in building a house. Most builders try to keep the natural outline of the land and to preserve different sorts of trees which grow in this place.

Comprehension

Exercise 7. Answer the following questions.

1. What do plumbers do during construction?
2. What is necessary to install to keep out sewages?
3. What is the trap used for?
4. When do the traps function properly?
5. Where does a cast-iron waste disposal pipe run from?
6. Where does water from the sewage flow?
7. What is the function of insulation?
8. When does heat pass from the warm air to the cold air?
9. What saves fuel costs in heating a house?
10. What is insulation made from?
11. What supplies heat for the entire house?
12. What passes through radiators that stand throughout the house?
13. When may air-conditioning units be used?
14. Who paints the rooms and finishes the floors?
15. What is the last step in building a house?
16. Why is it important to keep the natural outline of the land?

Exercise 8. Say if the sentences are true or false.

1. During construction, plumbers install the pipes that will supply heat and ventilation.
2. These pipes carry away cold water.
3. Plumbers also install special cranes to keep out sewages.
4. To function properly, traps must have inside ventilation of the air.
5. A cast-iron waste disposal pipe connects with another pipe made of metal.
6. This pipe connects home-disposal pipe with the sewerage system of the city.
7. In areas without a city sewerage system, a sink near the house holds sewage until it comes into ground.
8. Insulation increases the amount of heat or cold that passes through walls, floors, and ceilings of a house.
9. In winter the cold outside passes into the house.
10. Insulation fills the air spaces in walls, floors, and ceilings and creates dead-air space.
11. Insulation is made from many materials, including cotton, wool, wadding etc.
12. The type of insulation used depends on size of a house.
13. Only some houses have central heating systems.
14. In radiant heating, cold-water pipes run between the walls.
15. In a new house, the builder usually makes all repaired works as a part of the contract with the homeowner.
16. The owners move into a ready flat to live in.
17. The owners of the flats clean themselves the territory near their house.

Exercise 9. Choose the best alternative according to the text.

1. Plumbers install the pipes that will supply _____.
 - a) heat and water, and carry away bad smell;
 - b) gas and water, and carry away waste;
 - c) gas and heat, and carry out cold air.
2. The trap used for bathroom washbasins, locates _____.
 - a) directly above the sink;
 - b) directly below the drain;
 - c) directly below the sewerage system.
3. _____ and prevents sewages from backing tip and leaking into the room.
 - a) Water settles in the higher part of the pipe;
 - b) Water settles in the middle part of the pipe;
 - c) Water settles in the lower part of the pipe.

4. A cast-iron waste disposal pipe runs from _____.
 - a) inside of the house to about 5 feet outside;
 - b) the lower ground of the house to about 5 feet to the roof;
 - c) the basement of the house to about 5 feet outside.
5. _____, a septic tank near the house holds sewage until it dissolves.
 - a) In areas which are rather far from a city sewerage system;
 - b) In village areas which have no sewerage system near their houses;
 - c) In areas without a city sewerage system.
6. Water from the sewage flows _____.
 - a) through pipes into a special septic tank;
 - b) directly into the ground;
 - c) through pipes into the ground.
7. Insulation fills _____ and creates dead-air space.
 - a) the air spaces in walls, floors and ceilings;
 - b) all spear places in walls, floors and ceilings;
 - c) the air spaces in floors and ceilings.
8. The type of insulation used depends on _____.
 - a) the weather and the building materials;
 - b) the climate and on whether it insulates floors, ceilings or walls;
 - c) the climate and on whether it insulates doors, windows or walls.
9. One furnace or heating unit, _____.
 - a) uses for heating a house;
 - b) supplies heat for only one room;
 - c) supplies heat for the entire house.
10. In hot-air heating a fan, connected to the furnace, _____.
 - a) blows cold air through pipes into the kitchen;
 - b) blows warm air through pipes into the rooms;
 - c) blows hot air through pipes into the bathroom.
11. An air conditioner _____, and recirculates cool air.
 - a) takes warm air from the house, cools it, removes moisture;
 - b) takes hot air from the lower floor, cools it, removes moisture;
 - c) takes warm air from radiators, cools it, removes moisture.
12. In a new house, builders usually _____.
 - a) paint the rooms and finish the floors;
 - b) paper the rooms and paint the floors;
 - c) buy everything necessary to finish flats.
13. Sometimes the owner hires a professional interior decorator _____.
 - a) to help him to buy necessary tools for making a repair of a flat;
 - b) to select, to buy and to arrange the furnishings;
 - c) to select and to buy new wall papers for his flat.

14. _____ and to preserve different sorts of trees which grow in this place.

- a) Professional decorators advise to keep the natural outline of the land;
- b) Most builders try to keep the natural outline of the land;
- c) Most builders try to clean the territory round the new house.

Vocabulary and grammar

Exercise 10. Say the same in English.

- 1) _____ ; 2) _____ ; 3) _____
- 5) _____
- 13) _____
- 16) _____ 17) _____
- 18) _____ 19) _____

Exercise 11. Combine the words with the help of the preposition *of*. Translate these words.

1	the lower part	of	A	the land
2	a pipe		B	trees
3	the amount		C	insulation
4	the type		D	the contract
5	part		E	another material
6	the natural outline		F	the city
7	different sorts		G	heat or cold
8	outside ventilation		H	a house
9	the sewerage system		I	the air
10	walls, floors, and ceilings		J	the pipe

Exercise 12. Choose a word to put into each gap: *furnace, traps, insulation, waste disposal pipe, fixtures and sinks, an air conditioner, perlite, radiant heating, a septic tank, interior decorator, fuel costs, landscaping, a flaky mineral.*

1. Plumbers install bathroom _____ just before other workers add the finishing touches to the house.
2. Plumbers also install _____ to keep out sewages.

3. A cast-iron _____ connects with a pipe of another material, usually clay.

4. In areas without a city sewerage system, _____ near the house holds sewage until it dissolves.

5. _____ fills the air spaces in walls, floors, and ceilings and creates.

6. Insulation can save _____ in heating a house.

7. A glassy lava is called _____.

8. _____ is called vermiculite.

9. One _____ supplies heat for the entire house.

10. In _____, hot-water pipes run under the floors or in the ceilings or walls.

11. _____ takes warm air from the house, cools it, removes moisture, and recirculates cool air.

12. Sometimes the owner hires a professional _____ to select, buy and arrange the furnishings.

13. _____ is the last step in building a house.

Exercise 13. Make up the sentences.

1. Heating systems / have / houses / central / most.

2. Is / many / insulation / materials / made from.

3. Install / sewages / plumbers / also / to keep out / traps.

4. Is / landscaping / the last / in / step / a house / building.

5. Traps / the air / must / of / have / ventilation / outside.

6. Insulation / a house / can / in heating / save / costs / fuel.

Exercise 14. Use the derivatives of the following words.

1. An air conditioner cold air, add moisture and _____ warm air. (CIRCULATE)

2. Most builders try to keep the _____ outline of the land and to preserve _____ sorts of trees which grow in this place. (NATURE, DIFFER)

3. The trap used for bathroom washbasins locates _____ below the drain. (DIRECT)

4. To function properly, traps must have outside _____ of the air. (VENTILATE)

5. The owner generally selects, buys and arranges the _____. (FURNISH)

6. _____ reduces the amount of heat or cold that passes through walls, floors, and ceilings of a house. (INSULATE)

7. Most houses have central _____ systems. (HEAT)

Exercise 15. Translate the following sentences from Russian into English.

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

Unit 5. ROADS

Lesson 1. ROADS. HOW IT ALL STARTED

Pre-reading task

Exercise 1. Read the words and learn them.

- To tend [tend] –
- To take for granted –
- Vast [v st] –
- Extensive [k stens v] –
- Well-maintained [welme n te nd] –
- Grumbling [r mbl] –
- Pothole [p th l] –
- Traffic jam [træf k d æm] –
- To pave [pe v] –

Paved road [pe vd r d] –
 Site [sa t] – □ □
 Route [ru t] – □
 Market outlet [m k t a tlet] – □
 To carry [kær] – □
 To stretch [stret] – □
 To consume [k n sju m] –
 Supplies [s pla z] – □
 Equipment [kw pm()nt] –
 Engineer corps [end n k] –

Pontoon bridge [p n tu n br d] –
 To level [lev()l] –
 Track [træk] – , ,
 Cart [k] – ,
 Siege engine [end n] –
 Stone [st n] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Before reading the text, study the following words.

Egypt pt] –
 The Pharaoh Cheops r ps] –
 The Great Pyramid [p r m d] – ()
 The Silk Route [s lk] –
 China a n] –
 Asia] –
 Spain [spe n] –
 The Atlantic Ocean [□ n] –
 The Old Testament [ld test m()nt] –
 Damascus [d m sk s] – □
 Palestine pal sta n] –
 The Gulf of Aqaba [lf v k b] – □

Syria s r] –
 Mesopotamia mes p te m] –
 Trajan's Road –
 The Romans [r m nz] –
 The Crusaders [kru se d z] –

The Assyrian Empire [s r n empa] –

The Persians p n z] –

The Persian Gulf p n lf] –

The Aegean Sea [i d i n si:] –

Carthage k d] –

Africa k] –

Exercise 4. Before you start.

