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университет»

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Английский язык

**WATER AND DEVELOPMENT**

Учебно-методическое пособие

для бакалавров факультета водоснабжения и водоотведения

Краснодар

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**УДК 811.111 (078)**

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**К21**

**Р е ц е н з е н т:**

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Предлагаемое учебно-методическое пособие предназначено для работы в группах бакалавров факультета водоснабжения и водоотведения.

Целью данного издания является расширение активного словарного запаса по специальности, совершенствование навыков чтения, развитие умения вести беседу по специальности.

Пособие включает в себя тексты из отечественной и зарубежной литературы по специальности, поурочный словарь, грамматический материал в виде таблиц и кратких правил и упражнения.

Содержание заданий и упражнений обеспечивает развитие навыков чтения, устной речи, закрепление лексического и грамматического материала.

Учебно-методическое пособие написано в соответствии с программой по иностранным языкам для неязыковых вузов.

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**Water Quiz**

Are you a fountain of knowledge when it comes to water? Well, dive in to find out if you are a water baby or not...

1. What is water made up of?

Choose one of the following:

1. Nitrogen
2. Carbon and Oxygen
3. Carbon Monoxide
4. Oxygen and Hydrogen
5. How much of the water on earth is available for human use?

Choose one of the following:

1. 31 per cent
2. 13 per cent
3. 0.3 per cent
4. 1.3 per cent
5. How much of the earth's surface is covered by water?

Choose one of the following:

1. 75 per cent
2. 34 per cent
3. 55 per cent
4. 16 per cent
5. The energy generated from water is known as..:

Choose one of the following:

1. Relative energy
2. Irrigation
3. Hydroelectric energy
4. Electromagnetic energy
5. Water is used over and over again in a never ending cycle. What is the cycle called?

Choose one of the following:

1. Water Ring
2. The Hydrological Cycle
3. Water Recycling Loop
4. Water Cycle
5. How much water does the human body contain?

Choose one of the following:

1. 20 per cent
2. 40 per cent
3. 55 per cent
4. 80 per cent
5. Water boils at a temperature of:

Choose one of the following:

1. 80 degrees Fahrenheit
2. 180 degrees Centigrade
3. 100 degrees Fahrenheit
4. 100 degrees Centigrade
5. Who wrote the line, "Water, water, everywhere. Nor any drop to drink."

Choose one of the following:

1. William Shakespeare
2. Virginia Woolf
3. Samuel Taylor
4. Gilbert and Sullivan
5. In Hindu mythology, the Rain God is known as:

Choose one of the following:

1. Vishnu
2. Indra
3. Brahma
4. Shiva
5. Who is The Roman God of rain?

Choose one of the following:

1. Pluto
2. Mercury
3. Jupiter
4. Neptune
5. Who is known as the weather God in Greek mythology?

Choose one of the following:

1. Zeus
2. Helios
3. Thor
4. Adonis
5. Which of these continents is the driest?

Choose one of the following:

1. Australia
2. Africa
3. Antarctica
4. Europe
5. Which of these contributes to water pollution?
6. Sewers
7. Farms
8. Street runoff
9. All of the above

**Part I**

**Unit 1**

**Water**

**Introduction**

**Notes:**

to bond – связывать glacier – ледник

state – состояние liquid – жидкость

matter – материя aquifer – водоносный слой

vapour – пар vital – жизненно важный

Water is the chemical substance with chemical formula H2O: one molecule of water has two hydrogen atoms bonded to a single oxygen atom.

Water appears in nature in all three common states of matter and may take many different forms on Earth: water vapour and clouds in the sky; seawater in the oceans; icebergs in the polar oceans; glaciers and rivers in the mountains; and the liquid in aquifers in the ground.

Water covers 70.9% of the Earth's surface, and is vital for all known forms of life.

Water plays an important role in the world economy.

**Grammar Revision**

**Present Indefinite (Simple)**

|  |  |  |
| --- | --- | --- |
| **Утвердительная форма** | **Отрицательная форма** | **Вопросительная форма** |
| I work  He work**s**  She work**s**  It work**s**  We work  You work  They work | I do not work  He **does** not work  She **does** not work  It **does** not work  We do not work  You do not work  They do not work | Do I work?  **Does** he work?  **Does** she work?  **Does** it work?  Do we work?  Do you work?  Do they work? |

**do not = don’t does not = doesn’t**

**Характеристика действия**

|  |  |
| --- | --- |
| **Как?** | Обычное, регулярное, повторяющееся действие; факт. |
| **Когда?** | 1. Usually, generally, always, never, often, seldom, every day, sometimes 2. Будущее действие, связанное с графиком, расписанием |
| **Примеры** | The earth **moves** round the Sun.  She **does not live** in London.  I **work** in my garden every day.  The next train **leaves** in an hour. |
| **Вопрос – краткий ответ** | **- Do** you study?  - Yes, I **do**.  - **Does** your sister study?  - No, she **doesn’t**. She works. |

**I . Take this Present Indefinite Tense Quiz**

**Complete the sentences using Present Indefinite.**

|  |  |
| --- | --- |
| 1. He \_\_\_\_ it. | A don't like  B doesn't like  C doesn't likes  D don't likes |
| 1. They \_\_\_\_\_ here very often. | A don't come  B doesn't comes  C doesn't come  D don’t comes |
| 1. I \_\_\_\_\_ mind at all. | A am not  B isn't  C don't  D doesn't |
| 4 It \_\_\_\_\_ sense. | A don't make  D doesn't makes  C doesn't make  D isn’t make |
| 1. They \_\_\_\_ happy. | A seem  B seems  C are seeming  D are seem |
| 1. She \_\_\_\_ a brother. | A doesn't has  B don't has  C don't have  D doesn't have |
| 1. The exam \_\_\_\_\_ two hours. | A last  B lastes  C lasts  D is last |

**II . Open the brackets using the proper form of the verb.**

1. He (speak) English? – Yes, he (speak) English quite fluently. 2. She (write) letters to her mother every week. 3. Ships (travel) from Saratov to Novgorod in three days. 4. I think that he always (have) lunch at this hour. 5. Mary (learn) French at the university. 6. You (like) these flowers? – No, I don’t. They smell badly. 7. I (like) to translate articles from English into Russian. 8. The plane (arrive) at 8 p.m. 9. Sorry, but you (not, know) the lesson well.

**III. Give short answers to the following questions:**

1. Do you like to study at the university?
2. Do you live in the campus?
3. Does your friend live in the campus?
4. Do you get good marks at the classes?
5. Does your friend study well?
6. Do you enjoy giving gifts?
7. Do you often give flowers to your mother?
8. Does she like to get presents?
9. Do your parents have a garden?
10. Do you enjoy growing flowers?
11. Do you enjoy going to the clubs and disco?

**Vocabulary**

1. **Listen, read and memorize.**

|  |  |
| --- | --- |
| 1. ice 2. hail 3. fog 4. vapor 5. cloud 6. happen 7. reach 8. cover 9. contain 10. still 11. salt 12. harmful 13. move 14. leave (left, left) 15. behind 16. lake 17. evaporate 18. rise (rose, risen) 19. cool 20. fall (fell, fallen) 21. precipitation 22. depend(on/upon) 23. store 24. source 25. cause 26. renew 27. surface 28. support 29. crop 30. stock 31. power 32. continue 33. require 34. quantity 35. provide 36. raw materials 37. consume 38. per capita 39. increase 40. rapid 41. decrease 42. measure 43. plenty of 44. available 45. waste 46. pollution 47. improve 48. efficient | лёд  град  туман  пар  облако  случаться, происходить  достигать, доходить  покрывать  содержать (в себе), вмещать  тем не менее, всё ещё  соль  вредный, губительный  двигать(ся), передвигать(ся)  оставлять, покидать  сзади, позади  озеро  испаряться  подниматься; подъём  охлаждать(ся), холодный  падать, понижаться  осадки  зависеть (от)  запасать, накапливать  источник  вызывать, быть причиной  возобновлять, пополнять запас  поверхность  поддерживать  с/х культура  скот  питать (электро)энергией  продолжать(ся)  требовать, нуждаться  количество  снабжать, обеспечивать  сырьё  потреблять  на душу населения  расти, возрастать; рост, возрастание  быстрый  уменьшаться, убывать; уменьшение  мера; измерять  множество, избыток  доступный; пригодный  отходы, отбросы; бесполезная трата  загрязнение  улучшать(ся)  эффективный |

1. **Guess the meaning of the following words:**

resource, natural, form, atmosphere, ocean, cycle, mile, cubic, condensation, globe, planet, material, industry, irrigation, container, reservoir, climate, topography, region, kilometer, problem, accelerate, distribute, condense, method, agriculture

1. **Translate the following word combinations:**

resource, natural resources, water resources; ice, thin ice, thick ice, icy wind; fog, thick fog, a foggy day; vapor, water vapor; sea, sea water, sea plants; salt, harmful salts, salty water; to contain, to contain harmful salts, to contain information; to move, to move to the ocean, the movement of water; to evaporate, to evaporate water, evaporation from the land surface; to leave, to leave home, to leave salts behind; to rise, to rise into the air, to rise early; to fall, to fall to the land, to fall down; to cool, to cool in the air; to store, to store water, water stored in the atmosphere; source, a source of water, a source of information; to precipitate, precipitated vapor, the amount of precipitated vapor; quantity, a great quantity of water; waste, waste of water

1. **Match the word and its synonym.**

|  |  |
| --- | --- |
| 1) vapor  2) happen  3) still  4) store  5) quantity  6) rapid  7) available  8) contain  9) leave  10) important  11) accelerate | 1. Quicken 2. however 3. significant 4. take place 5. include 6. usable 7. steam 8. amount 9. walk out 10. accumulate 11. quick |

1. **Fill in the gaps choosing the words from the box. Translate the sentences.**

|  |
| --- |
| **efficiently, quantity, require, sky, evaporate, contain, water, resource, condense, globe, purposes** |

* + 1. Water is an important natural \_\_\_\_.
    2. Rain, snow, ice, hail, vapor, fog are various forms of \_\_\_\_.
    3. Three fourths of \_\_\_\_ are covered with water.
    4. Sea water \_\_\_\_ salts harmful to most plants.
    5. Water \_\_\_\_ from the surface of the ocean and into the air.
    6. Water vapor … and falls to the Earth.
    7. About 95,000 cubic miles of water are moving between earth and \_\_\_\_.
    8. Our homes, agriculture and industry \_\_\_\_ great quantities of water.
    9. We need water to support our lives, to grow our crops and for many other \_\_\_\_.
    10. The \_\_\_\_ of fresh water available to man is very small.
    11. We have to use water more \_\_\_\_.

1. **Translate the sentences into Russian.**
2. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing.
3. Over two thirds of fresh water is frozen in glaciers and polar ice caps.
4. The total quantity of water available at any given time is an important consideration.
5. Water is present in the atmosphere in solid, liquid, and vapor states.
6. Water is responsible for a large amount of processes that occur on the surface of the earth.
7. Water vapor condensing from the air precipitates to earth or ocean.
8. Sea water contains about 3.5% salt on average, plus smaller amounts of other substances.
9. To avoid a global water crisis, industry and cities find ways to use water more efficiently.
10. A large amount of the Earth's water is contained in oceans.
11. **Match the English and Russian proverbs.**

**A** a) Water is a boon in the desert, but the drowning man curses it. b) To go through fire and water. c) To take to something like a duck to water. d) To fish in troubled waters. e) A lot of water has flown under the bridge since. f) To muddy the water. g) To pour cold water over someone. h) To get into hot water. i) A drop in the ocean. j) To be in low water. k) To make someone’s mouth water. l) Like water off a duck’s back. m) After us the deluge!

**B** 1) Сесть на мель. 2) Слюнки текут. 3) Попасть как кур во щи. 4) Окатить холодной водой.5) Мутить воду. 6) Много воды утекло. 7) Ловить рыбу в мутной воды. 8) Как с гуся вода. 9) Как рыба в воде. 10) Пройти огонь и воду. 11) Капля в море. 12) Вода – это жизнь, но тонущий её проклинает. 13) После нас – хоть потоп!

1. **Read Text 1A and answer the question.**

Why is the amount of fresh water available to use decreasing rapidly?

**TEXT 1А**

**WATER IS LIFE**

Water is the natural resource we all know very well. We know its many forms – rain, snow, **ice, hail, vapor, fog**. Yet, water is the natural resource we least understand.

How does water get into the **clouds**? What **happens** when it **reaches** the Earth? Why is there sometimes too much and other times too little of it? And, most important, is there enough water for all the plants, and all the animals, and all the people?

Water **covers** nearly three fourth of the Earth, most being sea water. But sea water **contains** various **salts**, including those that are **harmful** to most land plants and animals. **Still**, it is from the salty seas and oceans that most of our fresh water comes - no longer salty and harmful. Water **moves** from clouds to land and back to the ocean in a never-ending cycle.

Ocean water **evaporates** into atmosphere **leaving** salts **behind**, and moves across the Earth as water vapor. Water in **lakes** and rivers also evaporates and **rises** into the air. Having **cooled** in the air the water vapor condenses and **falls** to the Earth as **precipitation**: rain, hail or snow, **depending on** region, climate, season and topography. This part of the cycle is very important because man can use water **stored** in the atmosphere only when it falls to the land.

Every year about 450,000 cubic kilometers of water evaporates from the oceans and about 61,000 cubic kilometers from land **sources**.

Water is an unchanging and ever **renewing** resource, but its distribution on the **surface** of the globe varies greatly - there is either too little or too much water. Many problems are **caused** by too much water when we do not need it or too little when we want it.

No natural resource on our planet has so many uses as water. We need water to **support** our lives, to grow our **crops**, to water our **stock**, to **power** our industries and for many other purposes.

Our water needs are great and they **continue** to grow. Agriculture **requires** great **quantities** of water to **provide** food and **raw materials** for industry. Industry **consumes** not less water than agriculture. **Per capita** use of water is **increasing rapidly** in the world.

There is plenty of water on the Earth. Man’s activity is accelerating the process of water pollution, the amount of fresh water **available** to use is **decreasing** rapidly.

**Measures** must be taken against **waste** of water and **pollution** of water. We have to **improve** methods of irrigation in order to use water more **efficiently**.

1. **Find in the text the sentence in which it is said that…**

Вода – это природный ресурс, который мы недостаточно осознаём.

Именно из солёных морей и океанов поступает пресная вода – уже не солёная и не вредная.

Охлаждаясь в воздухе, водяной пар конденсируется и выпадает на Землю в виде дождя, града или снега.

Человек может использовать воду, содержащуюся в атмосфере, только тогда, когда она выпадает на Землю.

Промышленность потребляет не меньше воды, чем сельское хозяйство.

Количество пресной воды, доступной для пользования, быстро сокращается.

1. **Put the sentences in the right order according to the text.**
2. Measures must be taken against waste of water and pollution of water.
3. Water covers nearly three fourth of the Earth, most being sea water.
4. Water is the natural resource we all know very well.
5. Man’s activity accelerating the process of water pollution, the amount of fresh water available to use is decreasing rapidly.
6. Water is an unchanging and ever renewing resource, but its distribution on the surface of the globe varies greatly - there is either too little or too much water.
7. Ocean water evaporates into atmosphere leaving salts behind, and moves across the Earth as water vapor.
8. No natural resource on our planet has so many uses as water.
9. Our water needs are great and they continue to grow.
10. **Finish the sentences.**
11. Water is a natural resource…
12. We know its many forms…
13. Water covers nearly…
14. But seawater contains…
15. Still, it is from the salty seas and oceans that…
16. Water moves from clouds to land…
17. Ocean water evaporates into the atmosphere…
18. Having cooled in the air the water vapor…
19. Water is an unchanging and ever renewing resource, but…
20. No natural resource on our planet…
21. Our water needs are great and…
22. The amount of fresh water available to use…
23. Measures must be taken against…
24. We have to improve…
25. **Answer the questions.**
    1. What is the natural resource we all know very well but least understand?
    2. What are the forms of water?
    3. What portion of the Earth does water cover?
    4. What is water cycle?
    5. Why is there sometimes too much and other times too little of water?
    6. Is there enough water for all the plants, and all the animals, and all the people?
    7. What uses has water?
    8. What do we have to do in order to use water more efficiently?
26. **Summarize the text using the following beginnings:**

The text reports on…

The text touches upon…

A careful account is given to…

It is reported that…

Much attention is given to…

The text points out that…

The text deals with the problem of…

The text provides information on…

The text defines the phenomenon of…

The text covers such points as…

1. **Read Text1B and choose the headline.**

a) Drinking Water

b) Water on Earth

c) Water Shortage

**Words and expressions:**

covalent bonds – ковалентные связи below – ниже, внизу

cover - покрывать pond – пруд

exist – существовать exceed - превышать

solid– твёрдый shortage – нехватка

water bodies – водоёмы amount - количество

**TEXT 1B**

Water is a chemical substance with the chemical formula H2O. Its molecule contains one oxygen and two hydrogen atoms connected by covalent bonds. Water is a liquid, but it often co-exists on Earth with its solid state, ice, and gaseous state (water vapor or steam). Water can also exist in a liquid crystal state.

Water covers 70.9% of the Earth's surface, and is vital for all known forms of life. On Earth, it is found mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifers and 0.001% in the air as vapor, clouds, and precipitation. Oceans hold 97% of surface water, glaciers and polar ice caps 2.4%, and other land surface water such as rivers, lakes and ponds 0.6%. A very small amount of the Earth's water is contained within biological bodies and manufactured products.

Clean drinking water is essential to humans and other life forms. Access to safe drinking water has improved steadily and substantially over the last decades in almost every part of the world. However, some observers have estimated that by 2025 more than half of the world population will be facing water shortage. A recent report (November 2009) suggests that by 2030, in some developing regions of the world, water demand will exceed supply by 50%. Water plays an important role in the world economy, as it functions as a solvent for a wide variety of chemical substances. Approximately 70% of the fresh water which is actively used by humans is consumed by agriculture.

1. **Find in the text international words and give their Russian equivalents.**
2. **Find in the text the sentence in which it is explained why water is important for the world economy.**
3. **Translate the following word combinations:**

химическое вещество; ковалентные связи; твёрдое состояние; поверхность Земли; большие водоёмы; очень маленькое количество; формы жизни; доступ к безопасной чистой воде; за последние десятилетия; некоторые наблюдатели; нехватка воды; потребность в воде; приблизительно 70%

1. **Find in the text the equivalents to the following sentences:**
2. Вода может также существовать в жидкокристаллическом виде.
3. Вода – это химическое вещество с химической формулой Н2О.
4. Очень маленькое количество воды содержится в биологических телах и промышленных продуктах.
5. Однако, по оценкам некоторых наблюдателей, к 2025 году более половина населения планеты столкнётся с нехваткой воды.
6. Чистая питьевая вода важна для людей и других форм жизни.
7. **Say if it is true or false.**
8. Water is a chemical substance with the chemical formula H3O.
9. Water cannot exist in a liquid crystal state.
10. Water is vital for all known forms of life.
11. A large amount of the Earth's water is contained within biological bodies and manufactured products.
12. Clean drinking water is essential to humans and other life forms.
13. A recent report suggests that by 2030, in some developing regions of the world, water supply will exceed demand by 50%.
14. Approximately 70% of the fresh water which is actively used by humans is consumed by industry.
15. **Retell the text in Russian.**
16. **Read and translate Text 1C in writing using a dictionary.**

**TEXT 1C**

**WATER FOR DRINKING**

The human body contains from 55% to 78% water, depending on body size. To function properly, the body requires between one and seven liters of water per day to avoid dehydration; the precise amount depends on the level of activity, temperature, humidity, and other factors. Most of this is ingested through foods or beverages other than drinking straight water. It is not clear how much water intake is needed by healthy people, though most advocates agree that approximately 2 liters (6 to 7 glasses) of water daily is the minimum to maintain proper hydration. Medical literature favors a lower consumption, typically 1 liter of water for an average male, excluding extra requirements due to fluid loss from exercise or warm weather. For those who have healthy kidneys, it is rather difficult to drink too much water, but (especially in warm humid weather and while exercising) it is dangerous to drink too little. People can drink far more water than necessary while exercising, however, putting them at risk of water intoxication, which can be fatal. The popular claim that "a person should consume eight glasses of water per day" seems to have no real basis in science. Similar misconceptions concerning the effect of water on weight loss and constipation have also been dispelled.

