Министерство сельского хозяйства
Российской Федерации

ФГБОУ ВО «Кубанский государственный аграрный
университет имени И. Т. Трубилина»

Н. Н. Тарасенко

ВОДА – ИСТОЧНИК

ЖИЗНИ НА ЗЕМЛЕ

Учебное пособие

Краснодар

КубГАУ

2017

**УДК 811.111:556 (075.8)**

**ББК 81.432.1**

**Т19**

**Рецензенты:**

**И. Н. Сухомлина –** доцент кафедры английской
филологии, канд. филол. наук
(Кубанский государственный университет);

**М. А. Батурьян** – доцент кафедры иностранных языков

Кубанского государственного аграрного университета,
канд. филол. наук

**Тарасенко Н. Н.**

**Т19** Вода – источник жизни на земле : учеб. пособие / Н. Н. Тарасенко. – Краснодар : КубГАУ, 2017. – 110 с.

**ISBN 978-5-00097-450-6**

Учебное пособие разработано в соответствии с программой по иностранным языкам для неязыковых вузов.

Даны задания на английском языке для закрепления и применения лексико-грамматического материала, а также тексты для перевода и общего понимания, упражнения и задания на развитие устной речи.

Предназначено для самостоятельной работы студентов-бакалавров факультета «Гидромелиорация»

**УДК 811.111: 556 (075.8)**

**ББК 81.432.1**

© Тарасенко Н. Н., 2017

© ФГБОУ ВО «Кубанский

государственный аграрный

университет имени

**ISBN 978-5-00097-450-6** И. Т. Трубилина», 2017

**ПРЕДИСЛОВИЕ**

Учебное пособие предназначено для самостоятельной работы студентов-бакалавров факультета «Гидромелиорация», обучающихся по специальности 20.03.02. «Природообустройство и водопользование» и рассчитано на лиц, имеющих базовую подготовку по английскому языку, овладевших лексическим и грамматическим минимумом для осуществления речевой деятельности в ситуациях социально-бытовой сферы общения.

Целью пособия является развитие речевой профессиональной деятельности на английском языке во внеурочное время. Реализация этой цели осуществляется благодаря специально подобранным аутентичным текстам, содержание которых полностью соответствует тематике учебной программы. Тексты пособия не адаптированы, взяты из современных источников и отражают богатство и разнообразие современного английского языка.

Пособие состоит из раздела «Грамматика», включающего теоретический материал и таблицы по грамматике, и восьми практических разделов, каждый из которых состоит из “READING”, “SPEAKING” и “GRAMMAR”.

“REAGING” включает в себя тексты разного уровня трудности, что даёт возможность преподавателю учитывать индивидуальные особенности студентов при выборе домашнего задания. Тексты предназначены для развития умения читать и понимать их содержание без словаря, а также умения перевода со словарём.

“SPEAKING”содержит диалоги, кейс-задания или вопросы для обсуждения с партнером, целью которых является развитие навыков говорения.

“GRAMMAR” состоит из упражнений по грамматике, способствующих более глубокому закреплению материала, пройденному на занятиях.

**ГРАММАТИКА**

**Времена активного залога (Active Voice)**

Активный залог в английском языке (в русском – действительный) – это одна из двух грамматических категорий, которая используется в том случае, если подлежащее является исполнителем действия над сказуемым. Это понятие напрямую связано с образованием времен с помощью особых форм глаголов. Иными словами, в активном залоге подлежащее само выполняет некое действие.

Для активного залога характерно наличие всех 12 временных форм глагола, каждая из которых выражает активное действие подлежащего. В таблице 1времен английского языка систематизированы правила образования различных временных форм активного залога.