- When was the first road built?
- Who built it?
- What was its purpose?

Exercise 5. Read and translate the text.

ROADS. HOW IT ALL STARTED

Most of us give very little thought to the roads we drive on every day, and tend to take them for granted – at least until they are closed for repairs, washed out in a flood and so on. However, only during the past forty years or so have we enjoyed the luxury of a vast, extensive, and well-maintained system of roads accessible to everyone. In the midst of our grumbling about potholes, traffic jams, and incompetent drivers, we forget how fortunate we truly are. Obviously, it was not always the case.

From the earliest times, one of the strongest indicators of a society's level of development has been its road system – or lack of one. Increasing populations and the advent of towns and cities brought with it the need for communication and commerce between those growing population centres.

A road built in Egypt by the Pharaoh Cheops around 2500 BC is believed to be the earliest paved road on record – a construction road 1,000 yards long and 60 feet wide that led to the site of the Great Pyramid.

The various trade routes, of course, developed where goods were transported from their source to a market outlet and were often named after the goods which travelled upon them. For example, the Silk Route stretched 8,000 miles from China, across Asia, and then through Spain to the Atlantic Ocean. However, carrying bulky goods with slow animals over rough, unpaved roads was a time consuming and expensive. As a rule, the price of the goods doubled for every 100 miles they had to travel.

Some other ancient roads were established by rulers and their armies. The Old Testament contains references to ancient roads like the King's Highway, dating back to 2000 BC. This was a major route from Damascus

in Palestine, and ran south to the Gulf of Aqaba, through Syria to Mesopotamia, and finally on to Egypt. Later it was renamed Trajan's Road by the Romans, and was used in the eleventh and twelfth centuries by the Crusaders.

Around 1115 BC the Assyrian Empire in western Asia began what is believed to be the first organized road-building, and continued it for 500 to 600 years. Since they were trying to dominate that part of the world, they had to be able to move their armies effectively along with supplies and equipment. Their army's engineer corps laid pontoon bridges and levelled tracks for carts and siege engines.

Later another imperial road, the Royal Road, was being built by the Persians from the Persian Gulf to the Aegean Sea, a distance of 1,775 miles. Around 800 BC, Carthage, on the northern coast of Africa, began to use stones for paving roads. Although they may not have been the first to pave their roads with stones, they were among the earliest, and some people believe that the Romans imitated Carthaginian techniques.

Comprehension

Exercise 6. Answer the following questions.

1. What was one of the indicators of the level society's development?
2. When and where was the first paved road built?
3. Where did it lead?
4. What was one of the main purposes to create routes?
5. How long was the Silk Route?
6. By whom were some ancient roads established?
7. What is the King's Highway?
8. What country began the first organized road-building?
9. Why did the country do it?
10. What road was built by Persians?
11. What is the achievement of Carthage?

Exercise 7. Say if the sentences are true or false.

1. People always have had a good system of roads.
2. Any developed society doesn't have and doesn't need road system.
3. The first paved road was built by Tutankhamun.
4. The Pharaoh Cheops road was 1,000 yards long and 60 feet wide.
5. Ancient routes were usually called after people who built them.
6. The Silk Route includes China, Asia, Egypt and Spain.
7. Romans called the King's Highway Trajan's Road.

Exercise 10. Make up word combinations and translate them.

- | | |
|----------------|--------------------|
| 1. extensive | a. corps |
| 2. incompetent | b. outlet |
| 3. trade | c. road |
| 4. engineer | d. system of roads |
| 5. slow | e. goods |
| 6. market | f. jam |
| 7. bulky | g. route |
| 8. road | h. bridge |
| 9. traffic | i. animals |
| 10. paved | j. system |
| 11. pontoon | k. drivers |

Exercise 11. Fill in the gaps with the suitable words: *pontoon bridges, stretched, communication, goods, carts, route.*

1. Increasing populations and the advent of towns and cities brought with it the need for _____ and commerce between those growing population centres.

2. The various trade routes, of course, developed where _____ were transported from their source to a market outlet.

3. The Silk Route _____ 8,000 miles from China, across Asia, and then through Spain to the Atlantic Ocean.

4. The King's Highway was a major _____ from Damascus in Palestine, and ran south to the Gulf of Aqaba, through Syria to Mesopotamia, and finally on to Egypt.

5. The Assyrian Empire army's engineer corps laid _____ and levelled tracks for _____ and siege engines.

Exercise 12. Give the missing forms of the verbs. Translate the verbs.

	V ₁	V ₂	V ₃	Translation
1	build			
2		ran		
3		were		
4			brought	
5		began		
6	take			
7			given	
8	drive			
9		led		

Exercise 13. Translate the sentences from Russian into English.

1.

2.

3.

4.

5.

6.

Exercise 14. Discuss with the group the following topics:

- Which of the roads mentioned in the text do you find more important?
- Are there any other famous ancient roads or routes? (use the Internet for additional information)

Lesson 2. ROMAN ROADS

Pre-reading task

Exercise 1. Read the words and learn them.

Road builder [r d b ld] –

Network of roads [netw v r d] –

To maintain [me n te n] –

To radiate [re d e t] –

To compose [k m p z] –

Course [k s] –

Bedding [bed] –

Sand [sænd] –

Soil [s l] –

Mortar [m t] –

Gravel [ræv()l] –

Lime [la m] –

Exercise 4. Before you start.

- Who are the most famous road builders?
- What civilizations do you know? Do they still exist?

Exercise 5. Read and translate the text.**ROMAN ROADS**

Without doubt, the champion road builders were ancient Romans, who, until modern times, built the world's straightest, best engineered, and most complex network of roads in the world. At their height, the Roman Empire maintained 53,000 miles of roads, which covered all of England to the north, most of Western Europe, radiated throughout the Iberian Peninsula, and encircled and crisscrossed the entire Mediterranean area. Famous for their straightness, Roman roads were composed of a soil foundation topped by four courses: a bedding of sand or mortar; rows of large, flat stones; a thin layer of gravel mixed with lime; and a thin surface of flint-like lava. Typically, they were 3 to 5 feet thick and varied in width from 8 to 35 feet, although the average width for the main roads was from 12 to 24 feet. Their design remained the most sophisticated until the advent of modern road building technology in the very late 18th and 19th centuries. Many of their original roads are still in use today, although they have been resurfaced numerous times.

Under Roman law, the public had the right to use the roads, but the district through which a road passed was responsible for the maintenance of the roadway. This system was effective so long as a strong central authority existed to enforce it. Unfortunately, as the Roman Empire declined so did their roads and their work fell into disrepair all across Europe and Great Britain.

South America

On the other side of the Atlantic Ocean, several centuries after the fall of the Roman Empire, the Inca Empire began to rise in South America during a period that corresponded with the Middle Ages in Europe. Centred in what is now Peru, the Incas branched out into Ecuador, Colombia, Bolivia, Argentina, and Chile, and, like the Romans, recognized the need for a system of roads that would enable them to extend their conquests and to govern their empire. Interestingly enough, the Incas built their empire without inventing the wheel, without the use of draft animals, and without a

written language. Because they had no wheeled vehicles to worry about, their roads could ascend steep inclines via terraces or steps.

In one place a road going up a steep mountainside was built of 3,000 consecutive stone steps. They also built over swamps, and constructed a causeway 24 feet wide and 8 miles long, which had a paved surface and stone walls. Unfortunately, their well-constructed system of roads assisted in their downfall as the invading Spaniards used the Incas' own roads to move Spanish armies, weapons, and supplies.

Comprehension

Exercise 6. Answer the following questions.

1. Why did the Romans decide to build roads?
2. What territory did Roman roads cover?
3. How long are they?
4. What was the design of these roads?
5. Are Roman roads used nowadays?
6. Who was responsible for the maintenance of the road?
7. What did the Incas recognize?
8. Why did Inca roads differ from Roman roads?
9. What territory did Inca roads cover?
10. What was the reason for road building?
11. What was the difficulty in building Inca roads?
12. Why were the roads one of the components to lead to Inca civilization fell down?

Exercise 7. Say if the sentences are true or false.

1. First road builders were the Babylonians.
2. The technology of Roman road building used to be advanced till X century.
3. For road-building Romans used sand, mortar, flat stones and flint-like lava.
4. According to Roman law rich and powerful Roman citizens were responsible for the maintenance of roads.
5. The system of road maintenance was effective.
6. The Inca civilization developed on the coast of the Pacific Ocean.
7. The Incas decided to build roads to deliver letters from one town to another.
8. The Incas didn't have wheeled transport so they didn't need very wide roads.