The Institute of Medicine (U.S.) recommends that, on average, men consume 3.0 liters and women 2.2 liters; pregnant women should increase intake to 2.4 liters (10 cups) and breastfeeding women should get 3 liters (12 cups), since an especially large amount of fluid is lost during nursing. Also noted is that normally, about 20% of water intake comes from food, while the rest comes from drinking water and beverages (caffeinated included).

**Unit 2**

**Water Resources**

**Introduction**

**Notes:**

household- домашний (бытовой) awareness - осознание

preserving water - сохранение воды require - требовать, нуждаться

supply of water- снабжение водой wetlands - влажные (подтопляемые) земли

water demand - потребность в воде environment - окружающая среда

frozen- замороженный renewable resource – возобновляемый

ресурс

emerge – появляться, возникать

Water resources are sources of water that are useful or potentially useful. Uses of water include agricultural, industrial, household, recreational and environmental activities. All of these human uses require fresh water.

97% of the water on the Earth is salt water. Only three percent is fresh water; over two thirds of this is frozen in glaciers and polar ice caps. The remaining unfrozen fresh water is found mainly as groundwater, with only a small fraction present above ground or in the air.

Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world and as the world population continues to rise, so too does the water demand. Awareness of the global importance of preserving water for ecosystem services has only recently emerged as, during the 20th century, more than half the world’s wetlands have been lost.

**Grammar Revision**

**Modal Verb “Can” and Its Equivalent**

|  |
| --- |
| **can/**  **be able to** |

|  |  |  |
| --- | --- | --- |
| **Present** | **Past** | **Future** |
| can  am  is able to…  are | could  was  able to…  were | -  will be able to… |

|  |  |
| --- | --- |
| Возможность:  *могу, умею*  *возможно*  Разрешение:  *можно*  Запрещение:  *Нельзя* | I **can run** very fast.  He **can speak** French. **Can** he **speak** Italian?  You **can get** there by bus.  You **can come** at any time.  **Can** I **have** a cup of coffee?  You **can’t cross** the street here. |

**Обратите внимание!**

Когда эквивалент модального глагола *can* дублирует уже имеющиеся формы (**I can = I am able; He could = He was able**), он имеет собственный оттенок значения **am/is/are/able to** – *быть в состоянии, быть способным*; **was/were able to** – *смог, сумел, удалось* (= manage).

*Например:*

He is an honest man. He **is not able to** do it (*не способен*).

Jack was an excellent tennis player. He **could** beat anybody (*мог выиграть*). But once he had a difficult game against John. John played very well but in the end Jack **was able to** beat him (*смог*).

**I. Take this *Can, Could, Be able to* Quiz.**

**Fill in the gaps.**

1. \_\_\_\_ he understand what you were talking about?

2. My sister \_\_\_\_ play tennis now.

3. I \_\_\_\_ walk when I was less than a year old.

4. (Polite) \_\_\_\_ you tell me what time it is, please?

5. My grandfather \_\_\_\_ walk without any help last night.

6. I would like to \_\_\_\_ play the piano.

7. How long have you \_\_\_\_ drive?

8. I'll \_\_\_\_ help you later.

9. Can you help me? I \_\_\_\_ never understand this.

10. Will Man \_\_\_\_ live forever one day?

**II. Write the verbs in brackets in their correct forms into the gaps.**

1. Last week we \_\_\_\_ swimming, this week we can't. (can/ to go)

2. Maybe the Smiths \_\_\_\_ a new house next year. (can/ to build)

3. If you try hard, you \_\_\_\_ your examinations. (can/ to pass)

4. When I was five, I \_\_\_\_. (not/ can/ to swim)

5. Dennis \_\_\_\_ the trumpet after four months. (can/ to play)

6. Luke has passed his driving test, now he \_\_\_\_ a car. (can/ to drive)

7. I \_\_\_\_ to him on the phone for three weeks last month. (not/ can/ to speak)

8. Alex \_\_\_\_ his homework when his desk is in such a mess. (not/ can/ to do)

9. They were so busy, they \_\_\_\_ me a text message. (not/ can/ to write)

10. Lisa \_\_\_\_ her dress. She can wear it again. (can/ to clean)

**Vocabulary**

1. **Listen, read and memorize.**

|  |  |
| --- | --- |
| 1.replenish   1. discharge 2. seepage 3. although 4. input 5. watershed 6. storage capacity 7. artificial 8. permeability 9. soil 10. beneath 11. runoff 12. timing 13. affect 14. water lost 15. devastating 16. impact 17. velocity 18. pave 19. channelizing 20. consideration 21. intermittent 22. supply 23. throughout 24. release 25. power plant 26. average 27. stream flow 28. augment 29. pipeline 30. negligible 31. through | снова наполнять, пополнять  сток, сброс  просачивание, инфильтрация  хотя  ввод  водораздел, бассейн реки  ёмкость, объём водохранилища  искусственный  водопроницаемость  почва  внизу  поверхностный сток  выбор определённого времени  влиять, воздействовать  потеря воды  опустошительный, разрушительный  удар; влияние, воздействие  скорость  мостить  канализация русла  соображение  скачкообразный  снабжать, обеспечивать; снабжение  повсюду, в продолжение  освобождать, выпускать  электростанция, силовая установка  средний  расход потока  увеличивать, прибавлять  трубопровод  незначительный  через, посредством |

* 1. **Guess the meaning of the words.**

naturally, oceans, system, factors, reservoir, characteristics, local, proportions, human activities, constructing, draining, total, users, collect, period, importing, canal, practice, total

* 1. **Translate the following word combinations:**

replenish the reservoir; replenish surface water; natural input; heavy precipitation; precipitation rates; discharge to the oceans; evaporation rates; sub-surface seepage; surface water system watershed; total quantity; storage capacity of artificial reservoirs; the permeability of the soil; beneath the Earth’s surface; the proportions of water lost; devastating impact; increase runoff quantities and velocities; water available at any given time; an intermittent need for water; throughout the year; the average stream flow; augment artificially; negligible quantities of water

* 1. **Match the word and its synonym.**

|  |  |
| --- | --- |
| 1. replenish 2. discharge 3. seepage 4. affect 5. devastating 6. beneath 7. velocity 8. intermittent 9. throughout 10. negligible | 1. slow leaking through 2. fill up again 3. destructive 4. speed 5. irregular 6. everywhere 7. below 8. insignificant 9. influence 10. release |

* 1. **Translate the sentences into Russian.**

1. The discharge of water from the reservoir is carefully controlled.
2. There was water seepage through the roof of the tunnel.
3. This reservoir was limited in its storage capacity to meet the growing demand for water.
4. This graph shows a trend of decreasing storage capacity during the first half of the year, and then increasing or stabilizing during the second half of the year.
5. The effects of tornadoes are devastating.
6. In physics, velocity is speed in a given direction. Speed describes only how fast an object is moving, whereas velocity gives both the speed and direction of the object's motion.
7. Permeability in fluid mechanics and the earth sciences is a measure of the ability of a porous material to allow fluids to pass through it.
8. You should use one of the numerous websites that are available for researching precipitation rates.
9. The effect was too negligible.
   1. **Read Text 2A and answer the question.**

What users have a continuous need for water?

**TEXT 2A**

**SOURCES OF FRESH WATER**

**Surface Water**

Surface water is water in a river, lake or fresh water wetland. Surface water is naturally **replenished** by precipitation and naturally lost through **discharge** to the oceans, evaporation, and sub-surface **seepage**.

**Although** the only natural **input** to any surface water system is precipitation within its **watershed**, the total quantity of water in that system at any given time is also dependent on many other factors. These factors include **storage capacity** in lakes, wetlands and **artificial** reservoirs, the **permeability** of the **soil beneath** these storage bodies, the **runoff** characteristics of the land in the watershed, the **timing** of the precipitation and local evaporation rates. All of these factors also **affect** the proportions of **water lost**.

Human activities can have a large and sometimes **devastating impact** on these factors. Humans often increase storage capacity by constructing reservoirs and decrease it by draining wetlands. Humans often increase runoff quantities and **velocities** by **paving** areas and **channelizing**.

The total quantity of water available at any given time is an important **consideration**. Some human water users have an **intermittent** need for water. For example, many farms require large quantities of water in the spring, and no water at all in the winter. To **supply** such a farm with water, a surface water system may require a large storage capacity to collect water **throughout** the year and **release** it in a short period of time. Other users have a continuous need for water, such as **power plants** that require water for cooling. To supply such a power plant with water, a surface water system only needs enough storage capacity to fill in when the **average stream flow** is below the power plant's need.

Natural surface water can be **augmented** by importing surface water from another watershed **through** a canal or **pipeline**. It can also be artificially augmented from any of the other sources, however in practice the quantities are **negligible**. Humans can also cause surface water to be "lost" (i.e. become unusable) through pollution.

* 1. **Find in the text the sentence in which it is said that…**

Вода на поверхности Земли естественным образом пополняется за счёт осадков.

Общее количество воды также зависит от многих других факторов.

Все эти факторы также влияют на пропорции потери воды.

Люди часто повышают количество потоков воды и их скорость путём мощения участков земли и направления этих потоков в русла.

Важно учитывать количество воды, доступной в данное время.

Другие пользователи, такие как электростанции, постоянно нуждаются в воде для охлаждения.

Люди, загрязняя воду, могут стать виновниками того, что вода будет «утеряна».

* 1. **Put the sentences in the right order according to the text.**

1. Surface water is naturally replenished by precipitation.

2. These factors include storage capacity, the permeability of the soil, the runoff characteristics of the, the timing of the precipitation and local evaporation rates.

3. Other users have a continuous need for water.

4. All of these factors also affect the proportions of water lost.

5. Some human water users have an intermittent need for water

6. Although the only natural input to any surface water system is precipitation, the total quantity of water in that system also depends on many other factors.

7. Surface water is water in a river, lake or fresh water wetland.

8. Human activities can have a large and sometimes devastating impact on these factors.

9. Natural surface water can be augmented by importing surface water from another watershed through a canal or pipeline.

10. Humans can also cause surface water become unusable through pollution.

* 1. **Fill in the gaps choosing the words from the box. Translate the sentences.**

|  |
| --- |
| **affect, velocities, discharge, intermittent, watershed, devastating, replenished, augmented, seepage** |

1. Surface water is naturally \_\_\_\_by precipitation.

2. Surface water is naturally lost through \_\_\_\_ to the oceans, evaporation, and sub-surface \_\_\_\_.

3. Although the only natural input to any surface water system is precipitation within its \_\_\_\_, the total quantity of water in that system at any given time is also dependent on many other factors.

4. All of these factors also \_\_\_\_ the proportions of water lost.

5. Human activities can have a large and sometimes \_\_\_\_ impact on these factors.

6. Humans often increase runoff quantities and \_\_\_\_ by paving areas and channelizing stream flow.

7. Some human water users have an \_\_\_\_ need for water.

8. Natural surface water can be \_\_\_\_ by importing surface water from another watershed through a canal or pipeline.

* 1. **Answer the questions.**

1. What is surface water?

2. How is surface water naturally replenished and lost?

3. What does the total quantity of surface water depend on?

4. Do these factors also affect the proportions of water lost?

5. What impact can human activities have on these factors?

6. Is the need for water the same for all users?

7. How can natural surface water be augmented?

* 1. **Summarize the text using the following beginnings:**

The text reports on…

The text touches upon…

A careful account is given to…

It is reported that…

Much attention is given to…

The text points out that…

The text deals with the problem of…

The text provides information on…

The text defines the phenomenon of…

The text covers such points as…

* 1. **Read Text 2B and find the sentences in which it is explained why a sub-surface water source may become saline.**

**TEXT 2B**

**SOURCES OF FRESH WATER**

**Ground Water**

**Words:**

pore пора

rocks горная порода, скала

distinction различие

spring источник, родник

substantial значительный

occur случаться, происходить

coastal прибрежный

reverse поворачивать в противоположном направлении

endorheic эндогенный – внутреннего происхождения;

объясняемый внутренними причинами

Sub-surface water, or groundwater, is fresh water located in the pore space of soil and rocks. It is also water that is flowing within aquifers below the water table. Sometimes it is useful to make a distinction between sub-surface water that is closely associated with surface water and deep sub-surface water in an aquifer.

The natural input to sub-surface water is seepage from surface water. The natural outputs from sub-surface water are springs and seepage to the oceans.

If the surface water source is also subject to substantial evaporation, a sub-surface water source may become saline. This situation can occur naturally under endorheic bodies of water, or artificially under irrigated farmland. In coastal areas, human use of a sub-surface water source may cause the direction of seepage to ocean to reverse which can also cause soil salinization. Humans can also cause sub-surface water to be "lost" (i.e. become unusable) through pollution. Humans can increase the input to a sub-surface water source by building reservoirs or ponds.

* 1. **Find in the text international words and give their Russian equivalents.**
  2. **Find in the text the equivalents to the following word combinations:**

пористое пространство; в пределах водоносного слоя; ниже водной поверхности; естественный приток; естественный отток; подвергается значительному испарению; становиться солёной; эндогенные водоёмы; орошаемые фермерские земли; прибрежные территории; повысить приток

* 1. **Say if it is true or false.**

1. Groundwater is fresh water located in rivers and ponds.
2. Sub-surface water is water that is flowing within aquifers below the water table.
3. The natural input to sub-surface water is seepage from precipitation.
4. The natural outputs from sub-surface water are springs and seepage to the oceans.
5. A sub-surface water source may become saline due to substantial evaporation.
6. Humans can decrease the input to a sub-surface water source by building reservoirs or ponds.
   1. **Retell the text in Russian.**
   2. **Read Text 2C and answer the questions.**

Why is the amount of water on the globe unchangeable?

Where is Earth’s water located?

What is the main source of water people use?

**TEXT 2C**

**WHERE IS EARTH’S WATER LOCATED?**

Water is continually moving around, through, and above the Earth as water vapor, liquid water, and ice. In fact, water is continually changing its form. The Earth is pretty much a "closed system," like a terrarium. That means that the Earth neither, as a whole, gains nor loses much matter, including water. Although some matter, such as meteors from outer space, are captured by Earth, very little of Earth's substances escape into outer space. This is certainly true about water. This means that the same water that existed on Earth millions of years ago is still here. Thanks to the water cycle, the same water is continually being recycled all around the globe. It is entirely possible that the water you drank for lunch was once used by ancient man for drinking.

Where is Earth's water located and in what forms does it exist? About 97 percent of all water is in the oceans. Only three percent of all Earth's water is freshwater. The majority, about 69 percent, is locked up in glaciers and icecaps, mainly in Greenland and Antarctica. You might be surprised that of the remaining freshwater, almost all of it is below your feet, as ground water. Of all the freshwater on Earth, only about 0.3 percent is contained in rivers and lakes, it is also where most of the water we use in our everyday lives exists.

Over 99 percent of all water (oceans, seas, ice, most saline water, and atmospheric water) is not available for our uses. And even of the remaining fraction of one percent much of that is out of reach. Considering that most of the water we use in everyday life comes from rivers, we generally only make use of a tiny portion of the available water supplies. The majority of the fresh water available for our uses is stored in the ground.

Notice that of the world's total water supply of about 1,385 million cubic kilometers, over 96 percent is saline. And, of the total freshwater, over 68 percent is locked up in ice and glaciers. Another 30 percent of freshwater is in the ground. Thus, rivers and lakes that supply fresh surface water for human uses only constitute about 93,100 cubic kilometers, which is about 0.007 percent of total water, yet rivers are the source of most of the water people use.

* 1. **Find in the text the equivalents to the following Russian words and word combinations:**

фактически, закрытая система, террариум, метеоры, вещества, миллионы, цикл, земной шар, обед, океаны, вода в атмосфере, часть, кубические километры, большинство, грунт, человек, весь

* 1. **Draw a chart of water distribution on the Earth.**
  2. **Read and translate Text 2D in writing using a dictionary.**

**TEXT 2D**

**SOURCES OF FRESH WATER**

**Fresh Water Storage**

Some runoff water is trapped for periods of time, for example in lakes. At high altitude, during winter, and in the far north and south, snow collects in ice caps, snow pack and glaciers. Water also infiltrates the ground and goes into aquifers. This groundwater later flows back to the surface in springs, or more spectacularly in hot springs and geysers. Groundwater is also extracted artificially in wells. This water storage is important, since clean, fresh water is essential to human and other land-based life. In many parts of the world, it is in short supply.

**Frozen Water**

Several schemes have been proposed to make use of icebergs as a water source, however to date this has only been done for novelty purposes. Glacier runoff is considered to be surface water.

The Himalayas, which are often called "The Roof of the World", contain some of the most extensive and rough high altitude areas on Earth as well as the greatest area of glaciers and permafrost outside of the poles. Ten of Asia’s largest rivers flow from there, and more than a billion people’s livelihoods depend on them. To complicate matters, temperatures are rising more rapidly here than the global average. In Nepal the temperature has risen with 0.6 degree over the last decade, whereas the global warming has been around 0.7 over the last hundred years.

**Unit 3**

**Uses of Fresh Water**

**Introduction**

**Notes:**

consumptive water use использование воды c потерями

non-consumptive water use использование воды без потерь

remove перемещать

deplete истощать

sewage сточные воды

additional дополнительный

Uses of fresh water can be categorized as consumptive and non-consumptive (sometimes called "renewable"). Consumptive water use is water removed from available supplies without return to a water resources system (e.g., water used in manufacturing, agriculture, and food preparation). Non-consumptive water use is the use of water that does not deplete water supplies, e.g. fishing. Water that can be used and returned as surface water, such as sewage, is generally considered non-consumptive if that water can be put to additional use.