Таблица 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Indefinite** | **Continuous** | **Perfect** | **Perfect****Continuous** |
|  | 1 | 2 | 3 | 4 |
| **Present** | I askHe askWe askYou askThey ask | I am askingHe is askingWe are askingYou are askingThey are asking | I have askedHe has askedWe have askedYou have askedThey have asked | I have been askingHe has been askingWe have been askingYou have been askingThey have been asking |
| Do I ask? | Am I asking? | Have I asked? | Have I been asking? |
| I do not ask | I am not asking | I have not asked | I have not been asking |
|  | 1 | 2 | 3 | 4 |
| **Past** | I askedHe askedWe askedYou askedThey asked | I was askingHe was askingWe were askingYou were askingThey were asking | I had askedHe had askedWe had askedYou had askedThey had asked | I had been askingHe had been askingWe had been askingYou had been askingThey had been asking |
| Did I ask? | Was I asking? | Had I asked? | Had I been asking? |
| I did not ask | I was not asking | I had not asked | I had not been asking |
| **Future** | I shall (will) askHe will askWe shall askYou will askThey will ask | I shall be askingHe will be askingWe shall be askingYou will be askingThey will be asking | I shall have askedHe will have askedWe shall have askedYou will have askedThey will have asked | I shall have been askingHe will have been askingWe shall have been askingYou will have been askingThey will have been asking |
| Shall I ask? | Shall I be asking? | Shall I have asked? | Shall I have been asking? |
| I shall not ask | I shall not be asking | I shall not have asked | I shall not havebeen asking |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | 1 | 2 | 3 | 4 |
| **Future** | I shall (will) askHe will askWe shall askYou will askThey will ask | I shall be askingHe will be askingWe shall be askingYou will be askingThey will be asking | I shall have askedHe will have askedWe shall have askedYou will have askedThey will have asked | I shall have been askingHe will have been askingWe shall have been askingYou will have been askingThey will have been asking |
| Shall I ask? | Shall I be asking? | Shall I have asked? | Shall I have been asking? |
| I shall not ask | I shall not be asking | I shall not have asked | I shall not havebeen asking |
| **Future in the Past** | I should askHe would askWe should askYou would askThey would ask | I should be askingHe would be askingWe should be askingYou would be askingThey wouldbe asking | I should have askedHe would have askedWe should have askedYou would have askedThey would have asked | I should have been askingHe would have been askingWe should have been askingYou would have been askingThey would have been asking |
| I should not ask | I should not be asking | I should not have asked | I should not have been asked |

Отрицательная форма глагола во всех временах образуется при помощи отрицательной частицы **not**, которая ставится после вспомогательного глагола, а при сложной форме самого вспомогательного глагола – после первого вспомогательного глагола. В отрицательной форме в Present Indefinite употребляется вспомогательный глагол **to do** в форме настоящего времени, в Past Indefinite – **did** (форма прошедшего времени глагола **to do**) I do not write.

I am not writing.

I did not write.

I have not written.

I shall/will not write.

I have not been writing.

Вопросительная форма глагола во всех временах образуется вынесением вспомогательного глагола на место перед подлежащим. В Present и Past Indefinite употребляется вспомогательный глагол **to do**. Если форма вспомогательного глагола сложная, перед подлежащим ставится первый вспомогательный глагол: Do I write?

Have I written?

Did I write?

Shall/Will I be writing?

Shall/Will I write?

Have I been writing?

Am I writing?

Вопросительно-отрицательная форма глагола во всех временах образуется следующим образом:

вспомогательный глагол ставится перед подлежащим, а частица **not** - после подлежащего:

Do I not write?

Did I not write?

Have I not been writing?

**Характеристика действия**

В таблице 2 времен английского языка систематизированы правила употребления различных временных форм активного залога.