Exercise 11. Translate the sentences from Russian into English.

1.
2.
3.
4.
5.
6.
7.

Exercise 12. Using the information from the text compare the road systems of two civilizations: Roman roads and Inca roads.

Lesson 3. ROAD CONSTRUCTION PROCESS

Pre-reading task

Exercise 1. Read the words and learn them.

Timing [ta m] –

Land survey [lænd s] –

To handle [hænd()l] –

Evaluating [vælj e t] –

To maintain [me n te n] –

Data [de t d t] –

Transportation planner [træns p te ()n plæn] –

Environmentalist [n va r n ment()l st] –
Landscape architect [læn(d)ske p k tekt] –

Soil scientist [s l sa nt st] –
To determine [d t m n] –
Accuracy [ækj r s] –
Terrain [te re n] –
Drainage [dre n d] –
Capability [ke p b l t] – □
Ratio [re] –
Level [lev()l] – □n □v)
To provide [pr va d] –
Screened dirt [skri nd d rt] –
Bump [b mp] –
Dip [d p] –
To spray [spre] –
To compact [k □] –
Density [dens t] –
Sewer [su] –
Paving [pe v] –
Crushed rock [kr t r k] –
Finishing machine [f n m i n] –
Joint [d nt] –
Wire basket [wa b sk t] –
Dowel [da l] –
Paving equipment [pe v kw pm()nt] –

To grind [ra nd] –
Landscaping [læn(d)ske p] –
Pavement marking [pe vm()nt m k] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Before you start.

- Have you ever seen road works?
- What were the road builders doing?
- What do you think about the quality of roads in our country?
- What influences the quality of roads?

Exercise 4. Read and translate the text.

ROAD CONSTRUCTION PROCESS

Pre-construction activities. The type of construction adopted for a particular road depends on:

- the volume and nature of traffic;
- the nature of available materials;
- the topography;
- foundation conditions;
- type and availability of construction equipment;
- financing arrangements and timing.

There are many steps in the road construction process. They involve many teams of people and much organization from the use of a surveying company to handle land surveys to project managers. The steps must be carefully followed to ensure a successful project is completed. These steps can be summarized as:

- planning;
- design;
- earthworks;
- pavement construction;
- open to traffic.

Step I: Planning. A road project begins with evaluating the transportation system, taking into account statewide priorities, including strategic plans for the state's transportation system. Department of Transportation collects and maintains information about our roads, including road and bridge conditions, traffic volumes and crash statistics. Using this data, transportation planners, engineers, environmentalists, landscape architects, soil scientists and others identify trends that determine what and how to build.

Step II. Design. A survey of the area is step two. Recently, Global Positioning Systems, laser surveys, and other technology have sped up the process and improved accuracy. Many factors influence designs, including location, terrain and soil properties, drainage capabilities, traffic volume, the ratio of cars to trucks and buses, possible future development in the area, effects on the environment or nearby residents.

Step III. Earthwork. Earthwork is one of the most important elements in road construction because it establishes a stable foundation. The aim of the earthworks phase of the construction is to position the subgrade underlying the pavement layers in the right location and at the correct level and to provide drainage. First, embankments are built. Next, a grader or

bulldozer levels the screened dirt. Leveling bumps and filling in dips creates a surface that will support a road for decades. The screened dirt is sprayed with water and compacted to its maximum density. During this stage, drains and sewers are installed. The center of the road must be higher than the edges so water will run off into the storm sewers. Drainage is a critical element because improper drainage will greatly reduce the new pavement's life expectancy. All of this work must pass strict inspections before the project can continue. To complete the earthwork, workers place gravel in 12-inch layers on the roadbed, then moisten and compact each layer. Layers are added and compacted until the roadbed reaches the height called for in the design. The earthwork is often the largest task in the road building process and therefore careful planning and organization are essential. Speed and efficiency depend very much upon the quantity and types of earthmoving plant available.

Construction activities

Step IV. Pavement. Construction At last, the roadbed is ready for paving. Planners and engineers study such factors as the cost of maintaining the road, the amount and type of traffic, the cost of paving material. A formula that includes all these factors tells engineers to use either asphalt (bituminous) or concrete pavement. Asphalt uses bitumen, a petroleum product, to glue together sand and crushed rock. This mixture is heated to approximately 300 degrees at the asphalt plant. At the construction site, workers spread and compact the hot mixture onto the roadbed. Concrete uses cement and water as the glue between sand and crushed rock. Workers place concrete into steel molds called forms. A finishing machine vibrates and trims it to the necessary height. To prevent cracks, workers cut joints between the concrete slabs. At each joint, wire baskets and steel dowels connect the slabs. These allow the slabs to expand and contract as the temperature changes. The slabs can slide from side to side along the dowels, but not up and down.

Step V. Open to traffic. With the new surface in place, quality testing is conducted. Testers use seismology equipment to measure vibrations of the new pavement. If there is too much vibration, the contractor must grind the pavement to ensure a smooth surface. The final steps are:

- another drainage test;
- grading and landscaping around the pavement (where applicable);
- applying the permanent pavement markings.

Comprehension

Exercise 5. Answer the following questions.

1. What are the main factors on which the type of construction depends?
2. How many steps are distinguished in road construction?
3. What does the road project begin with?
4. What data do transportation planners and others use to identify trends? What has improved the accuracy of surveying the area?
5. Why is earthwork considered one of the most important elements in road construction?
6. By what machines is the screened dirt leveled?
7. When are drains and sewers installed?
8. Why should the centre of the road be higher than the edges?
9. What do speed and efficiency of earthworks depend upon?
10. How many stages are distinguished in highway pre-construction and construction activities?
11. What tells the engineers to use either asphalt or concrete pavement?
12. What does asphalt use to glue sand and crushed stone?
13. What connects the slabs at each joint?
14. Why is landscaping around the pavement necessary?
15. What does concrete use to glue sand and crushed stone?
16. What does seismology equipment measure?
17. What are the final steps?

Exercise 6. Say if the sentences are true or false.

1. The type of road construction doesn't depend on any factors.
2. The road construction process involves many teams of people and much organization.
3. A road project begins with positioning the subgrade underlying the pavement layers in the right location.
4. Global Positioning Systems, laser surveys and other technology have slowed down the process of surveying the area.
5. Terrain and soil properties, drainage capabilities, traffic volume have no influence on design.
6. Earthwork establishes a stable foundation.
7. Improper drainage reduces the new pavement's life expectancy.
8. Excavator levels the screened dirt.
9. Screened dirt is sprayed with water at the stage of paving.
10. Asphalt uses cement and water to glue together sand and water.
11. Concrete slabs can slide from side to side, up and down.

8	earthwork	h	material used on a road surface in order to provide separation between traffic moving in opposite directions
9	drain	i	sticky, black and highly viscous liquid or semisolid form of petroleum
10	asphalt	j	work involving moving quantities of soil
11	to grind	k	surfacing of roads and walkways
12	subgrade	l	a collection and transportation system for storm water

Exercise 9. Put the following words in the right column: *factor, cost, type, include, bitumen, approximately, glue, rock, heat, roadbed, hot, steel, height, prevent, necessary, joint, concrete, change, slab, expand, slide, dowel, new, quality, conduct, grind, permanent, marking.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 10. Find in the text synonyms to the following words and word combinations.

Information, ecologist, precision, correlation, decrease, get better, affect, lorry, location, wrong, price, quantity, using.

Exercise 11. Make up the sentences.

1. There / many / road / are / the / steps / construction / in / process.
2. A / project / evaluating / transportation / begins / road / the / with / system.
3. Earthwork / road / elements / of / the / one / most / in / is / construction / important.
4. A / levels / screened / the / grader / dirt.
5. The / than / center / the / edges / road / of / must / be / the / higher.
6. The / is / largest / earthwork / the / often / task / in / process / the / building / road.
7. Testers / vibrations / pavement / the / seismology / new / equipment / use / to / measure / of.

Exercise 12. Translate the sentences from Russian into English.

1.
2.

TIMBER

Timber is the most ancient building material. In comparison with steel timber is lighter, cheaper, easier to work and its mechanical properties are good. On the other hand, timber has certain disadvantages. First, it burns and is therefore unsuitable for fireproof buildings. Second, it decays.

At present an enormous amount of timber is employed for a vast number of purposes. Timber is used in building too.

Timber is a name applied to the cut material derived from trees. Timber used for building purposes is divided into two groups: softwoods and hardwoods. Softwoods are commonly used for interior mouldings, the manufacturing of windows, construction framing and generating sheet goods such as plywood and fibreboard. Hardwoods are chiefly used for decorative purposes, as for panelling, veneering in furniture, and some of them are selected for building use because of their high strength and durability. In modern construction timber is often used for window and door frames, flooring, fences and wallplates, for temporary buildings and unpainted internal woodwork.