**Grammar Revision**

**Comparatives and Superlatives**

**(Степени сравнения прилагательных и наречий)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Положительная**  **Степень** | **Сравнительная**  **cтепень**  **(Comparatives)** | **Превосходная**  **cтепень**  **(Superlatives)** |
| **Односложные,**  **двусложные\*** | hot  easy (adj)  polite  soon (adv) | hott**er**  easi**er**  polit**er**  soon**er** | (the) hott**est**  (the) easi**est**  (the) polit**est**  (the) soon**est** |
| **Многосложные** | correctly (adv)  beautiful (adj) | **more** correctly  **more** beautiful | (the) **most** correctly  (the) **most** beautiful |
| **Смешанные**  **случаи** | old (adj)  often (adv),  slowly  quickly | older/elder  oftener/more often  slower/more slowly  quicker/more quickly | oldest/eldest  oftenest/most often  slowest/most slowly  quickest/most quickly |
| **Случаи, которые**  **следует запомнить** | well (adv)/good (adj)  badly/bad  much  little  far  near | better  worse  more  less  farther/further  nearer | best  worst  most  least  farthest/furthest  nearest |

\*Двусложные прилагательные с ударением на втором слоге и некоторые другие прилагательные: *common, pleasant, quiet*.

**Некоторые особенности употребления прилагательных в сравнительной и превосходной степени**

|  |  |  |
| --- | --- | --- |
| **most**  **farther**  **farthest**  **further**  **furthest**  **elder**  **eldest**  **nearer**  **nearest**  **later**  **latest** | имеет и другие значения:   1. *крайне/весьма*   Может использоваться с артиклем **a/an**   1. *большинство/большая часть*   используется, когда речь идёт о расстоянии: *дальше, самый дальний*  выражает значения: *дальнейший, последующий, добавочный*  употребляется для обозначения возрастных отношений в семье  *ближе, ближайший* (о расстоянии);  **next** - *следующий* (о порядке следования)  *позже, последний* (о времени); **last** – *последний* (о порядке следования) | This is a **most** interesting film.  They are **most** interesting people.  **Most** of my friends live in Moscow.  You must go a little **farther**.  **further information**  дополнительная информация  **further discussion**  дальнейшее обсуждение  my **elder** brother  Where is the **nearest** post office?  They live in the **next** house.  I’ll call you back **later**.  It’s his **last** book. |

Для сравнения качества предметов используют также следующие формулы:

1. **than** – чем Moscow is **larger than** St.-Petersburg.
2. **as…as** – так(ой)же…как He is **as** young **as** my brother.
3. **not so…as** – не так(ой)…как This train goes **not so** quickly **as** that one.
4. **the more…the better** – чем…тем **The more** you work **the better** you know the

language.

1. **much, far** – намного,гораздо, The husband was **much older** than the wife.

значительно

**a bit, a little** – немного Could you speak **a bit louder**?

**I. Take this Comparatives/Superlatives Quiz.**

**Complete the sentences.**

|  |  |
| --- | --- |
| 1. The blue car is \_\_\_\_\_\_ than the red car. 2. This is \_\_\_\_\_\_\_ than that one. 3. Mt. Everest is \_\_\_\_\_ than Mt Fuji. 4. This is the \_\_\_\_\_\_ shirt in the store. 5. The Mona Lisa is one of the \_\_\_\_\_\_ paintings in this museum. 6. Michael Jordan is the \_\_\_\_\_\_\_ basketball player. 7. This is the \_\_\_\_\_\_ book in the store. 8. That was the \_\_\_\_\_\_\_\_\_\_ exam I had all semester. 9. Oxygen is the \_\_\_\_\_\_\_\_\_\_ natural resource. 10. A blue whale is the \_\_\_\_\_\_\_\_ animal in the world. | 1. more fast 2. more faster 3. faster 4. fast 5. more interesting 6. interestinger 7. more interest 8. interesting 9. more high 10. highest 11. higher 12. more higher 13. expensivest 14. most expensive 15. most expensiver 16. more expensive 17. more beautifuler 18. most beautiful 19. beautifuler 20. most beauty 21. most best 22. best 23. most better 24. more better 25. worse 26. most bad 27. baddest 28. worst 29. more difficult 30. difficultest 31. most difficult 32. most difficultest 33. cheapest 34. most cheap 35. more cheapest 36. more cheaper 37. heaviest 38. most heavy 39. most heaviest 40. heaver |

**II. Open the brackets using Comparatives or Superlatives.**

1. The Trans-Siberian railway is (long) in the world. 2. The 22nd of December is the (short) day of the year. 3. Iron is (useful) of all metals. 4. The Volga is (wide) and (deep) than the Neva River. 5. Elbrus is the (high) peak in the Caucasian Mountains. 6. His theory is (practical) than yours. 7. Moscow is the (large) city in Russia. 8. Yesterday was the (cold) day we have had this winter.

**III. Fill in the gaps with *as…as* or *so…as*.**

1 The temperature today is \_\_\_\_ high \_\_\_\_it was yesterday. 2. He is not \_\_\_\_ old \_\_\_\_ he looks. 3. He is \_\_\_\_ strong \_\_\_\_his brother. 4. This street is \_\_\_\_wide \_\_\_\_ the next one. 5. The luggage is not \_\_\_\_ heavy \_\_\_\_ I expected. 6. His TV set is not \_\_\_\_ powerful \_\_\_\_ mine. 7. She is \_\_\_\_ tall \_\_\_\_ her mother. 8. In Novgorod it is not \_\_\_\_ hot \_\_\_\_ in Rostov.

**Vocabulary**

1. **Listen, read and memorize.**

|  |  |
| --- | --- |
| 1. estimate   1. worldwide 2. withdrawal 3. unsustainable 4. it takes 5. satisfy 6. considerable 7. compare 8. inhabit 9. dam 10. ore 11. refineries 12. solvent 13. certain 14. power generation 15. derive 16. force 17. flow 18. downhill 19. ultimately 20. altitude 21. pump 22. creation 23. consumption 24. due to 25. expose 26. overheating 27. relative 28. large scale 29. fertilizer 30. untreated water 31. solute 32. pure 33. purification techniques | оценивать, подсчитывать  мировой, распространённый по всему свету  изъятие, отбор (воды)  неустойчивый  требуется, необходимо  отвечать (требованиям); удовлетворять  значительный  сравнивать  населять  дамба, плотина  руда  очистные сооружения  растворитель  определённый  производство электроэнергии  получать, извлекать  сила  течь  вниз, под уклон  в конце концов, в конечном счёте  высота (altitudes – возвышенность)  насос  создание  потребление  из-за, благодаря  выставлять, подвергать действию (солнца)  перегрев  относительный  крупномасштабный  удобрение  необработанная (неочищенная) вода  раствор  чистый, беспримесный  технологии очистки |

1. **Guess the meaning of the words.**

to convert, dietary, to produce, canal, to circle, industrial, hydroelectric, thermoelectric, chemical processes, energy, turbine, generator, pressurized, machinery, major, design, thermal

1. **Translate the following word combinations:**

It is estimated; worldwide water use; irrigation withdrawals; converted from liquid to vapour; daily dietary need; a canal ten metres deep; 180 times; hydroelectric dams; thermoelectric power plants; ore and oil refineries; renewable power generation; force of water flowing downhill; a turbine connected to a generator; a low-cost, non-polluting, renewable energy source; pumped-storage hydroelectric plants; due to the larger surface area; much higher water consumption; discharged solutes; laws requiring industrial grey water to be treated

1. **Match the word and its synonym.**

|  |  |
| --- | --- |
| 1. to sustain 2. to satisfy 3. considerable 4. to compare 5. to inhabit 6. to derive 7. large scale | 1. important, significant 2. to correlate, liken 3. to meet 4. to draw, extract 5. of high degree 6. to live, occupy 7. to keep up, maintain |

1. **Translate the sentences into Russian.**
2. What are the examples of unsustainable resource use?
3. Wood is a renewable resource, but we are currently using more than grows back, so we are depleting it down.
4. The same thing with most commercial fisheries. We are reducing them down to the point that they can't recover.
5. Many fisheries, like blue fin tuna, are at risk of disappearing.
6. A refinery is a production facility composed of a group of chemical engineering unit processes and unit operations refining certain materials or converting raw material into products of value.
7. A solvent is a liquid, solid, or gas that dissolves another solid, liquid, or gaseous solute, resulting in a solution.
8. In hydrology, discharge is the volume rate of water flow, including any suspended solids, dissolved chemical species and/or biologic material, which is transported through a given cross-sectional area.
9. Untreated water is drinking water that has not been chemically treated, filtered, or boiled to eliminate infectious bacteria, viruses, and parasites.
10. **Read Text 3A and answer the question.**

Why is industrial consumption of water generally much lower than withdrawal?

**TEXT 3A**

**AGRICULTURAL AND INDUSTRIAL USE OF WATER**

Agricultural

It is **estimated** that 69% of **worldwide** water use is for irrigation in agriculture, with 15-35% of irrigation **withdrawals** being **unsustainable**. **It takes** around 3,000 litres of water, converted from liquid to vapour, to produce enough food to **satisfy** one person's daily dietary need. This is a **considerable** amount, when **compared** to that required for drinking, which is between two and five litres. To produce food for over 7 billion people who **inhabit** the planet today, it is required the water that would fill a canal ten meters deep, 100 meters wide and 7.1 million kilometers long – that's enough to circle the globe 180 times.

Industrial

It is estimated that 22% of worldwide water use is industrial. Major industrial uses include hydroelectric **dams**, thermoelectric power plants, which use water for cooling, **ore** and oil **refineries**, which use water in chemical processes, and manufacturing plants, which use water as a **solvent**. Water withdrawal can be very high for **certain** industries, but consumption is generally much lower than that of agriculture.

Water is used in renewable **power generation**. Hydroelectric power **derives** energy from the **force** of water **flowing downhill**, driving a turbine connected to a generator. This hydroelectricity is a low-cost, non-polluting, renewable energy source. **Ultimately**, the energy in a hydroelectric power plant is supplied by the sun. Heat from the sun evaporates water, which condenses as rain in higher **altitudes** and flows downhill. **Pumped**-storage hydroelectric plants also exist, which pump water uphill when demand is low, and use the stored water to produce electricity when demand is high.

Hydroelectric power plants generally require the **creation** of a large artificial lake. Evaporation from this lake is higher than evaporation from a river **due to** the larger surface area **exposed** to the elements, resulting in much higher water **consumption**. The process of driving water through the turbine and tunnels or pipes also removes this water from the natural environment, creating water withdrawal. The impact of this withdrawal on wildlife varies greatly depending on the design of the power plant.

Pressurized water is used in the cooling of machinery to prevent **overheating**. This is generally a very small source of water consumption **relative** to other uses.

Water is also used in many **large scale** industrial processes, such as thermoelectric power production, oil refining, **fertilizer** production and other chemical plant use. **Discharge** of **untreated water** from industrial uses is pollution. Pollution includes discharged **solutes** (chemical pollution) and increased water temperature (thermal pollution). Industry requires **pure** water for many applications and uses a variety of **purification techniques** both in water supply and discharge. Industrial consumption of water is generally much lower than withdrawal, due to laws requiring industrial grey water to be treated and returned to the environment.

1. **Find in the text the sentence in which it is said that…**

Более половины всей воды используется для орошения.

В некоторых отраслях промышленности потребление воды может быть очень высоким.

Вода используется для получения возобновляемой электроэнергии.

Электричество, получаемое на гидроэлектростанциях, является дешёвым, экологически чистым и возобновляемым ресурсом.

Влияние отбора воды на дикую природу зависит от типа электростанции.

Вода под давлением используется в охлаждении машинного оборудования.

Промышленное потребление воды обычно ниже, чем отбор воды.

1. **Put the sentences in the right order according to the text.**

1. It is estimated that 69% of worldwide water use is for irrigation.

2. It is estimated that 22% of worldwide water use is industrial.

3. This hydroelectricity is a low-cost, non-polluting, renewable energy source.

4. Water is used in renewable power generation.

5. Hydroelectric power plants generally require the creation of a large artificial lake.

6. It takes around 3,000 litres of water, converted from liquid to vapour, to produce enough food to satisfy one person's daily dietary need.

7. Water is also used in many large scale industrial processes, such as thermoelectric power production, oil refining, fertilizer production and other chemical plant use.

8. The process of driving water through the turbine and tunnels or pipes also briefly removes this water from the natural environment, creating water withdrawal.

9. Hydroelectric power derives energy from the force of water flowing downhill, driving a turbine connected to a generator.

10. Water withdrawal can be very high for certain industries, but consumption is generally much lower than that of agriculture.

1. **Fill in the gaps choosing the words from the box. Translate the sentences.**

|  |
| --- |
| **discharge, It takes, considerable, inhabit, refineries, solvent, altitudes, artificial, overheating** |

1. \_\_\_\_ around 3,000 litres of water, converted from liquid to vapour, to produce enough food.

2. Major industrial uses include hydroelectric dams, thermoelectric power plants, which use water for cooling, ore and oil \_\_\_\_.

3. Heat from the sun evaporates water, which condenses as rain in higher \_\_\_ and flows downhill.

4. Pressurized water is used in the cooling of machinery to prevent \_\_\_\_.

5. This is \_\_\_\_ amount, when compared to that required for drinking.

6. Hydroelectric power plants generally require the creation of a large \_\_\_\_ lake.

7. Manufacturing plants use water as a \_\_\_\_.

8. To produce food for over 7 billion people who \_\_\_\_ the planet today requires the water that would fill a canal ten metres deep, 100 metres wide and 7.1 million kilometres long.

9. \_\_\_\_ of untreated water from industrial uses is pollution.

1. **Answer the questions.**

1. How much water does it take to produce enough food to satisfy one person's daily dietary need?

2. What is industrial percentage of water use?

3. What do major industrial uses include?

4. Where does hydroelectric power derive energy from?

5. How is the energy in a hydroelectric power plant supplied?

6. When are pumped-storage hydroelectric plants used?

7. What do hydroelectric power plants generally require?

8. Where is pressurized water used?

9. Water is also used in many large scale industrial processes. What are they?

10.Why is industrial consumption of water generally much lower than withdrawal?

1. **Summarize the text using the following beginnings:**

The text reports on…

The text touches upon…

A careful account is given to…

It is reported that…

Much attention is given to…

The text points out that…

The text deals with the problem of…

The text provides information on…

The text defines the phenomenon of…

The text covers such points as…

1. **Read Text 3B and choose the headline:**
2. Worldwide Water Use
3. Drinking Water
4. Household and Environmental Use of Water

**TEXT 3B**

**Words and expressions:**

household purposes –бытовые цели potable water – водопроводная вода

exclude – исключать impoundment – запруда

quality–качество habitat – место обитания

long-term harm – длительное вредное воздействие fish spawn – нерест рыбы

It is estimated that 8% of worldwide water use is for household purposes. These include drinking water, bathing, cooking, sanitation, and gardening. Basic household water requirements have been estimated by Peter Gleick at around 50 liters per person per day, excluding water for gardens. Drinking water is water that is of sufficiently high quality so that it can be consumed or used without risk of immediate or long-term harm. Such water is commonly called potable water. In most developed countries, the water supplied to households, commerce and industry is all of drinking water standard even though only a very small proportion is actually consumed or used in food preparation.

Environmental water use is also a very small but growing percentage of total water use. Environmental water may include water stored in impoundments and released for environmental purposes. Environmental water usage includes watering of natural or artificial wetlands, artificial lakes intended to create wildlife habitat, and water releases from reservoirs to help fish spawn, or to restore more natural flow regimes

Like recreational usage, environmental usage is non-consumptive but may reduce the availability of water for other users at specific times and places. For example, water release from a reservoir to help fish spawn may not be available to farms upstream.

1. **Find in the text international words and give their Russian equivalents.**
2. **Find in the text the sentences in which it is explained what the terms “household purposes”, “drinking water”, and “environmental water use” mean.**
3. **Find in the text the equivalents to the following word combinations:**

мировое использование воды; нормы потребления воды; на одного человека в день; высокое качество; без риска; развитые страны; стандарт питьевой воды; очень маленькая часть; приготовление еды; общее использование воды; искусственные озёра; место обитания дикой природы; восстановить более естественную скорость течения; доступность к воде; вверх по течению

1. **Say if it is true or false.**
2. Water use for household purposes includes water for agriculture and industry.
3. Basic household water requirements have been estimated by Peter Gleick at around 60 liters per person per day.
4. Drinking water is water that is of sufficiently high quality.
5. The water supplied to households is called portable water.
6. Environmental water use is a very large percentage of total water use.
7. Environmental water usage excludes watering of natural or artificial wetlands.
8. Environmental usage may reduce the availability of water for other users.
9. **Retell the text in Russian.**
10. **Read Text 3C and choose the sentence from the given below which best expresses the main idea of the text.**

1. The village has used more than $1 million in taxpayer funds to defend itself against lawsuits.

2. The researchers could not prove that the higher cancer rates were caused by the polluted water.

3. The officials in the village of Crestwood have been secretly introducing contaminated well water into the town water supply.

4. Frank Caldario was diagnosed with kidney cancer in 2009.

**Words and expressions:**

reveal выявлять

conduct a survey проводить исследование

tainted water испорченная вода

disease rates уровень заболеваемости

feel deceived чувствовать себя обманутым

contaminated water загрязнённая вода

kidney cancer рак почек

lung cancer рак лёгких

defend oneself against lawsuits защититься от судебных исков

**TEXT 3C**

**CHEMICALS IN WATER SUPPLY NEAR CHICAGO**

**LINKED TO CANCER**

August 11, 2010 by: David Gutierrez, staff writer

A report by the Chicago Tribune has revealed that officials in the village of Crestwood, just outside Chicago, have been secretly introducing tainted water into the town water supply for years.

"I feel deceived," village resident Tom Parkis said.

For years before the story broke, town residents had wondered if there might not be something wrong with their water. For example, Frank Caldario was diagnosed with kidney cancer in 2009, at the age of 30.

"I can't help but wonder if what happened to me had something to do with the water," said Caldario, a non-smoker.

"It's just unreal for someone my age to get that."

Several months ago, the Tribune revealed that during some periods, up to 20 percent of the town's drinking water came from the polluted well.

In response to the article, the Illinois Department of Public Health conducted a survey of disease rates in Crestwood between 1994 and 2006. The researchers found that rates of kidney cancer were significantly higher in Crestwood men than in the population at large, and rates of lung cancer were significantly higher in both men and women. The researchers could not prove that the higher cancer rates were caused by the polluted water, but did find it to be a possible cause.

Now residents are worried about the effects that drinking contaminated water over the long term may have had on their health.

"Of course there's a concern. If I said it wasn't in the back of my head, I'd be lying," said Dominic Covone. "You don't want to think something bad could happen from just drinking water."

Since the story broke, the village has used more than $1 million in taxpayer funds to defend itself against lawsuits.