Таблица 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Как?** | **Когда?** | **Примеры** | **Вопрос – краткий ответ** |
| 1 | 2 | 3 | 4 | 5 |
| **Present** **Indefinite** | 1. Обычное, регулярное, повторяющееся действие; факт.2. Будущее действие, связанное с графиком, расписанием | Usually, generally, always, never, often, seldom, every day, sometimes | The earth **moves** round the Sun.She **does not live** in London.I **work** every day.The next train **leaves** in an hour. | **Do** you study? – Yes, I **do**.**Does** your sister study? – No, she **doesn’t.** She works. |
| **Present Continuous** | Действие происходит в момент речи | Now, at the moment | He **is asking** a question now. | **Is** he **asking** a question now**?** **–** Yes, he **is**. |
| **Present** **Perfect** | Действие совершилось к моменту речи, есть результат | Already, just, yet, recently, lately, ever, never | I **have** already **finished** my work. | **Have** you **read** the paper yet? – No, I **haven’t.** |
|  |  |  |
|  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 |
| **Present** **Perfect** **Continuous** | Действие, которое началось в прошлом, продолжалось в течение некоторого времени и либо закончилось или все еще продолжается в момент разговора. | Since, for | She **has been cleaning** the room since morning (for three hours). | **Have** you **been living** here for a long time? – Yes, I **have**. |
| **Past** **Indefinite** | Действие происходило в прошлом | Last (week, month, year), yesterday, ago | We **met** him two days ago. | **Did** you **travel** last summer? – No, I **didn’t**. |
| **Past** **Continuous** | Действие происходило в определенный момент в прошлом | 1) At 5 o’clock yesterday2) When the phone rang | I **was taking** a shower when the phone rang | **Were** you **doing** homework at 8 p.m. yesterday? – No, I **wasn’t** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 |
| **Past** **Perfect**  | Действие завершилось к определенному моменту в прошлом или совершилось раньше другого действия в прошлом | 1) By last month, by 6 o’clock yesterday;2) Before, after | They **had built** the house by last week.After she **had read** the book she went to the library. | **Had** you **cleaned** the teeth before you went to sleep? – Yes, I **had**. |
| **Past** **Perfect** **Continuous** | Действие, которое началось в прошлом, продолжалось в течение некоторого времени и либо закончилось или не закончилось к моменту в прошлом. | Since,For (yesterday last week /month) | We **had been drawing** a map for 2 hours yesterday | **Had** you **been drawing** a map for 2 hours yesterday? – Yes, we **had**. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 |
| **Future** **Indefinite** | Действие произойдет в будущем | Tomorrow, next week (month, year) | They **will graduate** from the university next year. | **Will** they **meet** you at the station on Sunday? – Yes, the **will**. |
| **Future** **Continuous** | Действие произойдет в определенный момент в будущем | 1) At 4 p.m. tomorrow 2) When mother comes from work | Mike **will be sleeping** at 10 p.m. tomorrow | **Will** Mike **be sleeping** at 10 p.m. tomorrow? – Yes, he **will.** |
| **Future Perfect** | Действие совершится к определенному моменту в будущем | By next year | We **shall have passed** all the exams by next week | **Will** you **have learned** the words by next lesson? – Yes, we **shall.** |
| **Future in the Past** | Обозначает действия в будущем, воспринимаемом из прошлого: | Said (that), told (that), thought (that) и т. п. | He said he **would go** to the dentist. We wondered if the train **would arrive** at 7.  | **Did** he **say** he **would go** to the dentist? – Yes, he **did.** |

**Времена пассивного залога** (**Passive Voice**)

Если подлежащее обозначает лицо или предмет, подвергающийся действию со стороны другого лица или предмета, сказуемое употребляется в форме страдательного залога**.**

**Когда употребляется страдательный залог?**

Существует мнение, что следует избегать употребления страдательного залога особенно в письменной речи, чтобы не усложнять высказывание. Это действительно так: не нужно употреблять страдательный залог там, где можно употребить действительный. Когда стоит употреблять пассивный залог? Есть несколько случаев:

– Лицо / предмет, совершающее действие, неизвестно.

Our house was broken into last week. – Наш дом ограбили на прошлой неделе.

– Лицо / предмет, совершающее действие, не важен.

The job will be finished by Monday. – Работа будет закончена к понедельнику.

– Лицо / предмет, совершающее действие, очевиден из контекста.

My brother was fined for driving without license. – Моего брата оштрафовали за вождение без прав.

– Когда мы заинтересованы в действии, а не в деятеле (в новостях, инструкциях, заголовках, объявлениях).

The international exhibition of sport equipment will be held next month. – Международная выставка спортивного оборудования будет проведена в следующем месяце.

– Для описания процесса приготовления, инструкция проведения исследований и пр.

Water is heated and added to the mixture. – Вода нагревается и добавляется к смеси.

– В официальных объявлениях, в научных докладах.

Much research has been conducted on this topic. – Множество исследований было проведено по этой теме.

Таблица 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Indefinite** | **Continuous** | **Perfect** | **Perfect****Continuous** |
|  | 1 | 2 | 3 | 4 |
| **Present** | I am askedHe is askedWe are askedYou are askedThey are asked | I am being askedHe is being askedWe are being askedYou are being askedThey are being asked | I have been askedHe has been askedWe have been askedYou have been askedThey have been asked |  –  |
| Am I asked? | Am I being asked? | Have I been asked? |  –  |
| I am not asked | I am not being asked | I have not been asked |  –  |
| **Past** | I was askedHe was askedWe were askedYou were askedThey were asked | I was being askedHe was being askedWe were being askedYou were being askedThey were being asked | I had been askedHe had been askedWe had been askedYou had been askedThey had been asked |  –  |
| Was I asked? | Was I being asked? | Had I been asked? |  –  |
| I was not asked | I was not being asked | I had not been asked |  –  |
|  | 1 | 2 | 3 | 4 |
| **Future** | I shall be askedHe will be askedWe shall be askedYou will be askedThey will be asked |  –  | I shall have been askedHe will have been askedWe shall have been askedYou will have been askedThey will have been asked |  –  |
| Shall I be asked? |  –  | Shall I have been asked? |  –  |
| I shall not be asked |  –  | I shall not have been asked |  –  |
| **Future in the Past** | I should be askedHe would be askedWe should be askedYou would be askedThey would be asked |  –  | I should have been askedHe would have been askedWe should have been askedYou would have been askedThey would have been asked |  –  |