Timber cannot be used for either carpenters' or joiners' work immediately it has been felled because of the large amount of sap which it contains. Most of this moisture must be removed, otherwise the timber will shrink excessively, causing defects in the work and a tendency to decay. Elimination of moisture increases the strength, durability and resilience of timber.

Comprehension

Exercise 4. Answer the following questions.

1. Is timber a very ancient building material?
2. What are the advantages of timber in comparison with steel?
3. What are the disadvantages of timber in comparison with steel?
4. Into what groups is timber, used for building purposes, divided?
5. What are softwoods commonly used for?
6. For what purposes are hardwoods chiefly used?
7. For what purposes is timber often used in modern construction?
8. What increases the strength, durability and resistance of timber?

Exercise 5. Say if the sentences are true or false.

1. The mechanical properties of timber are good.
2. Timber is suitable for fireproof buildings.

3. Today an enormous amount of timber is employed for a vast number of purposes.

4. Softwoods are chiefly used for decorative purposes.

5. Timber can be used for either carpenters' or joiners' work immediately it has been felled.

6. Elimination of moisture decreases the strength, durability and resilience of timber.

Vocabulary and Grammar

Exercise 6. Say the same in English.

- 1) _____ 2) _____
 3) _____
 4) _____ 5) _____ 6) _____
 7) _____ 8) _____
 9) _____ 10) _____ 11) _____

Exercise 7. Fill in the gaps using the following words: *softwoods, fireproof, frames, ancient, veneering, wallplates.*

1. Timber is the most _____ building material.
2. Timber burns and therefore unsuitable for _____ buildings.
3. Timber used for building purposes is divided into two groups: _____ and hardwoods.
4. Hardwoods are chiefly used for decorative purposes, as for paneling and _____ in furniture.
5. In modern construction timber is often used for window and door _____, flooring, fences and _____, for temporary buildings and unpainted internal woodwork.

Exercise 8. Give the missing forms of the adjectives.

	Positive	Comparative	Superlative
1			the highest
2	ancient		
3		cheaper	
4		earlier	the earliest
5	good		
6	modern		
7		lighter	

Exercise 9. Make up the sentences.

1. Is / easier / lighter / steel / cheaper / timber / and / than.
2. Good / timber / properties / mechanical / has.
3. Timber / fireproof / for / unsuitable / buildings / is.
4. Hardwoods are used because of their high strength and durability.

Exercise 10. Translate the sentences from Russian into English.

1.
2.
3. -
4.
5.
6.

Lesson 2. STONE

Pre-reading task

Exercise 1. Read the words and learn them.

- Crushed stone - ,
Dimension stone -
Slab [slæb] -
To erect [] - ,
Stone masonry [] -
Scarcity [] - ,
Granite [] -
Basement [] - ,
Sandstone [] -
Quartz [] -
Sill [] -
Aggregate [] -
Marble [] -
Stairway [] -

Hearths [] – , , ,

Limestone [] –

Slate [] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

STONE

Building stone is one of the world's most important construction materials. Stone has been used as a building material since the earliest days. It comes from natural stone deposits in the earth and is mined through quarrying. Almost all famous buildings of classic times of the medieval and Renaissance periods and of the eighteenth and early nineteenth centuries were erected of stone. The art of making any structure in stone is called stone masonry. In some places stone was used because of its durability.

Stone is used as crushed stone and dimension stone.

Crushed stone is generally limestone or dolomite that has been crushed and graded by screens to certain size classes. It accounts for about 99 per cent of all building stone. It is widely used in concrete and as a surfacing for roads.

Dimension stone is cut from large blocks and slabs into definite shapes and sizes. It is used most often for finishing and decorating all types of structures. Constructors expect good dimension stone to last more than 100 years. Dimension stone includes granite, limestone, sandstone, marble and slate.

Granite. Many people recognize granite because it is the most common igneous rock found at Earth's surface and because granite is used to make many objects that we encounter in daily life. Granite is very hard, strong and durable. It is used particularly for basements, base courses, columns, steps, the entire facades, ornamental stone and monuments. Its colour may be grey, yellow, pink or deep red. Crushed granite is used as a durable construction material in asphalt and concrete used in highway and

Marble. Marble is a crystalline stone chiefly used for decorative purposes. Marble is white, streaked with veins of black, grey, green, pink, red and yellow. Builders use marble to decorate stairways, hearths, floors and as paneling. White and black marbles are used for ornamental decoration where the beauty of the marble is shown to its best advantage.

Limestone. Limestone is a hard and lasting building stone that can be cut easily and shaped with saws, planes, and even lathes. These stones are sometimes placed over the rough stonework of a building to make an attractive surface. Limestone is also used to tile floor, and for sills and steps.

Slate. Slate is fine-grained rock that can be split easily into thin slabs and used for roofing shingles and flagstone flooring.

Comprehension

Exercise 4. Answer the following questions.

1. Do you know that stone has been used as a structural material since the earliest days?
2. What is called stone masonry?
3. Why did people begin to use stone?
4. Can you name the stones used for masonry work?
5. Granite is usually used in construction, isn't it?
6. Does granite possess any special properties?
7. What are these properties?
8. What does the durability of sandstone depend upon?
9. Why are many sandstones selected for steps, sills, etc.?
10. Where is marble chiefly used?
11. Is limestone a soft or hard stone?

Exercise 5. Say if the sentences are true or false.

1. Stone has been used as a building material for two centuries.
2. In some places people used stone because of its durability.
3. Granite is very hard and is used only for basements.
4. There are different colours of granite.
5. Sandstones form one of the most valuable materials.
6. There is only one kind of sandstone.
7. Marble is a crystalline stone chiefly used for basements, columns and steps.
8. Limestone is a soft building stone.
9. Slate is used for decorative purposes.

Unit 7. ARTIFICIAL BUILDING MATERIALS

Lesson 1. METALS

Pre-reading task

Exercise 1. Read the words and learn them.

- Ferrous [fer s] – ()
Non-ferrous [n s] – ()
Iron [a n] –
Alloy [æl] –
To possess [p zes] –
Luster [l st] – ,
To forge [f] –
Mercury [m r] –
To melt [melt] – ()
Cast iron [k a n] –
To refer to [r f] –
To support [s p] –
To impose upon [z] – ,
Partition [p t () n] –
Reinforcement [() nt] – ,
Corrosion-resistant [k r () n r z st nt] –
Stainless [ste nl s] – ()
Cutlery [k tl r] –
Furnace [f s] – ,
Valve [v ælv] –
Ball-bearing [b r] –
Aluminium [æl(j) m n m] –
p] –
Conductor [k kt] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

METALS

All metals are divided into ferrous metals and non-ferrous metals. **Ferrous metals** include iron, steel and its alloys. Nonferrous metals are metals and alloys the main component of which is not iron but some other

element. Metals, in general, and especially ferrous metals are of good importance in variations.

Metals possess the following properties:

- 1) All metals have specific metallic luster.
- 2) They can be forged.
- 3) Metals can be pulled.
- 4) All metals, except mercury, are hard substances.
- 5) They can be melted.
- 6) In general, metals are good conductors of electricity.

These characteristics are possessed by all metals but the metals themselves differ from one another. Steel and cast iron are referred to the group of ferrous metals. Cast iron is the cheapest of the ferrous metals. It is chiefly used in building for compressed members of construction as the supporting members.

When an engineer designs a steelwork he must carefully consider that steel frame and every part of it should safely carry all the loads imposed upon it. The steel framework must be carefully hidden in walls, floors and partitions. It is steel and metal that is employed as reinforcement in modern ferroconcrete structures.

Steel. There are different kinds of steel. Alloyed steel (or special steel) is corrosion-resistant steel. This kind of steel is widely used in building. Stainless steel is also corrosion-resistant steel. It is used for cutlery, furnace parts, chemical plant equipment, valves, ball-bearing, etc.

Non-ferrous metals. Non-ferrous metals have the following characteristics: high electric and heat conductivity, high corrosion resistance, non-magnetic qualities, light weight.

Aluminium. This is the oldest and best known light metal. It is used in aircraft, automobile, chemical and some other industries.

Copper. Copper is the best conductor of electricity. There are different alloys with copper. An alloy of copper and tin is called bronze. This metal is often used for making various ornaments.

Comprehension

Exercise 4. Answer the following questions.

1. What do ferrous metals include?
2. Is iron the main component of non-ferrous metals?
3. What properties do metals possess?
4. Do the metals themselves differ from one another?
5. Is cast iron the cheapest of the ferrous metals?

6. What must an engineer carefully consider when he designs a steelwork?
7. Where must the steel framework be carefully hidden?
8. Is alloyed steel corrosion-resistant steel?
9. Where is aluminium used?
10. What is the best conductor of electricity?
11. An alloy of copper and tin is called bronze, isn't it?

Exercise 5. Say if the sentences are true or false.