1. **Find in the text the equivalents to the following Russian word combinations.**

доклад выявил; городское водоснабжение; житель деревни; чувствовать себя обманутым; годами; разразился скандал; в возрасте 30 лет; имело отношение к воде; некурящий; питьевая вода; загрязнённая скважина; в ответ на статью; уровень заболеваемости; вероятная причина; в течение долгого периода; в подсознании; фонды налогоплательщиков; защитить себя

1. **Finish the sentences.** 
   * 1. Officials in the village of Crestwood have been secretly introducing tainted water into the town water supply out of \_\_\_\_.
2. lake
3. river
4. well
   * 1. Frank Caldario was diagnosed with \_\_\_\_.
5. kidney cancer
6. stomach cancer
7. lungs cancer
   * 1. The Illinois Department of Public Health conducted a survey of \_\_\_\_.
8. water contamination
9. disease rates
10. shortage of water supply
    * 1. The researchers found that rates of lung cancer were significantly higher in Crestwood \_\_\_\_.
11. men
12. both men and women
13. women
    * 1. The village has used more than $1 million in taxpayer funds to defend itself against \_\_\_\_.
14. lawsuits
15. polluted water
16. cancer
17. **Answer the questions.**
18. What has the report by the Chicago Tribune revealed?
19. What age was Frank Caldario diagnosed with kidney cancer at?
20. How much of the town's drinking water came from the polluted well?
21. What did the Illinois Department of Public Health undertake in response to the article?
22. What did the researchers find?
23. Could the researchers prove that the higher cancer rates were caused by the polluted water?
24. What are the residents worried about?
25. How much in taxpayer funds has the village used to defend itself against lawsuits?
26. **Read Text 3D and translate it in writing using a dictionary.**

**TEXT 3D**

**INCREASING WATER SCARCITY**

Fifty years ago, the common perception was that water was an infinite resource. At this time, there were fewer than half the current number of people on the planet. People were not as wealthy as today, consumed fewer calories and ate less meat, so less water was needed to produce their food. They required a third of the volume of water we presently take from rivers. Today, the competition for water resources is much more intense. This is because there are now seven billion people on the planet, their consumption of water-thirsty meat and vegetables is rising, and there is increasing competition for water from industry, urbanization, biofuel crops, and water reliant food items. In future, even more water will be needed to produce food because the Earth's population is forecast to rise to 9 billion by 2050. An additional 2.5 or 3 billion people, choosing to eat fewer cereals and more meat and vegetables could add an additional five million kilometres to the virtual canal mentioned above.

An assessment of water management in agriculture was conducted in 2007 by the International Water Management Institute in Sri Lanka to see if the world had sufficient water to provide food for its growing population. It assessed the current availability of water for agriculture on a global scale and mapped out locations suffering from water scarcity. It found that a fifth of the world's people, more than 1.2 billion, live in areas of physical water scarcity, where there is not enough water to meet all demands. One third of the world’s population does not have access to clean drinking water, which is more than 2.3 billion people. A further 1.6 billion people live in areas experiencing economic water scarcity, where the lack of investment in water and insufficient human capacity make it impossible for authorities to satisfy the demand for water. The report found that it would be possible to produce the food required in future, but that continuation of today's food production and environmental trends would lead to crises in many parts of the world. To avoid a global water crisis, farmers will have to strive to increase productivity to meet growing demands for food, while industry and cities find ways to use water more efficiently.

**Unit 4**

**From the History of Water Supply**

**Introduction**

**Notes:**

in the olden days – в былые времена

dig wells – рыть колодцы

When the Earth was being formed, two hydrogen atoms combined with one oxygen atom to form H2O, or water.

Water is all around us. Nearly 80% of the surface of the Earth is water. The water we use today is the same water the dinosaurs used millions of years ago!

In the olden days, people did not have running water in their homes. Some had to walk miles every day to find clean water. That's why lots of our towns are built beside lakes and rivers, or where people could dig wells.

**Grammar Revision**

**The Past Indefinite (Simple) and the Present Perfect**

**The Past Indefinite**

|  |  |  |
| --- | --- | --- |
| **Утвердительная**  **Форма** | **Отрицательная**  **Форма** | **Вопросительная**  **форма** |
| I **worked**  He (she, it) **worked**  You **worked**  They **worked** | I **did not work**  He (she, it) **did not work**  You **did not work**  They **did not work** | **Did** I **work**?  **Did** he (she, it) **work**?  **Did** you **work**?  **Did** they **work**? |

**did not = didn’t**

**The Present Perfect**

|  |  |  |
| --- | --- | --- |
| **Утвердительная**  **Форма** | **Отрицательная**  **Форма** | **Вопросительная**  **форма** |
| I **have worked**  He (she, it) **has worked**  You **have worked**  They **have worked** | I **have not worked**  He (she, it) **has not worked**  You **have not worked**  They **have not worked** | **Have** I **worked**?  **Has** he (she, it) **worked**?  **Have** you **worked**?  **Have** they **worked**? |

I **have worked** = I’**ve worked**

He (she, it) **has worked** = He’**s** (She’**s**, It’**s**) **worked**

I **have not worked** = I **haven’t worked**

He (she, it) **has not worked** = He (she, it) **hasn’t worked**

**Характеристика действия**

|  |  |  |
| --- | --- | --- |
|  | **Past Indefinite** | **Present Perfect** |
| **Как?** | Повторяющееся действие,  факт в прошлом. | Действие завершено к определённому моменту в настоящем, имеется результат. |
| **Когда?** | *yesterday*  *last week*  *in 1990*  *5 years ago* | *already/yet, ever/never, just/since, lately, recently, this week/today, by now* |
| **Вопрос – краткий ответ** | - **Did** you **pass** your exam yesterday?  - Yes, I **did**.  - **Did** she **go** to the concert on Sunday?  - No, she **didn’t**. | - **Have** you **passed** your exam?  - Yes, I **have**.  - **Has** he **seen** this film yet?  - No, he **hasn’t**. |
| **Примеры** | I **met** him *yesterday* in the park.  He **graduated** from the university *3 years ago.*  I **passed** my exam *last week*.  O. Wild **wrote** five plays. | I’**ve** never **met** him *before*.  She **has** *already* **seen** this film.  They **have arrived** *by now*.  I **haven’t seen** her *since* summer.  The taxi **has arrived**. |

**I . Take this Present Simple vs Present Perfect Quiz.**

|  |  |
| --- | --- |
| 1. Jack \_\_\_\_\_ (live) in Boston for the past 15 years. 2. Janet \_\_\_\_ (work) for Smith and Brothers before she came to work for us. 3. Dad, \_\_\_\_ (you/finish) reading the paper yet? 4. I would love to visit Prague sometime. Unfortunately, I \_\_\_\_ (be/never) there. 5. Peter \_\_\_\_\_ (play) tennis for five years when he \_\_\_\_\_ (be) at school. 6. Can you help me? I \_\_\_\_\_ (finish) my homework, but I still don't understand number 7. I \_\_\_\_\_ (work) in Italy for 5 years. I \_\_\_\_ (begin) work as soon as I arrived. 8. I'm afraid I'm not hungry. I \_\_\_\_\_ (eat/already). 9. When Jack was at school, he \_\_\_\_\_ (learn) to play the saxophone. He \_\_\_\_\_ (play) it ever since. | A has lived  B lives  C lived  A works  B worked  C has worked  A did you finish  B are you finishing  C have you finished  A have never been  B was never  C will never be  A has played - was  B played - was  C has played - has been  A have finished  B didn't finish  C finish  A work - began  B have worked - have begun  C have worked – began  A didn't eat already  B have already eaten  C haven't already eaten  A has learned - has played  B learned - has played  C learned - played |

**II . Put the verbs into the correct tense (Past Simple or Present Perfect).**

1. I (just / finish) \_\_\_\_ my homework.
2. Mary (already / write) \_\_\_\_ five letters.
3. Tom (move) \_\_\_\_ to this town in 1994.
4. My friend (be) \_\_\_\_ in Canada two years ago.
5. I (not / be) \_\_\_\_ to Canada so far.
6. But I (already / travel) \_\_\_\_ to London a couple of times.
7. Last week, Mary and Paul (go) \_\_\_\_ to the cinema.
8. I can't take any pictures because I (not / buy) \_\_\_\_ a new film yet.
9. (they / spend) \_\_\_\_ their holiday in New Zealand last summer?
10. (you / ever / see) \_\_\_\_ a whale?

**III. Put the verbs into the correct tense (Past Simple or Present Perfect).**

**A**: (you / be / ever) \_\_\_\_ to London?

**B**: Yes, I (be) \_\_\_\_ there three times.

**A**: When (be) \_\_\_\_ the last time you (be) there?

**B**: Last summer. I (spend) \_\_\_\_ two weeks in Brighton with my parents and we (go) \_\_\_\_ to London one weekend.

**A**: (you / like) \_\_\_\_ it?

**B**: Oh yes. We really (have) \_\_\_\_ a great time in London.

**A**: Lucky you! I (be / never) \_\_\_\_ to London.

**Vocabulary**

1. **Listen, read and memorize.**

|  |  |
| --- | --- |
| 1. devise 2. convenient 3. plumbing 4. pipe 5. terminate 6. well 7. mediaeval 8. conduit 9. treatment works 10. in response (to) 11. threat 12. large scale 13. tower 14. steam 15. purification 16. skyscraper 17. roof 18. liquefy 19. thereafter 20. linen 21. desalination 22. urban 23. sufficient 24. keepup (with) 25. demand 26. prevalent 27. viable 28. solution 29. harvest 30. policy 31. eventually 32. tend 33. towards | придумывать, изобретать  удобный  водопровод, водопроводная система  труба  завершать(ся)  колодец  средневековый  трубопровод, акведук  очистные сооружения  в ответ (на)  угроза  крупномасштабный  башня  пар  очистка (воды)  небоскрёб  крыша  превращать в жидкое состояние  впоследствии  льняной  опреснение (воды)  городской  достаточный  не отставать, держаться наравне  потребность, спрос  преобладающий  жизнеспособный  решение  собирать, накапливать  политика, курс  в конечном счёте, со временем  иметь тенденцию (к чему-либо), клониться (к чему-либо)  к, по направлению к |

1. **Guess the meaning of the words.**

history, aqueduct, public, fountain, infrastructure, cholera, modern, reservoir, electric, diesel, technique, compressed, chlorine gas, Army Major, professor, medical, calcium hypochlorite, method, standard, basis, municipal, limit, population, centre, traditional, centralized, option, technology, decentralization, extensively, rational, decade

1. **Translate the following word combinations:**

throughout history, getting and using water, indoor plumbing, public wells and fountains, water supply infrastructure, over many centuries, modern large scale reservoirs, water towers, rooftop water towers, electric and diesel-powered water pumps, the technique of purification, drinking water, compressed liquefied chlorine gas, a solution of calcium hypochlorite, municipal water purification, urban and suburban population centres, traditional centralized infrastructure, a more rational use of water

1. **Match the word and its synonym.**

|  |  |
| --- | --- |
| 1. devise 2. convenient 3. conduit 4. threat 5. available 6. purification 7. sufficient 8. keep up 9. demand 10. prevalent 11. harvesting 12. eventually | 1. suitable 2. collecting 3. clearing 4. need 5. enough 6. finally 7. think out 8. large pipe 9. at hand 10. keep pace 11. common 12. danger |

1. **Translate the sentences into Russian.**

1. Water supply is the provision of water by public utilities, commercial organizations or by individuals, usually by a system of pumps and pipes.

2. About 14% (884 million people) did not have access to an improved water source and had to use unprotected wells or springs, canals, lakes or rivers for their water needs.

3. A clean water supply is the single most important determinant of public health.

4. Destruction of water supply infrastructure after major catastrophes (earthquakes, floods, war, etc.) poses the immediate threat of severe epidemics diseases, several of which can be life-threatening.

5. Water supply systems get water from a variety of locations, including groundwater, surface water (lakes and rivers), and the sea through desalination.

6. Many of the 3.5 billion people receive a poor or very poor quality of service, especially in developing countries where about 80% of the world population lives.

7. Clean and reliable drinking water is essential for good health.

1. **Read Тext 4A and answer the question.**

When did roof top water towers appear?

**TEXT 4A**

**FROM THE HISTORY OF WATER SUPPLY**

Throughout history people have **devised** systems to make getting and using water more **convenient**. Early Rome had indoor **plumbing**, meaning a system of aqueducts and **pipes** that **terminated** in homes and at public **wells** and fountains for people to use. London water supply infrastructure developed over many centuries from early **mediaeval conduits**, through major 19th century **treatment works** built **in response to** cholera **threats**, to modern **large scale** reservoirs.

Water **towers** appeared around the late 19th century, as **steam**, electric and diesel-powered water pumps became available. As **skyscrapers** appeared, they needed **rooftop** water towers.

The technique of **purification** of drinking water by use of compressed **liquefied** chlorine gas was developed in 1910 by U.S. Army Major Carl Rogers Darnall (1867–1941), Professor of Chemistry at the Army Medical School. Shortly **thereafter**, Major William J. L. Lyster (1869–1947) of the Army Medical Department used a solution of calcium hypochlorite in a **linen** bag to treat water. For many decades, Lyster's method remained the standard for U.S. ground forces in the field and in camps. Darnall's work became the basis for present day systems of municipal water 'purification'.

**Desalination** appeared during the late 20th century, and is still limited to a few areas.

During the beginning of the 21st century, especially in areas of **urban** and suburban population centres, traditional centralized infrastructure have not been able to supply **sufficient** quantities of water to **keep up with** growing **demand**. Among several options that have been managed are the extensive use of desalination technology, this is especially **prevalent** in coastal areas and in "dry" countries like Australia. Decentralization of water infrastructure has grown extensively as a **viable solution** including rainwater **harvesting** where **policies** are **eventually tending towards** a more rational use of water.

1. **Find in the text the sentence in which it is said that…**

Люди изобретали системы водоснабжения для более удобного использования воды.

Водонапорные башни появились, когда стали доступны электрические и дизельные насосы.

Работа Дарналла стала основой для создания современной муниципальной системы очистки воды.

Опреснение до сих пор ограничивается несколькими областями.

В городах и посёлках традиционная централизованная инфраструктура не способна обеспечить необходимое количество воды.

Перспективным решением является децентрализация системы водоснабжения.

1. **Put the sentences in the right order according to the text.**

1. London water supply infrastructure developed over many centuries from early mediaeval conduits to modern large scale reservoirs.

2. Decentralization of water infrastructure has grown extensively towards a more rational use of water.

3. Since the ancient times, people have invented systems to make getting and using water more convenient.

4. Desalination appeared during the late 20th century.

5. Water towers appeared around the late 19th century.

6. Early Rome had indoor plumbing, meaning a system of aqueducts and pipes that terminated in homes and at public wells and fountains for people to use.

7. For many decades, Lyster's method remained the standard for U.S. ground forces in the field and in camps.

8. As skyscrapers appeared, they needed rooftop water towers.

9. Among several possibilities that have been managed are the extensive use of desalination technology.

1. **Finish the sentences defining major landmarks in the history of water supply.**

1. Throughout history people have devised systems…

2. Early Rome had indoor plumbing…

3. London water supply infrastructure developed from early mediaeval conduits…

4. Water towers appeared…

5. The technique of purification of drinking water by use of…

6. Desalination appeared…

7. During the beginning of the 21st century…

8. Decentralization of water infrastructure has grown extensively as…

1. **Answer the questions.**

1. Why have people devised various systems of water supply?

2. What system of indoor plumbing had early Rome?

3. How did London water supply infrastructure develop?

4. When did water towers appear?

5. Who developed the technique of purification of drinking water by use of compressed liquefied chlorine gas?

6. When did desalination appear?

7. Is traditional centralized infrastructure able to supply sufficient quantities of water to keep up with growing demand?

8. What is the alternative to the traditional centralized infrastructure?

1. **Summarize the text using the following beginnings:**

The text reports on…

The text touches upon…

A careful account is given to…

It is reported that…

Much attention is given to…

The text points out that…

The text deals with the problem of…

The text provides information on…

The text defines the phenomenon of…

The text covers such points as…

1. **Read Text 4B and choose the headline:**

a) Water Consumption

b) Water Shortage

c) Water Supply

**Words and expressions:**

foresee – предвидеть stint – ограничение

abundant – обильный keep – держать, хранить

anew – заново living standards – уровень жизни

mention – упоминать tap – кран

**ТEXT 4В**

Centralized water supply dates back to 2500 BC. Ancient Egypt had complex engineering structures for the purpose. Yet to this day the percentage of the population enjoying centralized water supply on the African continent, and in Asia, too, is very low.

In our country, at the time of the revolution of 1917, only one-third of the towns had running water laid on, and then, as a rule, only in the central part of the town. In the pre-war period of industrial development running water reached millions of flats all over the country. But many of the systems and practically all in the western and central parts of European Russia, were destroyed during the war and had to be built anew.

Fresh water shortage was first mentioned soon after the end of the Second World War. The first to feel the stint was Europe. The problem came to many as a complete surprise, something in the nature of an unexpected “catastrophe”. This catastrophe, however, should have been foreseen, for it follows logically from the development of human life on our planet and of Man’s industrial activity.

In the absence of centralized water supply, a man can do with about 25 litres of water a day for his various personal needs. But in the modern city water consumption per person is much higher. An average of 300 to 500 litres of water is spent daily on household and sanitary needs per one inhabitant of a modern city. You can see this vastly exceeds the necessary minimum of 25 litres. Why the difference? Not because people keep their taps open. Because water is so abundant that no one thinks twice about taking a shower, or a bath, using the washing machine, washing the cars, etc. The volume of water consumption is indicative not only of the efficiency of the water supply but also of the population’s living standards.

1. **Find in the text the sentence in which it is explained why people consume much more water than they need.**
2. **Find in the text international words and give their Russian equivalents.**
3. **Translate the following word combinations:**

централизованное водоснабжение; инженерные сооружения; процент населения; в центральной части города; в довоенный период; промышленное развитие; водопровод; нехватка питьевой воды; полная неожиданность; промышленная деятельность; личные нужды; бытовые и санитарные нужды; на одного жителя

1. **Find in the text the equivalents to the following sentences:**
2. Для этой цели в Египте существовали сложные инженерные сооружения.
3. В довоенный период водопроводная вода появилась в миллионах квартир по всей стране.
4. Дефицит первой ощутила Европа.
5. Для многих эта проблема стала полной неожиданностью, чем-то вроде нежданной “катастрофы”.
6. Но в современном городе потребление воды на одного человека гораздо выше.
7. Объём потребляемой воды – это показатель не только эффективности водоснабжения, но также уровня жизни населения.
8. **Retell the text in Russian.**
9. **Read Text 4C and translate it in writing using a dictionary.**

**TEXT 4C**

**WATER SUPPLIES IN THE WIDER WORLD**

Water is vital to life. It has played an important part in the history of all great countries and civilizations.

**The Indus Civilization**, which produced the first cities of Mohnjo-Daro and Harappa around 2500 BC, also built the first sewers. They even had manhole covers so they could be cleaned and unblocked.

**Jerusalem** in the times of King Hezekiah in the 7th century BC was supplied by man-made underground water tunnel which led from a protected spring outside the walls.

**The Roman Empire** was famous for building raised canals called aqueducts to bring water to its cities. Every day the people of Rome used more than one thousand million litres of water for all uses including fountains and baths. Few homes had piped water though. This was drawn from public fountains or wells. People carried their waste to sewage disposal points, which led to the Great Sewer or Cloaca Maxima.

**The Inca Empire** provided homes for about 12 million people - over twice the size of modern Scotland. To keep people healthy, a stone channel ran down each street in the main city Cuzco carrying fresh water from the mountains, ready to flush away sewage.

**The Ashanti Kingdom** in 18th century West Africa was very clean. Buildings in the capital Kumasi had sewage pipes, which were cleaned daily with boiling water. And even remote villages had public toilets.

**Unit 5**

**Water Supply**

**Introduction**

**Notes:**

tap - кран

leak – течь, утечка

It is estimated that in the U.S the typical single family home uses about 262 litres of water per day. This includes (in decreasing order) toilet use, washing machine use, showers, baths, tap use, and leaks.