1. Nonferrous metals are iron, steel and its alloys.
2. All metals are hard substances.
3. Metals are good conductors of electricity.
4. Cast iron is mainly used in building for compressed members of construction as the supporting members.
5. Aluminium is used in aircraft, automobile, chemical and some other industries.
6. Copper is the worst conductor of electricity.

Vocabulary and grammar

Exercise 6. Say the same in English.

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____
- 6) _____
- 7) _____
- 8) _____
- 9) _____

Exercise 7. Put the following words in the right column: *component, forge, stainless, general, specific, especially, importance, variation, conductor, ferrous, chiefly, steel, construction, carry, carefully, safely, partition, structure, resistant, melt, equipment.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 8. Match the words with their definitions.

1	metal	a	is a form of energy used for heating and lighting
2	luster	b	is a lightweight metal used for making such things as cooking equipment and aircraft parts

3	electricity	c	is gentle shining light that is reflected from a surface
4	steel	d	is a hard substance such as steel, iron, copper and lead
5	copper	e	is a soft reddish-brown metal
6	aluminium	f	is a strong metal made mainly from iron which is used for making bridges, buildings, etc.

Exercise 9. Complete the sentences using the English equivalents for the Russian words in brackets.

1. All
2. Ferrous metals include
3.
4.
5.
6.
7.
8.

Exercise 10. Fill in the gaps with an appropriate derivative of the word in brackets.

1. Metals possess _____ properties. (VARY)
2. Cast iron is _____ used as the _____ members in building. (CHIEF, SUPPORT)
3. Alloyed steel is _____ used in building. (WIDE)
4. Non-ferrous metals have high heat _____. (CONDUCT)
5. There are _____ alloys with copper. (DIFFER)

Exercise 11. Translate the sentences from Russian into English.

1.
2.
3.
4.
5.
6.
7.

Lesson 2. CONCRETE

Pre-reading task

Exercise 1. Read the words and learn them.

- To lead to [li d tu] – □ -
Innovation [n ve ()n] – □
Cement [s ment] –
Limestone [la mst n] –
Composition [k mp z ()n] –
To grind up [ra nd p] – □
Raw material [r m t r l] –
Portland cement [p tl nd s ment] – -
To put up [p t p] – □
Blast furnace [bl st f n s] –
Marine [m ri n] –
To mix [m ks] –
Grading [re d] –
Girder [d] – □
Reinforced concrete [ri n f st k kri t] –
Dock-wall [d kw l] – □
Beam [bi m] –
Bar [b] –
Mesh [me] – □
To embed [m bed] –
To tamp [tæmp] – □
Tensional [ten ()n()l] –
Rigid [r d d] – ,
To expose to [z] –
To subject to [s ekt] –
To undergo [nd] – ,
Shrinkage [r d] – ,
Restraining [r stre n] – ,
Tensile [tensa l] –
Moisture [m st] –
Stress [stres] – ,
To keep in mind [n ma nd] –
Homogeneity [h m ()d ne t] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

CONCRETE

It is difficult to imagine modern structure without concrete. Concrete is the very building material which led to great structural innovations. The most important quality of concrete is its property to be formed into large and strong monolithic units. The basic materials for making concrete are cement, aggregate and water. Cement is the most essential material and the most important one for making concrete of high quality. Cement is made of limestone and clay. It is burnt (calcined) at high temperature and ground up into powder. Depending on the kind and composition of the raw materials different types of cement are obtained. Portland cement, blast furnace cement are suitable for putting up marine structures.

Concrete is made by mixing cement, water, sand and gravel in the right amount. As soon as it is thoroughly mixed it is poured into forms that hold it in place until it hardens. The crystals forming in the process of making concrete stick together in a very hard artificial stone. Cement starts hardening one hour after the water has been added and the process of hardening lasts for about twenty-eight days. The process is called concrete curing.

The characteristics of concrete depend upon the quality of the materials used, grading the aggregates, proportioning and amount of water. The most important requirements for concrete are: it should be hard, strong, durable, fire-resistant and economical. Concrete can be divided into two classes: mass or plain concrete and reinforced concrete (ferro-concrete) where it is necessary to introduce steel. Plain or mass concrete can be used for almost all building purposes. Ferro-concrete is used in building bridges and arches, dams and dock-walls, for structures under water, for foundations, columns, girders, beams. The use of concrete and ferro-concrete is almost universal.

REINFORCED CONCRETE

Reinforced concrete is a combination of two of the strongest structural materials, concrete and steel. This term is applied to a construction in which steel bars or heavy steel mesh are properly embedded in concrete. The steel is put in position and concrete is poured around and over it, then tamped in place so that the steel is completely embedded. When the concrete hardens and sets, the resulting material gains great strength. This new structural

concrete came into practical application at the turn of the 19th century. The first results of the tests of the reinforced concrete beams were published in 1887. Since that time the development of reinforced concrete work has made great progress. And the reasons for this progress are quite evident. Concrete has poor elastic and tensional properties, but it is rigid, strong in compression, durable under and above ground and in the presence or absence of air and water, it increases its strength with age, it is fireproof.

Steel has great tensional compressive and elastic properties, but it is not durable being exposed to moisture, it loses its strength with age, or being subjected to high temperature. So, what is the effect of the addition of steel reinforced to concrete?

Steel does not undergo shrinkage or drying but concrete does and therefore the steel acts as a restraining medium in a reinforced concrete member. Shrinkage causes tensile stresses in the concrete which are balanced by compressive stresses in the steel. For getting the best from reinforced concrete, the following consideration should be kept in mind:

1. For general use the most suitable proportions of cement and aggregate are: one part of cement, two parts of sand and four parts of gravel.

2. Only fresh water free from organic matter should be used for reinforced work. Seawater is not allowed.

3. Homogeneity of the concrete is a very important requirement. Steel constructions with reinforced concrete have become the most important building material invented in centuries and they have given modern architecture its peculiar features.

Comprehension

Exercise 4. Answer the following questions.

1. Is it possible to put up modern structures without using concrete?
2. What is the most important quality of concrete?
3. What is the essential material for making concrete?
4. What is cement made of?
5. What are portland and blast furnace cement suitable for?
6. When does cement start hardening?
7. How long does the process of hardening last?
8. What do the characteristics of concrete depend on?
9. How many classes can concrete be divided?
10. The use of concrete and ferro-concrete is almost universal, isn't it?
11. Is reinforced concrete a combination of two of the strongest structural materials?

12. What is the process of making reinforced concrete?
13. When did this new structural concrete come into practical application?
14. Since when has the development of reinforced concrete work made good progress?
15. What are the properties of concrete?
16. Does concrete increase its strength with age?
17. Does steel undergo shrinkage or drying?
18. What should be kept in mind for getting the best from reinforced concrete?

Exercise 5. Say if the sentences are true or false.

1. Concrete is a natural building material.
2. Cement, aggregate and water are basic materials for making concrete.
3. Cement is made of sand and clay.
4. Concrete is made by mixing limestone, water, sand and gravel in the right amount.
5. Cement starts hardening two hours after the water has been added.
6. Concrete should be hard, strong, durable and fire-resistant.
7. Concrete can be divided into two classes: plain concrete and reinforced concrete.
8. Reinforced concrete is a combination of steel and concrete.
9. It is a construction in which metal bars or heavy steel mesh are properly embedded in cement.
10. This new structural concrete came into practical application at the end of the 19th century.
11. Concrete has bad elastic and tensional properties.
12. Concrete decreases its strength with ages.
13. Steel is durable being exposed to moisture.
14. Steel doesn't lose its strength with ages.
15. Seawater isn't used for reinforced work.
16. Homogeneity of the concrete is a very important requirement.

Vocabulary and Grammar

Exercise 6. Say the same in English.

- | | | | |
|----|----|-----|-----|
| 1) | 2) | 3) | 4) |
| | 5) | 6) | 7) |
| | 8) | | 9) |
| □ | □ | 10) | 11) |

- 12) 13)
 14) 15) 16)
 17) 18) 19) ;
 20) 21) 22)
 23) 24)
 25) 26) 27)
 28) □

Exercise 7. Find synonyms in the text for the following words.

Up to date, result in, modernization, significant, big, main, tall, type, various, building, quantity, man-made, to apply, ordinary, basement, to obtain, induration, use, humidity.

Exercise 8. Complete the sentences using the English equivalents for the Russian words in brackets.

1. The resulting material gains great strength when ().
2. At the turn of the 19 century new structural concrete ().
3. Steel has great tensional compressive and elastic properties but ().
4. Steel doesn't undergo shrinkage and therefore it acts ().
5. Shrinkage causes tensile stresses in concrete which are balanced ().

Exercise 9. Complete the following table with the appropriate verb or noun form.

	Verb	Noun	Meaning
1	to compress		
2		construction	
3		hardening	
4		requirement	
5	to apply		
6	to build		
7		addition	
8		moisture	
9	to mix		

Exercise 10. Put the following words in the right column: clay, strong, properly, durable, tamp, shrinkage, essential, concrete, rigid, thoroughly, limestone, steel, compressive, together, elastic, strength,

undergo, beam, embed, bar, artificial, mesh, tensional, mixing, make, completely, sand, harden.

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 11. Translate the sentences from Russian into English.

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

Exercise 12. Read and memorize these dialogues.

Dialogue 1:

- There is something I want to ask you. May I?
- Sure, you may! Why not? Go ahead.
- What is the most important component of concrete?
- Do you mean to say that you don't know?
- Honestly, I don't! Tell me, please!
- OK, listen. The most important component of concrete is cement.

Dialogue 2:

- May concrete be considered an artificial conglomerate () stone?
- Certainly, it may! Why not?

- You know how it is made, don't you?
- Sure, I do. It is made by uniting cement and water into paste.
- What about sand? Isn't sand used?
- Of course, sand is used! How can you make concrete without sand?

Lesson 3. BRICK

Pre-reading task

Exercise 1. Read the words and learn them.

Rectangular □ –
 Shale [e l] –
 Resistant [r z st nt] – ,
 Dampness □ s] –
 Adhesives [v z] – ,
 Interlocking nt l k –
 Facing brick s br k] –
 Refractory brick [r frækt() r br k] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

BRICK

Brick is one of the oldest and most common building materials. It is a rectangular building block made of clay, shale, or various other materials. Bricks are strong, hard and resistant to fire and damage from the weather. They cost relatively little, resist dampness and heat, and can last longer than stone. The colour varies according to the clay used. Some bricks are made of special fireclays for use in fireplaces or ovens. Others may be made of glass or they may be textured or glazed.

A brick is a type of block used to build such structures as houses, commercial and public buildings, pavements, fireplaces and furnaces. The term brick denotes a block composed of dried clay. It is also used informally to denote other chemically cured construction blocks. Bricks can be joined together using mortar, adhesives or by interlocking them. Bricks are produced in numerous classes, types, materials, and sizes which vary with region and time period, and are produced in bulk quantities.

Bricks are divided into two general classes: building bricks and refractory bricks.

Different categories of building bricks are used for load-bearing walls, for structures carrying exceptional loads and where appearance is important. The highest-quality and most attractive building bricks are called facing bricks. They are used in highly visible areas of structures, such as the interior or exterior walls of houses. Facing bricks come in a variety of colours and surface textures. Most are made from high-grade fire clay or low-grade shale.

Refractory bricks can withstand temperatures between 1093° and 2204 °C. They are also highly resistant to chemical damage, physical wear and thermal changes. Refractory bricks are used in a wide variety of structures, including fireplaces and industrial furnaces.

The methods used to make bricks vary according to the raw materials used, the intended use of the bricks and other factors. However, the production of bricks generally involves four basic steps:

1. preparing the ingredients;
2. forming bricks;
3. drying bricks;
4. firing brick.

Comprehension

Exercise 4. Answer the following questions.

1. What is a brick?
2. What properties does a brick have?
3. Do bricks last longer than stone?
4. What does the colour of the brick depend on?
5. What are bricks made of?
6. Where are bricks used?
7. How many classes are bricks divided into?
8. What bricks are called face bricks?
9. What do you know about refractory bricks?
10. Where are refractory bricks used?

Exercise 5. Say if the sentences are true or false.

1. Brick is one of the oldest building materials.
2. Brick is a round building block made of clay, shale, or various other materials.
3. Bricks are used to build various structures.
4. Bricks can be joined together without using mortar.
5. Bricks are divided into building bricks and refractory bricks.

2.

□

3.

□

□

□

□

4.

□

□

□

□

5.

□

□

□

6.

□

□

□

7.

□

□

□

□

□

Lesson 4. GLASS

Pre-reading task

Exercise 1. Read the words and learn them.

Substance [sʌbst(ə)ns] –

Constituents [kɒnstɪtjənts] –

Spin (spun, spun) [spɪn] – ,

Fragile [frædʒəl] – □

Transparent [trænzpə'reɪnt] –

Float glass [fləʊt glɑːs] – ,

Plate glass [pleɪt glɑːs] –

Glare [glɑː] – , , ,

Wire mesh [waɪə meʃ] –

Fiberglass [faɪbə glɑːs] –

Foam glass [fəʊm glɑːs] –

Honeycomb [hɒni kɒm] –

Hollow [hɒlə] – ,

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

GLASS

Glass is one of the most important and useful materials in the world. Few manufactured substances add as much to modern living as does glass. Yet few products are made of such inexpensive raw materials as silica sand (silica, or silicon dioxide), soda ash (sodium carbonate), and limestone (calcium carbonate). These constituents need to be very pure for the glass to be clear. Glass can take many different forms. It can be spun finer than a spider web or molded into a disk. It can be stronger than steel, or more fragile than paper. Most glass is transparent. Glass can also be colored to any desired shade.

There are many kinds of glass. The float glass is made in the form of flat sheets. It is used chiefly in windows, in mirrors, room dividers. It provides the best qualities of the old plate glass with more than ten times the productivity of the plate glass process. It is also significantly more energy efficient and can be produced in a full range of thicknesses. The electro-float process led to the mass production of solar-control glass or tinted windows, which reduce solar heat gain and glare in buildings. One of the newer and most fascinating products of glass manufacture is fiber glass. It can be laminated with plastics or toughened, or a wire mesh can be sandwiched into glass sheets to provide strength or fire-resistant properties. Fiberglass insulates the walls of many homes. Foam glass, when it is cut, looks like a black honeycomb. It is filled with many tiny cells of gas. Each cell is surrounded and sealed off from the other by thin walls of glass. Foam glass is so light that it floats on water, like cork. It is widely used as a heat insulator in buildings, on steam pipes, and on chemical equipment. Foam glass can be cut into various shapes with a saw.

Glass building blocks are made of two hollow half-sections sealed together at a high temperature. Glass building blocks are good insulators because they withstand high temperatures on the inside and low, outdoor temperatures at the same time, because of the dead-air space inside thus making suitable blocks for building purposes. Glass building blocks are laid like bricks.

Comprehension

Exercise 4. Answer the following questions.

1. What role does glass play in modern life?

2. What forms can glass take?
3. Is glass a strong or fragile material?
4. Glass can be coloured, can't it?
5. How many types of glass are there?
6. Where is the float glass used?
7. What is fiberglass? What is it used for?
8. What does foam glass look like?
9. What are glass building blocks made of?

Exercise 5. Say if the sentences are true or false.

1. Glass is one of the most important materials in the world, which makes a great contribution to modern life.
2. Silica sand, soda ash and limestone need to be very pure for the glass to be clear.
3. Glass can be as strong as steel.
4. Glass can have different shades.
5. The float glass is used chiefly in windows.
6. Fiberglass insulates the walls of many homes.
7. The foam glass is very heavy.
8. Glass building blocks are good insulators.

Vocabulary and Grammar

Exercise 6. Say the same in English.

- | | | | |
|----|----|-----|---|
| 1) | 2) | 3) | |
| 4) | | 5) | - |
| | 6) | | |
| 7) | 8) | | |
| 9) | | 10) | □ |

Exercise 7. Put the words in the right order to make up a sentence.

1. Take / can / many / different / glass / forms.
2. Can / than / glass / be / steel / stronger.
3. Are / glass / of / many / there / kinds.
4. Insulates / fiberglass / walls / homes / of / the / many.
5. Building / insulators / glass / are / good / blocks.

Exercise 8. Put the following words in the right column: *insulate, temperature, pure, productivity, reduce, energy, strength, fragile, useful, chiefly, productivity, significantly, thickness, inexpensive, heat, chemical, suitable, substance, efficient, widely, shape, provide, glass, steel, transparent.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 9. Make up word combinations and translate them.

- | | |
|-------------------|------------------|
| 1. high | a. space |
| 2. building | b. piper |
| 3. good | c. heat |
| 4. hollow | d. temperature |
| 5. foam | e. blocks |
| 6. fire-resistant | f. cells |
| 7. tiny | g. production |
| 8. dead-air | h. insulators |
| 9. solar | i. half-sections |
| 10. mass | j. glass |
| 11. steam | k. properties |

Exercise 10. Translate the sentences paying attention to the Passive Voice.

- Glass can also be colored to any desired shade.
- The float glass is made in the form of flat sheets.
- The float glass is used chiefly in windows, in mirrors, room dividers.
- Fiber glass can be laminated with plastics or toughened.
- Foam glass can be cut into various shapes with a saw.
- Glass building blocks are laid like bricks.

Exercise 11. Translate the sentences from Russian into English.

- □
- □
-
-
-
-
- □
-

Lesson 5. CERAMICS

Pre-reading task

Exercise 1. Read the words and learn them.