**Grammar Revision**

**Modal Verbs “must, have to, be to, should”**

**Must/have to/be to**

|  |  |  |
| --- | --- | --- |
| **Present** | **Past** | **Future** |
| **must**  **have/has to…**  **am/is/are to…** | **-**  **had to…**  **was/were to…** | **-**  **will have to…**  - |

|  |  |
| --- | --- |
| 1. долг, обязательство 2. приказ, настоятельный совет   *должен*   1. запрещение   *нельзя, запрещено* | We **must study** hard.  I **must buy** some bread.  You **must go** there at once.  You **must see** the doctor immediately.  You **mustn’t smoke** here. |

Оттенки значения эквивалентов глагола **must**:

**Have to** – вынужден, придётся (в связи с обстоятельствами)

*Например:*

Jane was feeling ill last night so she **had to** leave the party early.

**Be to** – долженствование, связанное с планом, договорённостью

*Например:*

He **is to** meet us at the station at 5.

**Обратите внимание!**

**~** Для образования вопросительной и отрицательной формы эквивалента **have to** используются вспомогательные глаголы **do/does/did**:

*Например:*

**Do** you **have to** get up early on weekends?

Tom **doesn’t have to** work on Sundays.

**~ Mustn’t** и **don’t have to** имеют разные значения:

**Mustn’t** – «не должен» (просьба, приказ)

*Например:*

You **mustn’t** tell anyone what I said.

**Don’t have to** – «ненужно» (отсутствие необходимости)

*Например:*

She stayed in bed this morning because she **didn’t have to** go to work.

**~** Отрицательная форма глагола **must (mustn’t**) означает запрещение.

Отрицательная форма глагола **need (needn’t)** выражает отсутствие необходимости (не надо, не нужно).

*Например:*

- **May** I do it? - **Must** I do it?

- No, you **mustn’t**. - No, you **needn’t** do it now. You may do it tomorrow.

**Should**

Глагол **should** имеет только одну форму и выражает *моральный долг, обязательство, совет, рекомендацию, порицание*: **должен, следует, нужно, нужно было бы, следовало бы.**

*Например:*

You **should stop** smoking.

Tom **shouldn’t drive** so fast.

- Do you think I **should apply** for the job?

- Of course, you **should**.

It was his birthday yesterday. I **should have sent** him a birthday card (but I didn’t).

**I. Take this Must/Have to/Should Quiz.**

**Instructions:**

For questions 1 to 5, read each sentence and select the correct answer from the three options.

For questions 6 to 8, read each alternative and choose an answer that best fits the meaning of the first sentence.

|  |  |
| --- | --- |
| 1. You \_\_\_\_ drink tap water. It's not safe. 2. I think people who live in apartments \_\_\_\_ have dogs. 3. You \_\_\_\_ remember to finish the monthly report. The boss will be furious if you forget. 4. The exhibition was free so we \_\_\_\_ pay anything. 5. All employees \_\_\_\_ on time for work. 6. Attending today's meeting is not mandatory. 7. Trucks are not allowed to go on this road. 8. Tipping the waiter is recommended but not mandatory in this resort. | A. shouldn't  B. can't  C. don't have to  A. mustn't  B. should  C. shouldn't  A. should  B. must  C. shouldn't  A. shouldn't to  B. hadn't to  C. didn't have to  A mustn’t be  B must be  C have to be  A. You don't have to go to the meeting.  B. You shouldn't go to the meeting.  C. You have to go to the meeting.  A. Trucks shouldn't go on this road.  B. Trucks can't go on this road.  C. Trucks don't have to go on this road.  A. You have to tip the waiter.  B. You don't have to tip the waiter.  C. You should tip the waiter. |

**II. Match the following statements with their meaning.**

|  |  |
| --- | --- |
| 1. I could work on Saturdays. 2. I must work on Saturdays. 3. I need to work on Saturdays. 4. I have to work on Saturdays. 5. I mustn't work on Saturdays. 6. I couldn't work on Saturdays. 7. I don't have to work on Saturdays. 8. I shouldn't work on Saturdays. 9. I should work on Saturdays. 10. I might work on Saturdays. | 1. It's absolutely necessary for me to work on Saturdays. 2. It's absolutely necessary for me to work on Saturdays and someone forces me to do so. 3. I'm unable to work on Saturdays. 4. It isn't necessary for me to work on Saturdays. 5. It's possible for me to work on Saturdays. 6. It's a good idea for me to work on Saturdays. 7. It's important for me to work on Saturdays. 8. It's a good idea for me to work on Saturdays. 9. It's forbidden for me to work on Saturdays. 10. It isn't a good idea for me to work on Saturdays. 11. It's a possibility that I might work on Saturdays. |

**Vocabulary**

1. **Listen, read and memorize.**

|  |  |
| --- | --- |
| 1. Provision 2. public utilities 3. via 4. access 5. nowadays 6. means 7. include 8. standpipe 9. spring 10. however 11. need 12. determinant 13. health 14. destruction 15. sewage 16. earthquake 17. flood 18. present 19. severe 20. disease 21. several 22. threaten 23. overview 24. purify 25. treated water 26. either…or 27. once 28. sewage treatment plant 29. quality 30. receive 31. poor 32. especially 33. developing countries 34. dimension 35. continuity 36. pressure 37. degree 38. responsiveness 39. customer 40. complaint 41. take for granted 42. developed countries 43. commonly 44. undergo (underwent, undergone) 45. treatment | снабжение, обеспечение  коммунальные сооружения; коммунальные услуги  через, посредством  доступ  в наше время, теперь  средства  включать; заключать в себе  песчаная труба  источник, родник  однако  нужда, необходимость  решающий фактор  здоровье  разрушение  сточные воды, нечистоты  землетрясение  наводнение  представлять  тяжёлый, серьёзный  болезнь  несколько, некоторое количество  угрожать  беглый обзор  очищать  очищенная вода  или… или, либо…либо  некогда, когда-то; однажды  очистные сооружения  качество  получать  низкий, плохой  особенно  развивающиеся страны  сторона, аспект  непрерывность  давление  степень  ответственность  клиент  жалоба  считать само собой разумеющимся  развитые страны  обычно  испытывать, подвергаться  обработка |

1. **Guess the meaning of the words and word combinations.**

commercial organizations, individuals, global population, connections, water kiosks, protected wells, canals, single, public, infrastructure, major catastrophes, epidemics, technical, variety, locations, groundwater, conservation, to disinfect, chlorination, gravity, reservoirs, irrigation, industrial use, billion, service, service providers, micro-biological, physico-chemical, minimum, parameters, ultra violet light, basis

1. **Translate the following word combinations:**

via a system of pumps and pipes; access to piped water supply; improved water source; other means than house; for their water needs; the single most important determinant of public health; destruction of water supply and/or sewage infrastructure; severe epidemics; waterborne diseases; through desalination; a sewer system; to reuse for irrigation; water supply service quality; customer complaints; a few hours every day; about half of the population; on an intermittent basis; drinking water; at a minimum; to undergo treatment

1. **Match the word and its synonym.**

|  |  |
| --- | --- |
| 1. Access 2. nowadays 3. include 4. need 5. present 6. severe 7. disease 8. several 9. purify 10. receive 11. poor 12. commonly | 1. be 2. get 3. bad 4. at present 5. admission 6. serious 7. contain 8. illness 9. usually 10. demand 11. some 12. clean |

1. **Translate the sentences into Russian.**
2. Check with your local water and energy utilities for programs available in your area.
3. I sent this message via E-mail.
4. The city was also well known for its hot springs, which emitted lukewarm water continually.
5. Eating fish is good for your health.
6. After the bomb had gone off, the area was a scene of total destruction.
7. Many people were killed because of the earthquake and flood.
8. Climate change may threaten the survival of king penguins.
9. I'll either write to you or phone you next week.
10. Something often taken for granted by all of us is the availability of clean water.
11. The hotel closed in 2001 has since undergone external and internal improvements.
12. **Read Text 5A and answer the question.**

What treatment should water undergo in public water supply systems?

**TEXT 5A**

**WATER SUPPLY**

Water supply is the **provision** of water by **public utilities**, commercial organizations, or by individuals, usually **via** a system of pumps and pipes.

**Nowadays** about 85% of the global population have **access** to piped water supply **through** house connections or to an improved water source, through other **means** than house, **including standpipes**, water kiosks, **spring** supplies and protected wells. **However**, about 14% of people do not have access to an improved water source and have to use unprotected wells or springs, canals, lakes or rivers for their water **needs**.

A clean water supply is the single most important **determinant** of public **health**. **Destruction** of water supply and/or **sewage** infrastructure after major catastrophes (**earthquakes**, **floods**, war, etc.) **presents** the threat of **severe** epidemics of waterborne **diseases**, **several** of which can be life-**threatening**.

Technical **overview**

Water supply systems get water from a variety of locations, including groundwater (aquifers), surface water (lakes and rivers), conservation and the sea through desalination. The water is then, in most cases, **purified** and disinfected through chlorination. **Treated water** then **either** flows by gravity **or** is pumped to reservoirs. **Once** water is used, wastewater is usually discharged in a sewer system and treated in a **sewage treatment plant** before being discharged into a river, lake or the sea or reused for irrigation or industrial use.

Service **quality**

Many of the 3.5 billion people having access to piped water **receive** a **poor** or very poor quality of service, **especially** in **developing countries** where about 80% of the world population lives. Water supply service quality has many **dimensions**: **continuity**; water quality; **pressure**; and the **degree** of **responsiveness** of service providers to **customer complaints**.

Continuity of supply

Continuity of water supply is **taken for granted** in most **developed countries**, but is a severe problem in many developing countries, where sometimes water is only provided for a few hours every day or a few days a week. It is estimated that about half of the population of developing countries receives water on an intermittent basis.

Water quality

Drinking water quality has micro-biological and physico-chemical dimensions. There are thousands of parameters of water quality. In public water supply systems water should, at a minimum, be disinfected—most **commonly** through the use of chlorination or the use of ultra violet light—or it may need to **undergo treatment**, especially in the case of surface water.

1. **Find in the text the sentence in which it is said that…**

Водоснабжение – это обеспечение водой через систему трубопроводов и насосов.

Некоторые люди, удовлетворяя потребности в воде, вынуждены пользоваться незащищёнными источниками воды.

Разрушение инфраструктуры водоснабжения и канализации может представлять угрозу заболеваний.

Использованная вода сбрасывается в канализационную систему, а затем обрабатывается на очистных сооружениях.

Качество водоснабжения имеет много параметров.

В половине развивающихся стран подача воды непостоянна.

Питьевая вода имеет микробиологические и физико-химические параметры.

1. **Put the sentences in the right order according to the text.**
2. In public water supply systems water should, at a minimum, be disinfected.
3. Water supply is the provision of water by public utilities, commercial organizations, or by individuals, usually via a system of pumps and pipes.
4. Continuity of water supply is a severe problem in many developing countries.
5. Water supply service quality has many dimensions: continuity; water quality; pressure; and the degree of responsiveness of service providers to customer complaints.
6. Nowadays about 85% of the global population have access to piped water supply.
7. Destruction of water supply and/or sewage infrastructure after major catastrophes presents the threat of severe epidemics of waterborne diseases.
8. **Finish the sentences.**
9. Water supply is the provision of water by …
10. Nowadays about 85% of the global population have access to …
11. About 14%of people do not have access to an improved water source and have to use …
12. A clean water supply is the single most important determinant of …
13. Water supply systems get water from a variety of locations, including …
14. Wastewater is usually discharged in a sewer system and treated in a sewage treatment plant before being discharged into …
15. Water supply service quality has many dimensions: …
16. Continuity of water supply is taken for granted in most ...
17. There are thousands of parameters of …
18. In public water supply systems water should be disinfected—most commonly through …
19. **Answer the questions.**
20. What is water supply?
21. Do all people on Earth have access to piped water?
22. What does the destruction of water supply and/or sewage infrastructure result in?
23. Where do water supply systems get water from?
24. What happens with wastewater?
25. What dimensions has supply service quality?
26. What dimensions has drinking water quality?
27. **Summarize the text using the following beginnings:**

The text reports on…

The text touches upon…

A careful account is given to…

It is reported that…

Much attention is given to…

The text points out that…

The text deals with the problem of…

The text provides information on…

The text defines the phenomenon of…

The text covers such points as…

1. **Read Text 5B and choose the headline:**

a) Wastewater

b) Drinking water

c) Access to Potable Water

**Words and expressions:**

harm – вред survival – выживание

even though– даже если crucial – решающий

goal – цель solvent – растворитель

contaminate – загрязнять assume – предполагать

unacceptable – недопустимый adult – взрослый, совершеннолетний

cause – причина suggest - предлагать

**TEXT 5B**

Drinking water or potable water is water safe enough to be consumed by humans or used with low risk of harm. In most developed countries, the water supplied to households, commerce and industry meets drinking water standards, even though only a very small proportion is actually consumed or used in food preparation. Typical uses (for other than potable purposes) include toilet flushing, washing and landscape irrigation.

Over large parts of the world, humans have inadequate access to potable water and use sources contaminated with disease vectors, pathogens or unacceptable levels of toxins. Drinking or using such water in food preparation leads to chronic illnesses and is a major cause of death in many countries. Reduction of waterborne diseases is a major public health goal in developing countries.

Water has always been an important and life-sustaining drink to humans and is important to the survival of all known organisms. Water composes approximately 70% of the human body by mass. It is a crucial component of metabolic processes and serves as a solvent for many bodily solutes. The United States Environmental Protection Agency assumed that the average American adult consumes 2.0 litres per day. However, the United States Environmental Protection Agency now suggests that either science-based age-specific ranges or an all ages level should be used.

1. **Find in the text the sentences in which it is explained why water is important for humans.**
2. **Find in the text international words and give their Russian equivalents.**
3. **Translate the following word combinations:**

питьевая вода; малый риск вреда; стандарты питьевой воды; очень малая часть; приготовление еды; обычное использование; орошение ландшафтов; источники, загрязнённые болезнетворными веществами; недопустимый уровень токсинов; хронические заболевания; напиток, поддерживающий жизнь; все известные организмы; среднестатистический американец; особые возрастные критерии, основанные на научных данных

1. **Find in the text the equivalents to the following sentences:**
2. Питьевая вода – это вода, достаточно безопасная и безвредная для употребления человеком.
3. В большинстве развитых стран водоснабжение жилых домов, торговли и промышленности имеет стандарты питьевой воды.
4. Сокращение болезней, вызванных водой, является главной целью в развивающихся странах.
5. Агенство по защите окружающей среды Соединённых Штатов Америки предполагает, что среднестатистический взрослый американец потребляет 2 литра воды в день.
6. **Say if it is true or false.**
7. Potable water is water safe enough to be consumed by humans or used with low risk of harm.
8. In most developing countries, the water supplied to households, commerce and industry meets drinking water standards.
9. Typical uses (for other than potable purposes) include toilet flushing, washing and landscape irrigation.
10. All over the world, humans have inadequate access to potable water and use contaminated sources.
11. Reduction of waterborne diseases is a major public health goal in developing countries.
12. Water composes approximately 50% of the human body by mass.
13. Water is a crucial component of metabolic processes.
14. **Retell the text in Russian.**
15. **Read Text 5C and translate it in writing using a dictionary.**

**TEXT 5C**

**WATER PRESSURE**

Water pressures vary in different locations of a distribution system. Water mains below the street may operate at higher pressures, with a pressure reducer located at each point where the water enters a building or a house. In poorly managed systems, water pressure can be so low as to result only in a trickle of water or so high that it leads to damage to plumbing fixtures and waste of water. Pressure in an urban water system is typically maintained either by a pressurized water tank serving an urban area, or by pumping the water up into a tower and relying on gravity to maintain a constant pressure in the system.

Typical UK pressures are 4–5 bar for an urban supply. However, some people can get over eight bars or below one bar. A single iron main pipe may cross a deep valley, it will have the same nominal pressure. However, each consumer will get a bit more or less because of the hydrostatic pressure (about 1 bar/10 m height). So people at the bottom of a 100-foot (30 m) hill will get about 3 bars more than those at the top.

The effective pressure also varies because of the supply resistance even for the same static pressure. An urban consumer may have 5 metres of 15mm lead pipe running from the iron main, so the kitchen tap flow will be high. A rural consumer may have a kilometre of rusted and limed 22mm iron pipe, so their kitchen tap flow will be small.

For this reason the UK domestic water system has traditionally (prior to 1989) employed a "cistern feed" system, where the incoming supply is connected to the kitchen sink and also a storage tank in the attic. Water can dribble into this tank through a 12mm lead pipe, plus ball valve, and then supply the house on 22 or 28mm pipes. Gravity water has a small pressure (say ¼ bar in the bathroom) but needs wide pipes allow higher flows. This is fine for baths and toilets but is frequently inadequate for showers. People install shower booster pumps to increase the pressure. For this reason urban houses are increasingly using mains pressure boilers which take a long time to fill a bath but suit the high back pressure of a shower.

**Part II**

**Texts for Additional Reading and Translating**

**Read Text 1 and answer the question.**

What does urbanization imply?

**TEXT 1**

**WORLD POPULATION GROWTH**

World population has passed 6 billion. Although the annual increase probably peaked at about 87 million around 1990, the high proportion of young people in most developing countries means that global population will continue to increase significantly well into this century.

Recent projections suggest a peak of between 7.3 billion and 10.7 billion around 2050 before total population begins to stabilize or fall. Predictions cannot be precise, because other dimensions of development such as access to health, education, income, birth control and other services influence the pace of population growth.

Despite the massive investment in water resource management and particularly in dams, billions of children, women and men in rural areas lack access to the most basic water and sanitation services. Although problems of access are worst in rural areas, rapid urbanization is also increasing the demand for water-related services. In 1995, 46% of the world’s population lived in urban areas. If current trends persist (and they may accelerate), that figure could reach 60% by the year 2030 and over 70 % by 2050. Most of this growth will take place in developing countries where an estimated 25 to 50 % of urban inhabitants live in impoverished slums.

Urbanization implies an increasing concentration on water and energy demand in mega-cities, a switch to different lifestyles and consumption patterns, and a loss of productive agricultural land through urban expansion. It is a widely held view that lack of attention to development in rural areas is fuelling unsustainable forms of urban growth, shifting poverty from rural to urban areas, and contributing to rapidly growing demand for additional services. In heavily populated countries like China, India and Indonesia many question the sustainability of the high rates of urbanization in mega-cities.

**Vocabulary**

|  |  |
| --- | --- |
| 1. Peak 2. mean 3. significantly 4. prediction 5. influence 6. despite 7. water resource management 8. ruralareas 9. lack 10. rapid urbanization 11. urban areas 12. current trends 13. impoverished slums 14. imply 15. a switch to 16. consumption pattern 17. a widely held view 18. poverty 19. contribute to 20. sustainеd 21. question 22. rate | достичь высшей отметки  означать  значительно, существенно  предсказание  влиять  несмотря на  управление водными ресурсами  сельские районы  недоставать, не хватать  стремительная урбанизация  городские зоны, территории  современные тенденции  убогие трущобы  предполагать, означать  переключение, изменение  характер потребления  общепринятая точка зрения  бедность  способствовать  длительный, непрерывный  ставить под вопрос  коэффициент, степень |

1. **Translate the following word combinations:**

the annual increase, to increase significantly well into this century, recent projections, precise predictions, influence the pace of growth, despite the investment, access to the basic sanitation services, demand for water-related services, if current trends persist, rapidly growing demand, a switch to different lifestyles, high rates of urbanization

1. **Find in the text the equivalents to the following word combinations:**

мировое население, развивающиеся страны, существенно возрастать, размеры развития, доступ к здравоохранению, темпы роста населения, основные службы водоснабжения, увеличить спрос на, городская местность, общепринятая точка зрения, поставить под вопрос непрерывность процесса урбанизации

1. **Match these verbs with their opposites.**

|  |  |
| --- | --- |
| 1. to rise 2. to increase 3. to go up 4. to grow 5. to double 6. to expand | 1. to decrease 2. to shrink 3. to halve 4. to contract 5. to fall 6. to go down |

1. **Which verbs from Exercise 3 can you use with these groups of words?**

* Things that can be counted (e.g. number of homeowners/students, etc.)
* Things that can be described in terms of size (e.g. a company)
* Things that have monetary value (e/g/ cost of living, price of houses)

1. **Translate the following sentences into English:**
2. Численность мирового населения составляет 7 миллиардов человек.
3. Численность населения продолжает быстро увеличиваться.
4. Самое крупное в мире государство по численности населения – Китай. После 2025 года, возможно, его догонит Индия.
5. В 2009 году впервые за всю историю человечества численность городского населения сравнялась с численностью сельского.
6. Городское население продолжит расти быстрее, чем население в целом.
7. Численность населения Земли возросло с 1 миллиарда человек в 1800 году до 7 миллиардов человек в 2011 году.
8. **Answer the questions:**

1. What are the projections about world population growth?

2. What factors influence the population growth?

3. In what areas do people lack access to the water and sanitation services?

4. What does urbanization imply?

5. What accounts for urban growth?

**Read Text 2.**

**TEXT 2**

**ECONOMIC GROWTH AND DEVELOPMENT**

World economic activity has grown approximately five-fold since 1950 at a rate of about 4 % per year. The regional balance is changing, with a significant growth in Asia over the past 25 years. At present, OECD countries continue to account for the largest share, amounting to 55% of world production at purchasing power parity, nearly 80% at market prices.

Economic growth has two implications for water demand. The first is that increased economic activity will increase the demand for water-related services – regardless of whether the demand is satisfied by more efficient use of the existing supply, or by increasing the level of supply. The second is that both the development brought about by economic growth and the technological changes that accompany it will lead to structural changes in the pattern of goods and services that society produces, and in the way these services are provided. The water demand per unit of Gross Domestic Product (GDP) will depend on how these two components of economic growth are combined. Countries with the same product per capita but different production characteristics – for example with large scale irrigated agriculture or water intensive industries – may consume three or four times more water per dollar of GDP. This is evident when comparing the United States and Canada with Germany or France, or India with China.

Development and technological change can also save water per dollar of output. Between 1950 and 1990 the world economy grew by a factor of five while world water withdrawals only grew by a factor of 2. The last fifty years have seen a worldwide reduction in the amount per dollar of nonagricultural production as a result of improved technology, more recycling, enforcement of environmental standards, higher water prices, and industries moving away from natural resource intensive activities. However, the water management practices and technologies that enable such advances are not widely available or promoted and are often absent where they are most needed. Despite the increasing number of options available, the total number of people without access to clean water is growing.

**Vocabulary**

approximately приблизительно

five-fold в пятикратном размере, впятеро

account for составлять определенную часть

the largest share большая доля, часть

amount to составлять

purchasing parity покупательная способность

implication смысл, значение

regardless of не обращая внимания, не считаясь с

accompany сопровождать, сопутствовать

Gross Domestic Product валовой продукт страны

evident очевидный

output продукция, выпуск, производительность

a factor of five коэффициент 5, степень

water withdrawal водозабор

reduction снижение, понижение

recycling переработка для вторичного использования

enforcement of environment standards давление со стороны экологических норм

advances успехи, прогресс

1. **Give the comparative and superlative of the following adjectives and adverbs:**

a) significant, efficient, intensive;

b) large, high, clean, total;

c) widely, often, effectively, soon, well, quickly;

d) good, bad, little, many.

1. **Form nouns from the verbs:**

to grow, to develop, to serve, to produce, to characterize, to withdraw, to reduce, to manage, to irrigate, to combine, to compare

1. **Translate:**

water resource management, water management practice, water management technologies, human water demand, ground water resources, surface water resources, dam construction rate, job creation, reservoir projects, river transportation, flood protection

1. **Find in the text the equivalents to the following word combinations:**

значительный рост

экономическая активность

покупательная способность

более эффективное использование

привести к структурным изменениям

номенклатура товаров

разные производственные характеристики

более высокие цены на воду

способствовать этому прогрессу

доступны не повсюду

поддерживаются не везде

возрастающее количество возможностей

1. **Answer the questions:**
2. What is the rate of economic growth?
3. What are the two components of economic growth?
4. What will the water demand per unit of Gross Domestic Product depend on?
5. What else can save water per dollar of output?
6. **Mark the sentences true or false:**
7. World economic activity has grown three-fold since 1950.
8. Economic growth has two components.
9. Increased economic activity will increase the demand for water-related services.
10. The water management practices are widely available.
11. Despite the improved technology the number of people without access to water is decreasing.
12. **Discuss:**

* How much water does your household use every day?
* What do you need water for?
* Do you waste water?

**Read Text 3 and answer the question.**

How much water do we need?

**TEXT 3**

**INCOME DISTRIBUTION AND LIFE-STYLES**

Economic activity and development affect income, income distribution and lifestyles. These in turn affect the demand for water through changes in the level and composition of household consumption in areas such as diet, the use of household appliances and standards of sanitation.

How much water is needed for one more person? Although climate and culture influence what constitutes an appropriate level of domestic water consumption, several international agencies and experts have proposed 50 litres per person per day (or just over 18.25 m3 a year) as an amount that covers basic human water requirements for drinking, sanitation, bathing and food preparation. In 1990 over a billion people were below that level.

On the other hand, households in developed countries and better-off households in developing cities use from 4 to 14 times the threshold of 50 liters per person a day.

Drastically lower average figures for domestic consumption in developing countries reflect not only different life styles and lower incomes, but also a huge backlog of unsatisfied demand. The lower average also masks extremely high consumption among better–off urban households and acute deprivation among rural and urban poor.

**Vocabulary**

income доход

inturn в свою очередь

household consumption расходы семьи, бытовые расходы

appliances (бытовые) приборы

appropriate level соответствующий уровень

domestic домашний, внутренний

propose предлагать, предполагать

water requirements потребности в воде

food preparation приготовление пищи

below that level ниже того уровня

drastically решительно, значительно

average figure среднее число

reflect отражать

backlog задолженность, невыполнение

mask маскировать, скрывать

better-off богатый

acute deprivation острая нехватка, лишение

1. **Find in the text the equivalents to the following word combinations:**

экономическая активность и развитие

влиять на распределение доходов

санитарные нормы

культурное влияние

международные эксперты

основные человеческие потребности в воде

с другой стороны

развитые страны

развивающиеся страны

богатые семьи

разный образ жизни

острая нехватка

1. **Answer the questions:**
2. What does the demand of water depend on?
3. What amount of water covers the basic human requirements in water?
4. How much water do households use in developed countries?
5. What can you say about domestic consumption of water in developing countries?
6. **Discuss:**

What is the main water consumer in this country? (agriculture, industry, municipal or domestic users)

1. **Learn to recognize the following international words:**

analyst, agriculture, industry, municipal, domestic, reservoirs, trend, regional, management, potential, production, central, ecosystem, accelerate, degradation, priority

**Read Text 4 and answer the question:**

What do water analysts predict?

**TEXT 4**

**COMPETING USES OF WATER**

Water analysts foresee increased competition among water users in meeting the growing demand. They predict that competition will increase among the three largest water users in global terms. Agriculture accounts for about 67% of withdrawals, industry uses 19% and municipal and domestic uses account for 9%. Analysts foresee that these uses will continue to draw from the water needed to sustain natural systems. In dry climates, evaporation from large reservoirs, estimated at close to 5% of total water withdrawals, may also be a significant consumptive use of water.

Regional trends vary widely. Despite increasing urbanization in Africa, Asia and Latin America, agriculture is the dominant water user in these regions, accounting for approximately 85% of all water used. In all regions of the world except Oceania, domestic or household water consumption accounts for less than 20% of water use. In Africa, Central America and Asia, this is nearer to 5%. In the more developed regions of Europe and North America, industry is the major water consumer. The water use breakdown in a specific country influences where water demand management opportunities exist.

For many water-stressed countries that are industrializing, and that have large urban populations, the present water crisis often revolves around industrial and domestic water supply and sanitation. This is evident in the significant trend over the past few decades towards diverting water from agricultural to municipal and industrial uses. As this is happening in the context of an overall increase in withdrawals, it will lead to increased competition for water, unless more efficient water use in both sectors accompanies the transition from agricultural to industrial based economies.

There are additional challenges. To meet food requirements, water used in agriculture may have to increase 15 to 20% by 2025 even with improvements in irrigation efficiency and agronomic potential. In addition to increasing food production in the face of water stress, distribution, equitable access, purchasing power and poverty are central issues in meeting food demand.

Beyond competing human demands, water for nature is an essential consideration. The fresh water ecosystems that provide the livelihoods of the world’s riverine communities and many other goods and services to our societies depend on water. Arresting, and where possible reversing, the accelerating trend to increasing degradation of many of the world’s watersheds caused by human activity have emerged as an urgent priority.

**Vocabulary**

foresee предвидеть

meet the growing demand удовлетворить растущие потребности

predict предсказывать

sustain поддерживать, подкреплять

evaporation испарение

consumptive потребительный

dominant господствующий, преобладающий

water stressed countries страны, испытывающие недостаток воды

divert отводить

overall полный, всеобщий

leadto привести к

transition перевод, перемещение

additional дополнительный

challenges трудности, проблемы

improvement улучшение

efficiency действенность, эффективность, продуктивность

livelihood средства к жизни

arresting задерживающий, останавливающий

reverse поворачивать в противоположном направлении

emerge появляться, возникать

1. **Answer the questions:**
2. What are the three dominant water users?
3. What is the main water user in Africa and Latin America?
4. What is the major water consumer in Europe and North America?
5. What will the trend of diverting water to municipal and industrial uses lead to?
6. What are the problems in meeting food demand?
7. **Find in the text the equivalents to the following word combinations:**

возрастающая конкуренция

удовлетворять растущие потребности

поддерживать природные системы

испарение больших резервуаров

растущая урбанизация

потребление воды

главный потребитель воды

водоснабжение

отведение воды

чтобы удовлетворить потребности в пище

эффективность орошения

равный доступ

зависеть от воды

центральные вопросы

мировые бассейны

1. **Say it in English:**

Насчитывает около 67%; оценивается в 5%; насчитывает менее 20%; возрос на 10%; увеличился с 15 до 20; уменьшился на 30%.

1. **Look at these expressions for 90% and write down ways you could refer to 10%.**

**90%** **10%**

Ninety percent (of) \_\_\_\_ \_\_\_\_

A high percentage (of) \_\_\_\_ \_\_\_\_

Nine-tenths (of) \_\_\_\_ \_\_\_\_

Nine out of ten \_\_\_\_ \_\_\_\_

The vast majority of \_\_\_\_ \_\_\_\_

Most (of) \_\_\_\_ \_\_\_\_

Nearly all (of) \_\_\_\_ \_\_\_\_

1. **Translate the following sentences into English:**
2. Специалисты по водным ресурсам предсказывают возрастающую конкуренцию между водопользователями.
3. На сельское хозяйство приходится около 67% водопотребления, промышленность использует 19%, муниципальное и бытовое хозяйство использует 9%.
4. В более развитых регионах Европы и Северной Америки промышленность является основным потребителем воды.
5. Сельское хозяйство – главный потребитель воды в Африке, Азии и Латинской Америке.
6. Для удовлетворения потребностей в продовольствии доля воды, используемой в сельском хозяйстве, может возрасти с 15% до 20% к 2025 году.
7. **Learn to recognize the following international words:**

serious, resources, extraction, urbanization, region, surprisingly, category, total, pressure, municipal, aquifers, climate, results, seasonal, variations, globe

**Read Text 5 and answer the question.**

What makes surface and ground water unfit for many uses?

**TEXT 5**

**AVAILABILITY AND QUANTITY OF WATER**

Rainfall and other sources of freshwater (rivers, lakes, groundwater) are unevenly distributed around the world and are not always located where human water demand arises. Pollution threatens surface and ground water sources and may make them unfit for many uses, or require expensive treatment. Pollution is especially serious where ground water resources are over-exploited and suffer from reduced natural rates of recharge due to deforestation, land use changes and urbanization.

One third of the countries in water stressed region of the world are expected to face severe water shortages this century, and within these regions there are great disparities in access to fresh water. Not surprisingly, a significant number of less developed countries, including regions of India and China, are facing severe shortages. With population growth, the number of countries in this category is increasing, and by 2025 there will be approximately 6.5 times as many people – a total of 3.5 billion – living in water stressed countries.

Not only surface water is under pressure. The growing rate of extraction of fresh water from rivers and lakes is matched by increasing extraction of ground water, with many aquifers now seriously depleted. The volume of ground water withdrawal, primarily for irrigation but also for municipal and industrial use, exceeds long-term recharge rates. In many parts of India, Pakistan and China, the water table is sinking at the rate of one to two meters a year.

Climate change can also affect the seasonal distribution of rains and water availability. Results could include a decline in rainfall in arid and semi-arid regions, and an increase in seasonal variations in rainfall around the globe over the next 50 to 100 years.

**Vocabulary**

availability доступность

freshwater пресноводный

evenly – unevenly равномерно – неравномерно

treatment обращение, обхождение

fit –unfit годный - непригодный

shortage нехватка

pressure стесненность, затруднения

over-exploited чрезмерно эксплуатируются

sufferfrom страдать от

recharge пополнение

deforestation вырубка леса

disparity неравенство, несоответствие

expect ожидать

face встречать, сталкиваться

watertable уровень воды

deplete истощать, исчерпывать

exceed превышать, превосходить

is matched by соответствует, противостоит

1. **Find in the text the equivalents to the following word combinations:**

распределены неравномерно, угрожать поверхностным грунтовым водам, требовать дорогого обслуживания, столкнуться с серьезной нехваткой воды, из-за вырубки лесов, доступность воды, большое количество менее развитых стран, излишки воды, сезонное распределение дождей, превышать темпы восполнения, растущие темпы извлечения грунтовых вод

1. **Translate:**
2. Загрязнение угрожает поверхностным и грунтовым водам и делает их непригодными для разных видов пользования.
3. Ожидается, что одна треть стран, испытывающих недостаток воды, столкнется с серьезной нехваткой воды в нынешнем столетии.
4. Из-за неравномерного распределения воды в отдельных частях страны может быть избыток воды или ее недостаток.
5. Многие водоносные слои истощаются.
6. Во многих районах Индии и Пакистана уровень грунтовых вод понижается на 1 - 2 метра в год.
7. Климатические изменения влияют на сезонное распределение дождей.
8. Большое количество менее развитых стран испытывают серьезную нехватку воды.

**Read Text 6 and answer the question:**

* Where is the earliest dam found?

**TEXT 6**

**FROM THE HISTORY OF DAMS**

River basins are renowned as the cradles of civilization and cultural heritage. Ancient and modern communities alike have depended on rivers for livelihood, commerce, habitat and the sustaining ecological functions they provide. Throughout history alternations to rivers – natural or human generated – have affected riverine communities in one way or another.

The earliest evidence of river engineering is the ruins of irrigation canals over eight thousand years old in Mesopotamia. Remains of water storage dams found in Jordan, Egypt and other parts of the Middle East date back to at least 3000 BC.

Historical records suggest that the use of dams for irrigation and water supply became more widespread about a thousand years later. At that time, dams were built in the Mediterranian region, China and Meso America. Remains of earth embankment dams built for diverting water to large community reservoirs can still be found in Sri Lanka and Israel. The Dujiang irrigation project, which supplied 800 000 hectares in China, is 2 200 years old. Dams and aqueducts built by the Romans to supply drinking water and sewer systems for towns still exist today.

The first use of dams for hydropower generation was around 1890. By 1900, several hundred large dams had been built in different parts of the world, mostly for water supply and irrigation.

**Vocabulary**

|  |  |
| --- | --- |
| 1. renowned 2. cradle 3. heritage 4. habitat 5. alterations 6. human generated 7. riverine 8. evidence 9. ruins 10. historical records 11. remains 12. embankment 13. divert | известный, знаменитый  колыбель, истоки  наследие  среда обитания, естественная среда  изменения, перемены  произведенные человеком  речной, прибрежный  свидетельство  развалины, руины  исторические записи, документы  руины, развалины  дамба, насыпь, набережная  отводить, отклонять |

1. **Learn to recognize the following international words:**

basin, civilization, cultural, modern, community, commerce, functions, history, natural, ruin engineering, canal, dam, irrigation, project, aqueduct, hydropower generation

1. **Write three forms of the verbs:**

to depend, to affect, to find, to date back, to become, to build, to be, to use, to generate, to spread, to supply, to exist

1. **Answer the questions:**
2. Why are rivers renowned as the cradles of civilizations?
3. How old are the ruins of irrigation canals in the Middle East?
4. When did the use of dams become more widespread?
5. How old is the Dujiang irrigation project?
6. When were dams for hydropower generation used for the first time?
7. How many large dams had been built in different parts of the world by 1900?
8. **Tell your partner about the first alterations to rivers.**
9. **Find in the text the adjectives that describe the following words:**

dam, community, heritage, evidence, records, reservoirs, parts

1. **Read the sentences below. Think of synonyms for the underlined words.**

River basins are renowned as the cradles of civilization.

Dams were constructed in the Mediterranean region, China and Meso America.

Remains of water storage dams are found in Jordan, Egypt.

Remains of old dams built for diverting water to large reservoirs can be found in Sri Lanka.

**Read Text 7A and Text 7B.**

**TEXT 7A**

**ANCIENT DAMS**

**JORDAN AND EGYPTIAN DAMS**

The earliest known dam is the [Jawa Dam](http://en.wikipedia.org/wiki/Jawa_Dam_(Jordan))in [Jordan](http://en.wikipedia.org/wiki/Jordan), 100 kilometres (62 mi) northeast of the capital [Amman](http://en.wikipedia.org/wiki/Amman). This gravity dam featured an originally 9 m (30 ft) high and 1 m (3 ft 3 in) wide stone wall, supported by a 50 m (160 ft) wide earth rampart. The structure is dated to 3000 BC.

The [Ancient Egyptian](http://en.wikipedia.org/wiki/Ancient_Egypt) [Sadd-el-Kafara Dam](http://en.wikipedia.org/wiki/Sadd-el-Kafara_Dam)at Wadi Al-Garawi, located about 25 km (16 mi) south of [Cairo](http://en.wikipedia.org/wiki/Cairo), was 102 m (335 ft) long at its base and 87 m (285 ft) wide. The structure was built around 2800or 2600 BC.asa[diversion dam](http://en.wikipedia.org/wiki/Diversion_dam) for flood control, but was destroyed by heavy rain during construction or shortly afterwards. During the XIIth dynasty in the 19th century BC, the Pharaohs Senosert III, [Amenemhat III](http://en.wikipedia.org/wiki/Amenemhat_III) and Amenmehat IV dug a canal 16 km long linking the Fayum Depression to the Nile in Middle Egypt. Two dams called Ha-Uar running east-west were built to retain water during the annual flood and then release it to surrounding lands. The lake called "Mer-wer" or Lake Moeris covered 1700 square kilometers and is known today as Berkat Qaroun.