Porcelain [pɔːrəlɪn] – ;

Withstand [wɪð'stænd] –

Feldspar [ˈfɛldspɑːr] –

Silica [sɪˈlɪkə] –

Talc [tɑːlk] –

Earth's crust [ˈɜːθs kɹʌst] –

Insulator [ɪn'sjuːlətɔːr] –

Conduct [kənˈdʌkt] –

Dinnerware [ˈdɪnəweɪə] –

Refractory [rɪˈfrækt(ə)rɪ] –

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Read and translate the text.

CERAMICS

Ceramics are one of the most important types of engineering materials that are primarily synthetic. The other two are metals and plastics. Ceramics include such everyday materials as brick, cement, glass, and porcelain. Most ceramics are hard and can withstand heat and chemicals. These properties give them a wide variety of uses in industry.

Manufacturers make common ceramics from such minerals as clay, feldspar, silica, and talc. These minerals called silicates form most of the earth's crust. Clay is an important silicate. But it is not used in all ceramic materials. Glass, for example, is made from sand. Most ceramic products, like their mineral ingredients, can withstand acids, gases, salts, water, and high temperatures. But not all ceramic products have the same properties. Common ceramics are good insulators – that is, they conduct electricity poorly. However, certain ceramics lose their electrical resistance and become superconductors when they are cooled. Some ceramic materials are magnetic.

The properties of ceramics make them especially suitable for certain products. Products made of ceramic materials include abrasives (materials

used for grinding), construction materials, dinnerware, electrical equipment, glass products, and refractories (heat-resistant materials).

Comprehension

Exercise 4. Answer the following questions.

1. Are ceramics natural or artificial building materials?
2. What everyday materials do ceramics include?
3. What do you now about the properties of ceramics?
4. Is clay used in all ceramic materials?
5. Are common ceramics good or bad insulators?
6. When do certain ceramics lose their electrical resistance?

Exercise 5. Say if the sentences are true or false.

1. Ceramics can't withstand heat.
2. All ceramic products have the same properties.
3. Common ceramics conduct electricity well.
4. Certain ceramics lose their electrical resistance when they are cooled.
5. Some ceramic materials are magnetic.

Vocabulary and Grammar

Exercise 6. Say the same in English.

- 1) _____ 2) _____
- 3) _____ ; 4) _____ 5) _____
- 6) _____ 7) _____ 8) _____ 9) _____ □
- 10) _____
- 11) _____ 12) _____ □

Exercise 7. Fill in the gaps using the following words: *temperatures, withstand, insulators, ceramic, superconductors, equipment, glass, suitable*.

1. Ceramics include such materials as brick, cement, _____, and porcelain.
2. Most ceramics are hard and can _____ heat and chemicals.
3. Common ceramics are good _____.
4. Clay is not used in all _____ materials.
5. Most ceramic products can withstand high _____.
6. When certain ceramics are cooled they become _____.
7. The properties of ceramics make them especially _____ for such products as construction materials, dinnerware, electrical _____, glass products, and refractories.

Exercise 8. Put the following words in the right column: *electrical, insulator, resistance, poorly, important, withstand, synthetic, porcelain, feldspar, high, electricity, lose, magnetic, equipment, primarily, product, glass.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 9. Match the synonyms.

- | | |
|---------------|-------------------|
| 1. synthetic | a. similar |
| 2. primarily | b. characteristic |
| 3. the same | c. strong |
| 4. hard | d. fireproof |
| 5. important | e. isolator |
| 6. refractory | f. mainly |
| 7. insulator | g. artificial |
| 8. property | h. essential |

Exercise 10. Translate the sentences from Russian into English.

- 1.
2.
3.
4.
5.
6.

ENGLISH-RUSSIAN VOCABULARY

A

Abutment [b t m nt] –
 □ d()nt] –
 □ r s] –
 Adhesives [v z] – ,
 Adjacent [d e s()nt] – ,
 □ –
 □ –
 □] –
 Aluminium [ælj() m n m] –
 □ kw t] –
 Appliance [pla ns] – ,
 □ d kt] – ,
 Arch bridge [–
 Arouse one's wonder –
 Ascend [send] – ,
 Asphyxiate [ks e t] – ,
 Assemble [semb()l] –

B

Ball- r –
 Bar [b –
 Basement be sm()nt] – □ □ □
 Beam [bi m] – □
 Bedding bed – □
 Blast furnace [bl st f n s] –
 Blast hole [bl st h l] –
 Bolt [b lt] – □
 Bore [b –
 Bored tunnel [b d t n()l] – □
 Brace [bre s] –
 Branch [br n(t)] –
 Breakthrough [bre k ru] – □
 Brick [br k] –

Bridge [br d] –
 Build (built, built) [b ld] – ,
 Building felt ld felt] – ()
 Bump [b mp] –

C

Cable-stayed bridge [ke b()l ste d br d] –
 Cantilever bridge [kænt br d] –
 □ n] –
 Capability [ke p b l t] – ,
 □ –
 □] – ,
 Cart [k – ,
 Cast iron [k a n] –
 Castle k s()l] –
 Causeway k zwe] –
 Cave [ke v] –
 Ceiling si l –
 Cement [s ment] –
 æ l n(d)] – ,
 e mb] –
 Check [t ek] –
 mn] –
 k] – ,
 Circular s kj l] –
 Civil engineering s v()l end n r –
 Clay [kle] –
 Come to the decision [d s ()n] –
 Compact [k □ –
 mpleks] –
 Compose [k z] – : ,
 Composition [k mp z ()n] –
 Concrete [k] –
 Conduct [k kt] –
 Conductor [k kt] –
 Consecutive [k n sekj t v] – □

Constituents [k n st tj nts] –
 Construction [k n str k ()n] –
 Consume [k n sju m] –
 Consumption [k n s m(p) ()n] –
 Convenient [k n vi n nt] –
 Copper [k p] –
 Corrosion-resistant [k r ()n r z st nt] –
 Course [k s] –
 Courtyard [k tj d] –
 Covered walk [k v d w k] –
 Covering [k v()r] –
 Cripple [kr p()l] – ,
 Crossbeam arrangement [kr sbi m re n(d) m()nt] –

Cross-section [kr s sek ()n] –
 Crumb [kr m] –
 Crushed rock [kr t r k] –
 Crushed stone [kr t st n] – ,
 Cut-and-cover [k t nd k v] –

Cut-and-cover tunnel [k t nd k v t n()l] – □

[p sa z] –
 [tl r] –
 [t hed] – ()

D

Dampness [dæmp n s] –
 Dangerous [de n(d) ()r s] –
 Data [de t d t] – □
 Dead-air space [ded e spe s] –
 Deciduous [d s dj s] – □
 Density [dens t] –
 Depend on [d pend n] –
 Derive [d ra v] –
 Determine [d t n] –
 Dig (dug, dug) [d] –
 Dimension stone [d men ()n st n] –

F

Facing brick fe s br k] –
Fan [fæn] –
Feel a need –
Feldspar feldsp –
Ferrous fer s] – □
Fibre fa b] – □
Fiberboard fa b rb d] – - □
Fiberglass fa b r l s] –
Filler fl] – □
Finishing machine f n m i n] –
Firm [f m] – □
Fixture f kst] – □
Flaky fle k] – □ □
Flashing flæ – □ □
Flat [flæt] –
Flint [fl nt] – □
Float [fl t] –
Float glass [fl t l s] – □

Flotation [fl te ()n] –
Flourish fl r] –
Foam glass [f m l s] –
Force into [f s nt] –
Forecast (forecast, forecast f k st] –
Footing f t –
□ tpr nt] – □
Forge [f d] –
Former f m] –
Fragile fræd æ l] – □
Frame [fre m] – □ □
Furnace f n s] – □
Furnace f n s] – □
Fuse [fju z] –

G

Gantry-crane □ ntr kre n] –
Girder d] – □ □

Girder bridge [d br d] –

Glare [le] – □ □ □

Granite [ræn t] –

Gravel [ræv()l] –

Grind [ra nd] –

Grind up [ra nd p] – □

Grip [r p] –

Groove [ru v] –

Grumbling [r mbl] –

H

Handle [hænd()l] – □ □

Hang (hung, hung) [hŋ –

Hardwood(s) [h dw d(z)] – □

Harsh terrain [h –

Hazard [hæz d] – □ □

Hearth [h] – □ □ □ □

Heavy-duty [hev dju t] – □

Hire [ha] –

Hoist [h st] –

Hold (held, held) [h ld] –

Hollow [h l] – □ ,

Homogeneity [h m ()d ne t] –

Honeycomb [h n k m] –

Horseshoe-shaped [h s u e pt] –
sta l] –

Huge [hju d] –

Hut [h t] –

I

Immersed tube tunnels [m st tju b t n()lz] –

Impose upon [m p z] – □

Improved [m pru vd] –

Incline [nkla n] – □ □

Initially [n ()l] – □ □

Innovation [n ve ()n] – □
 Insulate [nsj le t] – □
 Insulation [nsj le ()n] –
 Insulator [nsj le t] –
 Interlocking [nt l k] –
 Invasion [n ve ()n] – □ □
 Invent [n vent] –
 Iron [a n] –
 Ironstone [a nst n] – □