**TEXT 7B**

**ROMAN DAM CONSTRUCTION**

[Roman dam construction](http://en.wikipedia.org/wiki/Roman_dam) was characterized by "the Romans' ability to plan and organize engineering construction on a grand scale". Roman planners introduced the then novel concept of large [reservoir dams](http://en.wikipedia.org/wiki/Reservoir_dam) which could secure a permanent [water supply](http://en.wikipedia.org/wiki/Water_supply) for urban settlements also over the dry season.Their pioneering use of water-proof hydraulic [mortar](http://en.wikipedia.org/wiki/Mortar_(masonry)) and particularly [Roman concrete](http://en.wikipedia.org/wiki/Opus_caementicium) allowed for much larger dam structures than previously built, such as the [Lake Homs Dam](http://en.wikipedia.org/wiki/Lake_Homs_Dam), possibly the largest water barrier to that date, and the [Harbaqa Dam](http://en.wikipedia.org/wiki/Harbaqa_Dam), both in [Roman Syria](http://en.wikipedia.org/wiki/Roman_Syria). The highest Roman dam was the [Subiaco Dam](http://en.wikipedia.org/wiki/Subiaco_Dam) near [Rome](http://en.wikipedia.org/wiki/Rome); its record height of 50 m (160 ft) remained unsurpassed until its accidental destruction in 1305.

Roman engineers made routine use of ancient standard designs like embankment dams and masonry gravity dams. Apart from that, they displayed a high degree of inventiveness, introducing most of the other basic dam designs which had been unknown until then. These include [arch-gravity dams](http://en.wikipedia.org/wiki/Arch-gravity_dam), [arch dams](http://en.wikipedia.org/wiki/Arch_dam), [buttress dams](http://en.wikipedia.org/wiki/Buttress_dam) and [multiple arch buttress dams](http://en.wikipedia.org/wiki/Arch_dam#Variations), all of which were known and employed by the 2nd century AD. Roman workforces also were the first to build dam bridges, such as the [Bridge of Valerian](http://en.wikipedia.org/wiki/Bridge_of_Valerian) in Iran.

1. **Put the sentences into the Passive Voice where possible.**
2. In Iran bridge dams provided hydropower through water wheels.
3. The Roman-built dam bridge in Dezful could raise water 50 cubits in height for the water supply to all houses in the town.
4. The Muslim engineers introduced milling dams.
5. The Dutch capital Amsterdam started with a dam through the river Amstel in the late 12th century, and Rotterdam started with a dam through the river Rotte.
6. French engineer [Benoît Fourneyron](http://en.wikipedia.org/wiki/Beno%C3%AEt_Fourneyron) developed the first successful [water turbine](http://en.wikipedia.org/wiki/Water_turbine) in 1832.
7. Hoover Dam completed on the Colorado River in 1936 initiated the era of large dams.
8. **Translate into Russian paying attention to the meaning of the verb *to be to*:**
9. In Mesopotamia and the Middle East dams were to control the water level, for Mesopotamia s weather affected the Tigris and Euphrates rivers and could be quite unpredictable.
10. The Kallanai dam was to divert the waters on the Kaveri river across the fertile Delta region for irrigation via canals in South India.
11. Water conducted from the back of the Pul-i-Bulaiti Dam on the River Karun in Iran was to drive a water wheel and a watermill.
12. In the 10th century the Band-i-Amir in Persia was to provide irrigation for 300 villages.
13. In the Netherlands, a low-lying country, dams were often to block rivers in order to regulate the water level and to prevent the sea from entering the marsh lands.
14. **Learn to recognize the following international words:**

construct, dam, industrialized, period, phenomenal, peak, decade, dramatic, technically, nations, focus

**Read Text 8 and match the paragraphs to the headings below:**

* The Peak and Decline in the Pace of Dam Building
* Large Dams’ Big Numbers
* The Top Five Dam–building Countries

**TEXT 8**

**DAMS IN THE 20th CENTURY**

The last century saw a rapid increase in large dam building. By 1949 about 5000 large dams had been constructed worldwide, three-quarters of them in industrialized countries. By the end of the 20th century, there were over 45000 large dams in over 140 countries.

The period of economic growth following the Second World War saw a phenomenal rise in the global dam construction rate, lasting well into the 1970s and 1980s. At its peak, nearly 5000 large dams were built worldwide in the period from 1970 to 1975. The decline in the pace of dam building over the past two decades has been equally dramatic, especially in North America and Europe where most technically attractive sites are already developed. The average large dam today is about 35 years old.

The top five dam-building countries account for nearly 80% of all large dams worldwide. China alone has built around 22000 large dams, or close to half the world’s total number. Before 1949 it had only 22 large dams. Other countries among the top five building nations include the United States with over 6390 large dams; India with over 4000; and Spain and Japan with between 1000 and 1200 large dams each.

Approximately two thirds of the world’s existing large dams are in developing countries.

Construction of large dams peaked in the 1970s in Europe and North America. Today most activity in these regions is focused on the management of existing dams, including rehabilitation, renovation and optimizing the operation of dams for multiple functions. 1700 large dams have been under construction in other parts of the world in the last few years. Of this total, 40% are being built in India.

Since average construction periods generally range from 5 to 10 years, this indicates a worldwide annual average of some 160 to 320 new large dams per year.

**Vocabulary**

rise подъем

decline снижение, упадок

lasting продолжающийся

attractive привлекательный

site участок, место

top занимающий первенство

existing существующий

rehabilitation реабилитация, восстановление, реконструкция

renovation восстановление, ремонт

multiple многочисленный

range колебаться в известных пределах

annual ежегодный

1. **Answer the questions:**
2. How many dams had been constructed by the end of the 20th century?
3. When was the peak of dam construction?
4. When was the decline in the pace of dam building?
5. What countries have most dams?
6. How much time does it take to construct a dam?
7. **Find in the text the equivalents to the following word combinations:**

быстрый рост

необыкновенный подъем

темпы сооружения дамб

два десятка лет

приблизительно две трети

сооружение больших дамб

включая восстановление и обновление

управление существующими дамбами

деятельность дамб

многочисленные функции

1. **Translate into Russian:**

**GRAND DIXENCE DAM – THE 285 METER HIGH DAM**

Grand Dixence Dam is a concrete gravity dam on the Dixence in Switzerland. It is the tallest gravity dam in the world. It is 200 meters thick at the base, 285 meters high and 695 meters long. The dam’s primary purpose is producing hydroelectricity. The four power stations produce 2 billion kWh annually, enough for 400000 households. It withholds Lac des Dix, the lake which contains 400 million cubic meters of water and is up to 284 meters deep. Construction of the dam began in 1950 and was completed in 1964. Guided tours take place in the interior of the dam.

1. **Translate into English:**

**ПЛОТИНА ГУВЕРА**

Плотина Гувера (Hoover dam) – уникальное гидротехническое сооружение США. Расположено в 48км от Лас-Вегаса. Эта большая бетонная плотина, высотой 221м, сооружена в нижнем течении реки Колорадо. Плотина названа в честь 31 президента США Герберта Гувера. Строительство началось в 1931 году и закончилось в 1936 году. Сегодня электричество вырабатывают 17 генераторов мощностью 2074 МВт. Плотина является одним из семи чудес индустриального мира. Плотина Гувера – одно из самых посещаемых достопримечательностей в окрестностях Лас-Вегаса.

**ДАМБА ИНГУРИ**

Дамба Ингури расположена на реке Ингури в Грузии. Строительство дамбы началось в 1960 году и завершено в 1980 году. Это самая высокая дугообразная бетонная дамба в мире. Ее высота достигает 272 м. Мощность Ингурской ГЭС – 1300 МВт. Ингури ГЭС ежегодно вырабатывает 4430 млн. кВт-ч энергии.

**ДАМБА НАГАРДЖУНА САГАР (NAGARJUNA SAGAR)**

В 1940-х годах в Индии началась зеленая революция, целью которой было улучшение сельского хозяйства. Возведение дамбы на реке Кришна стало первым и самым крупным инфраструктурным проектом. Строительство начато в 1956 году, закончено в 1970 году. Высота дамбы 120 метров. Конструкция способна выдержать 20 млн. кубометров воды. В настоящее время считается самой крупной дамбой в Азии. Туристам будет интересно увидеть дамбу Нагарджуна Сагар, искусственное озеро и остров Нагарджуконда.

**Read Text 9 and answer the question:**

What are the benefits of large dams decommissioning?

**TEXT 9**

**DECOMMISSIONING OF LARGE DAMS**

The end of the 20th century saw the emergence of another trend – decommissioning dams that no longer serve a useful purpose, are too expensive to maintain safely, or have unacceptable levels of impacts in today’s view. Nearly 500 dams, mainly relatively old, small dams have been decommissioned in the United States.

Experience in North America and in Europe shows that decommissioning dams has enabled the restoration of fisheries and riverine ecological processes. However, dam removals without proper studies and mitigation actions cause public concerns and environmental problems. These include negative impacts on downstream aquatic life due to a sudden flush of the sediments accumulated in the reservoir. Where there has been industrial or mining activity upstream, these sediments may be contaminated with toxic substances. Another option is to open the floodgates of dams where this is possible, either as a form of decommissioning, or to allow natural river flows and unrestricted fish passage at critical times of the year.

There is little experience with the removal of larger dams. The bigger the dam, the more problems decommissioning or removal are likely to face, and the more expensive they are likely to be. More studies are needed to address the costs, benefits and impacts of decommissioning.

**Vocabulary**

decommissioning списывание, перевод в резерв, вывод из эксплуатации

maintain поддерживать, обслуживать

unacceptable неприемлемый

enable давать возможность, право

restoration восстановление, реконструкция

fisheries рыбные места, рыболовство

mitigation смягчение, уменьшение

concern беспокойство, участие, интерес, озабоченность

flush прилив, приток

sediment осадок

downstream вниз по течению, низовая часть плотины

contaminate загрязнять, заражать

upstream против течения, вверх по течению

floodgates шлюз, шлюзные ворота

unrestricted неограниченный

removal удаление, снос

benefits выгода, польза

1. **Guess the meaning of the following words:**

process, negative, aquatic, accumulate, toxic, critical, option, address, restoration, public, action, activity

1. **Find in the text the equivalents to the following word combinations:**

вывод дамб из эксплуатации

больше не служат

неприемлемый уровень воздействия

без тщательного исследования

смягчающие действия

отрицательное влияние

вызывать общественную озабоченность

осадки, накопившиеся в резервуаре

зараженные токсическими веществами

открыть шлюзы

неограниченный путь рыб

рассмотреть расходы, пользу и недостатки

1. **Answer the** **questions:**
2. Why were some large dams decommissioned at the end of the 20 th century?
3. What does the experience in North America and in Europe show?
4. What problems can decommissioning face?
5. What steps should be taken to start decommissioning?

**Read Text 10.**

**TEXT 10**

**TYPES OF LARGE DAMS**

There are various definitions of large dams. The International Commission on Large Dams (ICOLD), established in 1928, defines a large dam as a dam with a height of 15 m or more from the foundation. If dams are between 5 – 15m high and have a reservoir volume of more than 3 million m3, they are also classified as large dams. Using this definition, there are over 45000 large dams around the world.

The two main categories of large dams are reservoir type storage projects and run-of-river dams that often have no storage reservoir and may have limited daily pondage. Within these general classifications there is considerable diversity in scale, design, operation and potential for adverse impacts.

Reservoir projects impound water behind the dam for seasonal, annual and, in some cases, multi-annual storage and regulation of the river.

Run-of-river dams (weirs and barrages, and run-of-river diversion dams) create a hydraulic head in the river to divert some portion of the river flows to a canal or power station.

**Vocabulary**

definition определение

establish основывать, создавать, учреждать

height высота

volume объем

run-of-river dams сточные дамбы, водопропускные плотины

pondage емкость пруда, резервуара

diversity разнообразие

adverse неблагоприятный

impound запруживать

weir плотина, запруда, водослив

barrage плотина, запруда

hydraulic head гидравлический напор, гидроузел

1. **Find in the text the equivalents to the following word combinations:**

разные определения

две главные категории

водохранилищные дамбы

спускные дамбы

многообразие размеров, дизайна и действия

неблагоприятное влияние

создавать гидравлический напор

отводить некоторую часть речного потока

1. **Answer** **the** **questions:**
2. What is the definition of a large dam?
3. What are the main categories of large dams?
4. How many large dams are there around the world?
5. What is the aim of the reservoir projects?
6. What is the purpose of run-of-river dams?
7. **Translate:**
8. Большие дамбы имеют высоту 15 и более метров от основания.
9. Большие дамбы бывают двух видов: водохранилищные и спускные.
10. Дамбы также различаются по размеру, дизайну, действию и по степени воздействия на окружающую среду.
11. Водохранилищные дамбы запруживают воду для сезонного, годичного и многолетнего хранения воды и регулирования рек.
12. Спускные дамбы создают гидравлический напор в реке для отвода части речного стока в каналы и на гидростанцию.

**Read Text 11.**

**TEXT 11**

**LARGE DAMS AS INSTRUMENTS OF DEVELOPMENT**

Dams have been promoted as an important means of meeting needs for water and energy services and as long-term, strategic investments with the ability to deliver multiple benefits.

Regional development, job creation and fostering and industry base with export capability are most often cited as additional considerations for building large dams. Other goals include creating income from export earnings, either through direct sales of electricity, or by selling cash crops or processed products from electricity intensive industry such as aluminium refining.

Water-rich countries such as Canada, Norway, Brazil and parts of Russia have developed large dams for hydropower generation where suitable sites were available. Governments in semi-arid countries such as South Africa, Australia and Spain have tended to build dams with large storage capacity to match water demand with stored supply, and for security against the risk of drought. For example, in Spain – one of the top five dam-building countries – rainfall is highly variable between seasons and from year to year.

In East and Southeast Asia, during the monsoon season, rivers swell to over 10 times the dry season flow. In these settings dams have been constructed to capture and store water during wet seasons for release during dry seasons.

Large dams require significant financial investments. Estimates suggest a worldwide investment of at least two trillion US dollars in the construction of large dams over the last century. During the 1990s, an estimated $32-46 billion was spent annually on large dams6 four-fifths of it in developing countries. Of the $22-31 billion invested in dams each year in developing countries, about four-fifths was financed directly by the public sector.

Today the world’s large dams regulate, store and divert water from rivers for agricultural production, human and industrial use in towns and cities, electricity generation, and flood control. Dams have been constructed to a lesser extent to improve river transportation and ,once created for other purposes, the reservoirs of many large dams have been used for recreation , tourism , and aquaculture.

About one third of large dams serve two or more purposes. Recent trends have favoured multi-purpose dams.

The majority of large dams in Africa and Asia are for irrigation, though large dams are more often than not multi-purpose. There is growing interest in dams for flood protection and in pumped storage dams for power generation to meet peak demand in Asia. Single-purpose hydropower dams are most common in Europe and South America, whereas single-purpose water supply projects dominate in Austral-Asia. North America has a relatively even spread of large dam functions. All other potential purposes, including recreation and navigation, were found in less than 5% of projects.

**Vocabulary**

|  |  |
| --- | --- |
| 1. Promote 2. deliver 3. capability 4. fostering 5. goal 6. create 7. earnings 8. сashcrop 9. electricity intensive industry 10. suitable 11. processed products 12. semi-arid 13. drought 14. capture 15. recreation 16. favour 17. pumped storage dams 18. single-purpose 19. multi-purpose 20. relatively even 21. spread | выдвигать, способствовать, позиционировать  доставлять  способность  поощрение, воспитание  цель  создавать  заработок, доход  сельскохозяйственная товарная структура  энергоемкая промышленность  подходящий  продукты переработки  полузасушливый  засуха  захватить, забрать  отдых, развлечение  благоприятствовать  насосные водохранилища  единственная цель  многоцелевой  относительно ровный  распространение |

1. **Find in the text the adjectives that describe the following words:**

means sites

investments interest

benefits purposes

industry dams

sales

1. **Answer** **the** **questions:**
2. What are the main considerations for building a large dam?
3. What is the aim of large dams in water-rich countries? In semi-arid countries?
4. In what region are single-purpose hydropower dams common?
5. **Translate into English:**
6. Плотины – это важное средство для удовлетворения растущих потребностей в воде и энергообеспечении.
7. Плотины возводятся для накопления воды в период дождей и ее использования во время засухи.
8. Крупные плотины требуют значительных финансовых вложений.
9. В настоящее время крупные дамбы регулируют, накапливают и отводят речную воду для производства сельхозпродукции, бытовых и промышленных нужд и защиты от паводков.
10. **Guess the meaning of the following words and word combinations:**

security, production, green revolution, food security, post green revolution period, exclusively, hectare, typically, control of the resource, balance, salinity, affect, types, extraction

**Read Text 12.**

**TEXT 12**

**IRRIGATION WATER SUPPLIED FROM LARGE DAMS**

Irrigation is the single largest consumptive use of fresh water in the world today. It is linked to food production and food security. About one fifth of the world’s agricultural land is irrigated and irrigated agriculture accounts for about 40% of the world’s agricultural production. The total area irrigated expanded dramatically during the first years of the green revolution in the 1960s, increasing yields and bringing down food prices. From 1970 to 1982, global growth in the irrigated area slowed to 2%a year. In the post green revolution period between 1982 and 1994 it declined to an annual average of 1.3%.

Half the world’s large dams were built exclusively or primarily for irrigation, and an estimated 30 to 40% of the 268 million hectares of irrigated lands worldwide rely on dams. Ground water irrigation typically has higher yields, for a given amount of water, than surface water irrigation because of better control of the resource at farm level.

Four countries – China, India, United States and Pakistan account for more than 50% of the world’s total irrigated area. Dams supply the water for almost 100% of irrigated production in Egypt – most coming from the Aswan High Dam – while in Nepal and Bangladesh dams provide only 1% of irrigation water. In the two countries with the largest irrigated areas – India and China- official statistics suggest large dams supply approximately 30 to 35% of irrigation water, with the balance coming mainly from ground water sources.

Unsustainable irrigation practices have affected more than a fifth o the world’s irrigated area in arid and semi-arid regions. As a result, soil salinity and waterlogging either make agriculture impossible, or limit yields and the types of crop that can be grown. In other regions, over-use of tubewells has depleted ground water aquifers, lowering water tables and making extraction increasingly expensive and especially difficult for small-holders.

**Vocabulary**

expand расширяться

security гарантия

yield урожай

slow замедляться

primarily прежде всего, главным образом

level уровень

salinity соленость

waterlogging затопление, заболачивание

overuse of tubewells чрезмерная откачка воды из скважин

deplete ground water aquifers истощать пласты подземных вод

lower water tables понижать уровень воды

extraction извлечение, добывание, водозабор

small-holder мелкий собственник, мелкий арендатор,

землевладелец

1. **Answer the questions:**
2. What part of the world’s land is irrigated today?
3. In what country do dams supply the water for 100% of irrigated production?
4. What dam is Egypt famous for?

**Focus**

|  |  |
| --- | --- |
| billions of people  hundreds millions of stars  thousands of people  thousands of books | six billion people  five million dollars  six thousand cars  three hundred letters |
| 1. Millions of books are collected in the best libraries of the world. 2. World population has passed 7 billion people. | |

1. **Express** **in** **English**:

а) миллионы гектаров, тысячи лет, сотни озер, сотни городов, миллионы людей,

миллиарды людей;

b) 268 миллионов гектаров, 2 тысячи лет, пятьсот видов, сто процентов, 7 миллиардов людей, 27 тысяч рублей, двести городов, 2 миллиона людей.

1. **Translate into English, paying attention to Passive Voice:**

**АСУАНСКАЯ ПЛОТИНА**

Асуанская плотина (Aswan Dam) – крупнейшее гидротехническое сооружение в Египте на реке Нил высотой 111 метров, длиной 3,6 км и шириной 1 км. Ее называют пирамидой XX века. Она построена из местного гранита, песка и гравия. Водохранилища называют озером Насера. Вода из озера Насер используется для полива сельскохозяйственных земель. Асуанская плотина считается одной из главных достопримечательностей Египта.

**Read Text 13 and answer the questions.**

1. How many large dams were build as water supply dams?
2. What is the share of hydropower in the world’s total electricity supply?
3. Why was hydropower especially attractive to governments with limited fossil fuel resources?

**TEXT 13**

**WATER FOR INDUSTRIAL USE AND URBAN CENTRES**

Globally, urban water consumption accounts for 7% of total freshwater withdrawals from rivers and 22% from lakes. Many reservoirs were built to provide a reliable supply of water to meet rapidly growing urban and industrial needs, especially in drought-prone regions where natural ground water sources and existing lakes or rivers were considered inadequate to meet all needs. Globally, about 12% of large dams are designated as water supply dams. About 60% of these dams are in North America and Europe.

The extent to which cities rely on dams and reservoirs for urban and industrial water varies greatly even within countries. In the Saxony region of Germany, reservoirs provide 40% of the water supplied to two million people, while Los Angeles derives 55% of its water supply from local ground water resources and 37% from a system of reservoirs and pipelines that bring water from more distant locations. Ho Chi Minh City in Vietnam gets 89% of its water from surface sources, whereas Hanoi gets 100% from ground water.

**Vocabulary**

water supply dams плотины, предназначенные для водоснабжения

reliable надежный

drought-prone склонный к засухе

consider считать, рассматривать

designate предназначать

extent степень, мера

location район

whereas тогда как

1. **Find in the text the adjectives that describe the following words:**

reason technology

purpose use of water

function life

electricity scale

amount levels of hydropower generation

source

1. **Translate into English:**
2. Сегодня плотина Гувера является важным источником водоснабжения всей Южной Калифорнии.
3. Иваньковская бетонная плотина на Волге образует огромное водохранилище – Московское море длиной 130 км и шириной 12 км. Водохранилище вмещает 1 миллиард 120 миллионов кубометров воды. Его основная задача – снабжать водой Восточную водопроводную станцию Москвы.
4. Для водоснабжения новых районов Москвы была построена еще одна Северная станция.

**Read text 14.**

**TEXT 14**

**ELECTRICITY GENERATION**

Electricity generation is an important reason for building large dams in many countries, either as the primary purpose, or as an additional function where a dam is built for other purposes. Over the last 22 years, global electricity production has more than doubled, though access is highly skewed between and within countries.

Hydropower currently provides 19% of the world’s total electricity supply and is used in over 150 countries. It represents more than 90% of the total national electricity supply in 24 countries and over 50% in 63 countries. About a third of the countries in the world currently rely on hydropower for more than half of their electricity needs. Five countries – Canada, United States, Brazil, China and Russia – account for more than half the world’s hydropower generation. Between 1973 and 1996 hydropower generation in non-OECD countries grew from 29 to 50% of world production, with Latin America increasing its share by the greatest amount in that period.

Hydropower has been perceived and promoted as a comparatively clean, low-cost, renewable source of energy. Except for reservoir evaporation, it is a non-consumptive use of water. Once built, hydropower, like all renewable sources, is considered to have low operating costs and a long life, particularly for run-of-river projects and reservoir projects where sedimentation is of no concern. In the past, hydropower was especially attractive to governments with limited fossil fuel resources, who would otherwise have had to import fossil fuels to sustain power generation. At the global scale, current levels of hydropower generation offset 4.4 million barrels of oil-equivalent (thermal electric generation) a day, roughly 6% of the world’s oil production.

**Vocabulary**

reason причина

double удвоиться

skew отклоняться

represent представлять

currently внастоящеевремя

renewable source of energy возобновляемый источник энергии

non-consumptive use of water безвозвратноe использование воды

low operating costs низкие эксплуатационные затраты

a long life длительный срок службы

of no concern отсутствует проблема, не важно

limited fossil fuel resources ограниченные запасы ископаемого топлива

otherwise иначе

offset сводить баланс, составлять

barrel баррель

roughly 6% примерно 6%

current level текущий уровень

thermal electric generation производство тепловой энергии

**Focus**

read + -er = reader sell + -er = seller

write + - er = writer produce + -er = producer

protect + -tion = protection populate + -tion= population

pollute + -tion = pollution cooperate + -tion = cooperation

develop + -ment = development white + -ness = whiteness

govern + -ment = government fresh + -ness = freshness

water + -less = waterless easy + -ly = easily

home + -less = homeless clear + -ly = clearly

1. **a) What nouns can you form from the following verbs and adjectives?**

1. To speak, to buy, to destroy, to create, to dump.

2. Calm, soft, ready, dark.

3. To generate, to produce, to evaporate, to develop, to operate, to cooperate.

1. **What adverbs can you form from the following adjectives with the help of the suffix –ly?**

High, current, total, comparative, particular, especial, rough.

1. **Answer** **the** **questions:**
2. Why is hydropower an important reason for building dams?
3. Why was hydropower especially attractive for governments with limited fossil fuel resources?
4. **Translate into English:**
5. Самые большие ГЭС в мире находятся в Китае, Бразилии и Венесуэле.
6. Благодаря гидроэлектростанциям на реках Черчил и Нельсон, Ла-Гранд и Маникуаган Канада входит в число крупнейших производителей гидроэлектроэнергии в мире.
7. Гидроэлектростанции Канады дают 62% всей вырабатываемой энергии в этой стране.
8. В Бразилии доля гидроэнергии составляет 86%.
9. В Китае и США эти показатели составляют 15% и 17% соответственно.
10. Россия располагает большим гидроэнергетическим потенциалом, занимая второе место в мире после КНР по обеспеченности гидроэнергетическими ресурсами.

**Read Text 15.**

**TEXT 15**

**PROTECTING AGAINST FLOODS**

While natural floods have many beneficial functions they also pose a threat to life, health, livelihoods, and property. They remain among the world’s most frequent and damaging disasters. Floods affected the lives, on average, of 65 million people between 1972 and 1996, more than any other type of disaster, including war, drought and famine. During the same period, an estimated 3.3 million people were left homeless every year as a result of floods.

About 13% of all large dams in the world – in more than 75 countries – have a flood management function. Although dams have historically been extensively used as a defence against floods, recent approaches see flood protection as more than building defences against rising waters. For instance, reporting on the 1998 flood, Chinese authorities acknowledged that its severity was partly due to long-term environmental degradation and heavy logging throughout the affected watersheds. There are also cases where dams have created or worsened floods due to dams breaks, poor reservoir operation and changed downstream sedimentation patterns that reduce river channel capacity.

**Vocabulary**

beneficial выгодный, полезный

pose a threat ставить под угрозу, угрожать

famine голод

extensively широко

authorities власти

approach подход

for instance например

acknowledge признавать, допускать

environmental degradation ухудшение состояния окружающей среды

severity трудности, тягости

log, logging заболачивание

worsen ухудшать

pattern структура, характер, образец

1. **Answer the questions:**
2. What threat did floods bring to people during the period between 1972 and 1996?
3. How many large dams have a flood management function?
4. Were there any cases where dams worsened floods?
5. **Translate into English:**

1. C незапамятных времен жизнь египтян зависела от наводнений.

2. Благодаря Асуанской дамбе впервые удалось установить контроль над половодьем Нила.

3. Плотина Форт-Пек – самая крупная плотина на реке Миссури. Плотина включает в себя дамбу для защиты от наводнений и гидростанцию.

4. Водохранилище крупнейшей в мире ГЭС «Три ущелья» на реке Янцзы имеет большое противопаводковое значение.

5. Создание Волжского каскада ГЭС с двумя водохранилищами практически полностью решило проблему борьбы с наводнениями на Волге.

1. **Translate** **into** **English,** **paying** **attention** **to** **the** **word** **due:**
2. Italy: In 1985 tailings dams built to store waste from fluorite mining failed due to poor design and extreme water pressure.
3. A third of water freshwater species are threatened or extinct due to water pollution, dams and diversions.
4. Due steps should be taken to prevent a repeat of flooding.
5. The article proves that these critical conditions are not due to the rainfall, but due to poor water management decisions.
6. Due steps have been taken at both the national and regional levels to reduce damage and the risk of injury.

**Read Text 16.**

**TEXT 16**

**PHYSICAL TRANSFORMATION OF RIVERS**

Large dams have fragmented and transformed the world’s rivers. The World Resources Institute found that at least one dam modifies 46% of the world’s 106 primary watersheds. The extent to which river flows have been changed varies around the world. The United States and the European Union regulate the flow of 60 – 65% of the rivers in their territories, though the amount varies from basin to basin. Spain’s 53 km3 of storage behind large dams regulates 40% of its river flow, varying from 71% in the Ebro river basin, to 11% in the basins on the Galicia coast. In Asia, just under half rivers that are regulated have more than one large dam.

The modification of river flows on trans-boundary rivers has particular implications. There are 261 watersheds that cross the political boundaries of two or more countries. These basins cover about 45% of the earth’s land surface, account for about 80% of global river flow and affect about 40% of the world’s population.

The aggregate storage capacity of large dams, based on dam design, is about 6000 km3. Assuming that half the design storage is achieved in reality, the aggregate real storage capacity of large dams globally is similar to total freshwater withdrawals estimated at around 38000 km3.

As estimated 0.5 -1% of the total fresh water storage capacity of existing dams is lost each year to sedimentation in both large and small reservoirs worldwide. This means that 25% of the world’s existing fresh water storage capacity may be lost in the next 25 to 50 years in the absence of measures to control sedimentation. This loss would mostly be in developing countries and regions, which have higher sedimentation rates.

**Vocabulary**

|  |  |
| --- | --- |
| 1. Vary 2. coast 3. fragment 4. modify 5. trans-boundary rivers 6. boundary 7. implication 8. capacity 9. the Ebro 10. loss 11. aggregate storage capacity 12. sedimentation 13. assume 14. design storage | Варьироваться  побережье  разбить на куски  видоизменять  пограничные реки, трансграничные реки  граница  вовлечение, значение  мощность  Эбро - самая полноводная река Испании  потеря  совокупная емкость водохранилищ  донные отложения  предположить, допустить  расчетная емкость |

1. **Guess the meaning of the following words:**

fragment, transform, modification, vary, regulate, basin, cross, global, reality, measure

1. **Find in the text the equivalents to the following word combinations:**

институт мировых ресурсов

регулировать сток

объем изменяется от бассейна к бассейну

бассейны побережья Галисии

на половине зарегулированных рек

изменение стока трансграничных рек

политические границы двух стран

реально заполняется половина расчетной емкости

Ежегодно теряется из-за донных отложений

Отсутствие мер по контролю за донными отложениями

1. **Answer** **the** **questions:**
2. What percentage of river flows do the USA regulate?
3. What is the aggregate storage capacity of large dams globally?
4. What is the reason of fresh water storage capacity loss?

**Read Text 17.**

**TEXT 17**

**RIVERINE ECOSYSTEMS IMPACTS**

Growing threats to the ecological integrity of the world’s watersheds come from rising populations, water pollution, deforestation, withdrawals of water for irrigation and municipal water supply and the regulation of water flows resulting from the construction of large dams. Among the many factors leading to the degradation of watershed ecosystems, dams are the main physical threat, fragmenting and transforming aquatic and terrestrial ecosystems with a range of effects that vary in duration, scale and degree of reversibility.

The watersheds of the world are the habitat of 40% of the world’s fish species, and provide many ecosystem functions ranging from nutrient cycling and water purification to soil replenishment and flood control. At least 20% of the world’s more than 9000 fresh water fish species have become extinct, threatened or endangered in recent years.

Fish are a critical source of animal protein for more than 1 billion people. In Africa, fish protein is 21% of the total animal protein in the diet, and in Asia it is 28%. While rivers supply about 6% of fish protein consumed by humans globally, it is often 100% of the supply for many inland riverine communities.

Ecosystem transformations do not only occur in the upper, lower and mid-reaches of watersheds, they also impact on river estuaries, which are frequently complex ecosystems. Closing the mouths of major rivers, salt intrusion, destruction of mangroves and loss of wetlands are among the many issues at stake.

**Vocabulary**

nutrient cycling круговорот питательных веществ

duration продолжительность

soil replenishment обеспечение плодородия почв

freshwater fish species виды пресноводных рыб

extinct вымерший

threatened исчезающий

endangered находящиеся под угрозой исчезновения

upper, lower and mid-reaches верхние, нижние и средние

of watersheds звенья речной сети

сlosing the mouths обмеление устье в рек

salt intrusion засоление

destruction of mangroves уничтожение мангровых зарослей

among the many issues at stake среди острых проблем

1. **Find in the text the equivalents to the following word combinations:**

воздействие на речные экосистемы

экологическая целостность водосборных бассейнов

водозабор для орошения

деградация экосистем речных бассейнов

основная угроза

продолжительность, масштаб и степень обратимости

важный источник животного белка

сообщества, живущие на берегах рек вдали от моря

1. **Guess** **the** **meaning** **of** **the** **following** **words**:

Integrity, physical, fragmenting, aquatic, scale, protein, diet, globally, riverine community, intrusion, transformation.

1. **Read** **the** **word** **combinations** **and** **give** **their** **Russian** **equivalents**:

The factors leading to degradation, many functions ranging from… to, fish protein consumed by humans, the threats coming from water pollution, water flows resulting from the construction of large dams, transformations occurred in the upper watersheds, the aggregate storage capacity based on dam design.

1. **Answer** **the** **questions:**
2. What factors lead to degradation of watershed ecosystems?
3. What ecosystem functions do the watershed of the world have?
4. Where do ecosystem transformations occur?

**Read Text 18.**

**TEXT 18**

**SOCIAL CONSEQUENCES OF LARGE DAMS**

While many have benefited from the services large dams provide, their construction and operation have led to many significant6 negative social and human impacts. The adversely affected populations include directly displaced families, host communities where families are resettled, and riverine communities, especially those downstream of dams, whose livelihood and access to resources are affected in varying degrees by altered river flows and ecosystem fragmentation. More broadly, whole societies have lost access to natural resources and cultural heritage that were submerged by reservoirs or rivers transformed by dams.

The construction of large dams has led to the displacement of some 40 to 80 million people worldwide, as shown in Chapter 4. Many of them have not been resettled or received adequate compensation, if any. Between 1986 and 1993, an estimated 4 million people were displaced annually by an average of 300 large dams starting construction each year. These figures only give an idea of the size of the problem, since there are enormous variations from case to case.

The scale and range of social issues encountered in the river basins altered by large dam construction vary from region from region. The number of people deriving their livelihoods directly from the river and its ecosystem, and the overall population density in the river basin, gives an indication of the potential impacts.

The world’s two most populous countries – China and India, have built around 57% of the world’s large dams – and account for the largest number of people displaced. In the late 1980s China officially recognized some 10.2 million people as ‘reservoir resettlers’, though other sources suggest the figure may be substantially higher. Large dams and reservoirs already built in the Yangtze basin alone have led to the relocation of at least 10 million people. In India, estimates of the total number of people displaced due to large dams vary from 16 to 38 million people.

In China, large dams are estimated to have displaced an estimated 27% of all people displaced by development projects (the total includes people displaced by urban expansion, roads and bridges). In India the figure is 77% (this total excludes people displaced by urban development). Among World Bank funded projects involving displacement, dams and reservoirs accounted for 63% of people displaced.

**Vocabulary**

displaced подвергшиеся перенаселению

submerge затапливаться

in varying degrees в разной степени

resettle переселить

figures цифровые данные

encounter встретиться, сталкиваться

derive происходить

density плотность

account for объяснять

urban expansion строительство городов

recognize признать

relocation переселение

exclude исключать

1. **Find in the text the equivalents to the following word combinations:**

серьезные негативные последствия

семьи, подвергшиеся переселению

сообщества, принимающие переселенцев

разделение экосистем

терять возможность пользоваться природными ресурсами

утрата культурных ценностей

масштаб и диапазон социальных проблем

источники существования напрямую зависят от реки и ее экосистемы

по оценочным данным

проекты, финансируемые Всемирным банком

1. **Say which of them can be:**

a country natural, cultural, populous, large, urban, adequate, social,

a dam enormous, potential

heritage

a resource

compensation

an impact

expansion

1. **Write the opposites using the words in the box:**

Positive, indirect, upstream, in the narrowest sense, tiny, small, die, include

large

broadly

negative

direct

exclude

live

downstream

enormous

**APPENDIX**

**Water Quiz (answers)**

1. Water is made up of Hydrogen and Oxygen and is known as H2O. H2O also indicates that in every molecule of water there are two parts of Hydrogen and one part of Oxygen.
2. More than 99 per cent of all water on earth is either saltwater in oceans and seas (97.24 per cent) or frozen in icecaps and glaciers (2.14 per cent). Less than half the remaining 0.3 per cent is available for human use, and even some of that is difficult to access.
3. About three-fourth of the earth's surface is covered by water. It may seem as though we have more water than we need. But let's take a closer look. Almost all of the earth's water is salty (about 97 per cent). This means that less than 3 per cent of the earth's water is fresh water. And 2 per cent out of this 3 per cent is locked up in glaciers.
4. The energy that is created by water flowing through the turbines in a dam is called hydroelectric energy.
5. The natural cycle of water is called the Hydrological cycle, continually changing from liquid water to water vapour and water vapour to ice.
6. The human body contains 80 per cent water. So when you don't get any water to drink, you start feeling weak and tired.
7. On Earth, water boils at 212 degrees Fahrenheit or 100 degrees centigrade.
8. British poet Samuel Taylor Coleridge wrote these lines in his epic poem, The Rime of the Ancient Mariner. The poem was first published between 1797 and 1798.
9. Indra, the chief of the Vedic Gods, is also known as the rain God of India. His most prominent weapons are lightning and thunderbolt.
10. Jupiter is the sky God in Roman mythology. In ancient times Jupiter was worshipped with a particular ritual to send rain in the time of drought.
11. In ancient Greek religion, Zeus was the weather God. He was regarded as the sender of thunder and lightning and rain and winds.
12. Antarctica is the driest continent on Earth. Although Antarctica is covered in ice, it is a desert and receives little precipitation.
13. Water pollution comes from many different sources, even from places like farms.

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