J

Joint [d nt] –
 Joist [d st] –
 Just prior [d] –

K

Keep in mind [ki p n ma nd] –
 Keep out [ki p a t] – □

L

Land survey [lænd s ve] –
 □ □ p] –
 Landscape architect [lænd(ske p k tekt] –

Landscaping [lænd(ske p] –
 Lath [l] – □
 Lay the foundation [fa ()n] of smth –
 Lead to [li d tu – □ -
 Leak [li k] – □
 Lean [li n] –
 Level [lev()l] – □n □v)
 Lightweight steel [la twe t sti l] –
 Lime [la m] –
 Limestone [mst n] –
 n v ð n()l] –
 Lip [l p] – ,

Load [l d] –
 Loads [l dz] –
 Log [l] –
 Lumber mill [l mb m l] –
 Luster [l st] –

M

Maintain [me n te n] –
 Manufacture [mænʃ fækt] –
 Maple [me p()l] –
 Marble [m b()l] –
 March [m t] –
 Marine [m ri n] –
 Market outlet [m k t a tlet] –
 Masterpiece [m st pi s] –
 Measure [me] –
 Mesh [me] –
 Melt [melt] –
 Mention [men ()n] –
 Mercury [m kj r] –
 Midway [m dwe] –
 Military [m l t()r] –
 Mix [m ks] –
 Moat [m t] –
 Moisture [m st] –
 Moistureproof paper [m st pru f pe p] –
 Mortar [m t] –
 Movement [mu vm()nt] –
 Mud [m d] –
 Multi-span bridge [m lt spæn br d]

N

Nail [ne l] –
 Nail head [ne l hed] –

Non-ferrous [nɪ'fɛrəs] – (vɪr'd] –

O

Oak [oʊk] –

Occurrence [ə'kʌr(ə)ns] – ,

Outstanding [aʊt'stændɪŋ] –

P

Pain [peɪn] –

Partition [pɑ:ˈtɪʃ(ə)n] –

Passageway [pæ'sdʒweɪ] –

Pave [peɪv] –

Paved road [peɪvd rəʊd] –

Pavement marking [peɪvm(ə)nt mɑ:kiŋ] –

Permit [pə'mɪt] –

Pier [pɪə] –

Pile [paɪl] –

Pipe [paɪp] –

Pit [pɪt] –

Place [pleɪs] –

Place directly [pleɪs dɪ'rektli] –

Plaited [plæɪtɪd] –

Plant [plɑ:nt] –

Plaster [plæstə] – (vɪ'plɑ:stə) (n)

Plasterboard [plæstə bɔ:d] –

Plate [pleɪt] –

Plate glass [pleɪt glɑ:s] –

Plumber [plʌmɪ] –

Plywood [plɑ w d] –
 Pole [p ɒ l] – □ □
 Pontoon bridge [p ɒ tu n br ɪ d] –
 Porcelain [p ɔ () l ɪ n] –
 Portland cement [p ɔ t l ɒ n d s ɪ m ɛ n t] – -
 Possess [p ɒ z ɪ s] –
 Pothole [p ɒ θ ɒ l] – □ □
 Precast concrete [pri k ɔ st k ɒ n k r ɪ t] –
 Prefabricated units [pri fæbr ɪ ke t d j u n ɪ t s] –
 Prehistoric [pri h ɪ st ɪ r k] –
 Preserve [pr ɪ z ɜ v] – □
 Press down [pres daʊ n] – □
 Pre-stressed concrete [pri strest k ɒ n k r ɪ t] –

Prevent from [pr ɪ vent fr ɒ m] –
 m t v mæn] –

Provide [pr ɒ va d] –
 ɪ] – ,
 Put up [p ʊ t p] – □

Q

Quarry [kw ɪ r ɪ] – □
 Quarter [kw ɔ t ɪ] –
 Quarts [kw ɔ ts] –

R

Radiate [re ɪ d e ɪ t] –
 Rafter [r ɔ ft] –
 Railroad [re ɪ l r ɔ d] – □
 Range [re ɪ n(d)] – □
 Ratio [re ɪ ʃ ɪ ɒ] –
 Ravine [r ɔ vi ɪ n] – □ □
 Raw material [r ɔ m t ɪ r ɪ ɪ l] –
 Ready-made [red ɪ me ɪ d] – □
 end] –
 □ -
 Refer to [r ɪ f ɪ -

Refractory [r frækt()r] –
Refractory brick [r frækt()r br k] –

Relatively rel t vl] –
Remain [r me n] –
Residential [rez den ()l] –
Resilience [r z l ns] –
Resistant [r z st nt] –
Restraining [r stre n –
Ridge [r d] –
Ridge board [r d b d] –
Rigid r d d] –
Road [r d] –
Road builder [r d b ld] –
Roadway r dwe] –
Rock [r k] –
Rock wool [r k w l] –
Roof [ru f] –
Route [ru t] –
Rug [r] –

S

Sand [sænd] –
Sandstone sæn(d)st n] –
Sap [sæp] –
Sash [sæ] –
Scarcity ske s t] –
Scenery si n()r] –
Screened dirt [skri nd d rt] –
Seal [si l] –
Serve as [s v z] –
d] –
Sewer su] –
Shaft [ft] –
Shale [e l] –
Shallow tunnel æl t n()l] –

Sheathing [i] – □
 Shellac [ˈlæk] – □
 Shelter [elt] –
 Shingle [l] – □
 Shield [i ld] –
 Shift [ft] –
 Shipping [p] –
 Shrinkage [r k d] – □
 Sick [s k] –
 Siding [sa d] – □
 Siege engine [si d end n] –
 Silica [s l k] –
 Sill [s l] –
 Similar [s m l] – □
 Sink [s k] –
 Sinking [s k] –
 Single-span bridge [s l spæn br d] – □
 Site [sa t] – □ □
 Slab [slæb] –
 Slanted [sl nt d] – □
 –
 Slate [sle t] –
 Slot [sl t] –
 Sludge [sl d] – □
 1] –
 f(t)w d] –
 Soil [s l] – ,
 Soil scientist [s nt st] –
 Span [spæn] – ,
 Spin (spun, spun) [sp n] – ,
 Spray [spre] –
 Stable [ste b()l] – □
 Stainless [ste nl s] – □
 Stairway [ste we] –
 Steel [sti l] –
 b()l] –
 – ,
 Stick [st k] –
 Stone [st n] – ,

Tongue [tʌŋ] – □
 Tongue and groove boards –
 Topple [tɒpəl] –
 Tower [taʊə] –
 Track [træk] – □ □
 Traffic [træfɪk] –
 Traffic jam [træfɪk dʌm] – □
 Transparent [trænsˈpær(ə)nt] –
 Transportation planner [trænsˈpɔːteɪ(ə)n plænɪŋ] – -

Trap [træp] – - □
 Treatise [triˈtiːs] – □
 Trench [tren(t)] –
 Trial [traɪəl] –
 Truss bridge [trʌs brɪdʒ] –
 Tunnel [tʌnəl] –
 Tunnel boring machine [tʌnəl bɔːrɪŋ mɪʃɪn] –

Tunneling [tʌnəlɪŋ] – □
 Tunneling [tʌnəlɪŋ] – □

U

Undergo [ˌʌndəˈɡoʊ] – □
 Undisturbed [ˌʌndɪˈstɜːbd] – □
 Unevenly [ˌʌniˈvnlɪ] –
 Unskilled [ˌʌnskɪld] –
 Unsuitable [ˌʌnsuːtəb(ə)l] –

V

Valve [vælv] –
 Varnish [ˈvɜːnɪʃ] – □ □
 Vast [væst] –
 Vehicle [ˈviːk(ə)l] –
 Veneering [ˌvenɪərɪŋ] – □ □
 Veneering [ˌvenɪərɪŋ] – □ □
 Vermiculite [vɜːmɪkjʊˈlaɪt] – □
 Vicinity [vɪˈsɪnɪtɪ] –
 Vinyl [ˈvaɪn(ə)l] –

W

Wall [w ɔːl] –

Wallplate [w ɔːlpleɪt] –

Washbasin [w ɔːsbæz(ə)n] – □

Water heater [w ɔːtəˈhiːtər] –

Wax [w æks] –

Weight [weɪt] – □

Welded bridge [weld d brɪdʒ] –

Well [wel] –

Well-maintained [welmeɪntənd] –

Width [wɪdθ] – k –

Withstand [wɪðstænd] –

Withstand [wɪðstænd] –

Withstand [wɪðstænd] –

Withstand [wɪðstænd] –

Wood [wɔːd] – □ □

Wrought iron [r ɔːtaɪn] –

XYZ

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