**Образование пассивного залога (Passive Voice)**

|  |
| --- |
| **be + III форма глагола** |

Правильные глаголы + **-ed** to study – studi**ed**

Неправильные глаголы – **III форма** to write – **written**

|  |
| --- |
| Действие совершается над подлежащим |
| I **am/was asked**He (she, it) **is/was asked**We (you, they) **are/were asked** |

Непереходные глаголы не могут использоваться в страдательном залоге, поскольку при них нет прямых дополнений. Это глаголы:

 – to fly, to arrive

 – to be, to become

 – to have, to lack, to possess, to consist, to belong

 – to hold, to suit, to resemble, to fit

 – to appear, to seem, to become, to go, to last

*Например:*

They **have** a nice house.

My shoes **don’t fit** me.

My sister **lacks** tact.

**Обратите внимание!**

Passive Voice – это не просто изменение действительного залога. Он используется, когда мы не можем/не хотим сказать, кто совершил действие, обращаем особое внимание на событие, избегаем использования формального подлежащего.

*Например:*

Rome **wasn’t built** in one day. Рим не один день строился.

The window **was broken** last night. Окно разбили прошлой ночью.

Cars **are fixed** here. Здесь ремонтируют машины.

Чтобы показать, **кем/чем** совершается действие, используются предлоги:

|  |  |
| --- | --- |
| **BY**Перед одушевленным предметом, а также после глаголов типа: *damage, make, bring, discover, break, destroy, etc.* | **WITH**Указывается, какой предмет, орудие, инструмент использован для совершения действия. |
| This building was designed **by Rossi**.The window was broken **by this stone**.The theatre was destroyed **by fire**. | The bag was cut **with a razor**.The pictures were drawn **with chalk**.The door was opened **with a key**. |

Обратите внимание на перевод глаголов с предлогом в страдательном залоге:

|  |  |
| --- | --- |
| **Русский язык** | **Английский язык** |
| **Об** этой книге много говорят.**Над** ним часто смеются. | This book is much spoken **about**.He is often laughed **at**.  |

**Наиболее распространенные глаголы с предлогами:**

hear of – слышать о send for – посылать за

laugh at – смеяться над speak of/about – говорить о

make fun of – насмехаться над talk about – говорить о

look after – ухаживать за think of – думать о

look at – смотреть на pay attention to – обращать внимание на

rely on – полагаться на take care of – заботиться о

**В русском языке не все глаголы сохраняют предлог:**

to listen to – слушать что-либо/кого-либо

to look for – искать что-либо

to operate on – оперировать кого-либо

to provide for – обеспечить кого-либо чем либо

to explain to – объяснять кому-либо

*Например:*

He was **operated on** last night.

**Его** оперировали прошлой ночью.

**Модальные глаголы (Modal Verbs)**

Модальные глаголы не употребляются самостоятельно, а только в сочетании с инфинитивом смыслового глагола. Они обозначают возможность, способность, вероятность, необходимость совершения действия, выраженного смысловым глаголом. Модальные глаголы в сочетании с инфинитивом смыслового глагола употребляются в предложении в роли составного глагольного сказуемого: Не can do it himself. – Он может это сделать сам. They may come tonight. – Они, может быть, придут сегодня вечером.

Модальные глаголы не выражают конкретных процессов (действий), а показывают лишь отношение говорящего к действию, оценку действия, т. е. возможность, необходимость, предположительность, долженствование, разрешение и т. д.

**Модальные глаголы и их эквиваленты**

Таблица 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Past** | **Present** | **Future** | **Характеристика действия** | **Перевод на Русский язык** |
| 1 | 2 | 3 | 4 | 5 |
| Could | Can | Will be able to | Возможность, способность, умение | Могу, умею  |
| Was/were able to | Am/is/are able to | Will be able to | Способность, возможность | Способен |
| Might | May | Will be allowed to | Просьба, разрешение, предположение, сомнение, вероятность, официальная/ формальная просьба. | Можно/ могу ли,возможно, вероятно |
| Was/were allowed to | Am/is/are allowed to | Will be allowed to | Разрешение, позволение | Позволено, разрешено |
| – | Must | – | Необходимость, обязанность, приказ. | Должен, обязан |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 |
| Had to | Have/has to | Will have to | Вынужденность действия, надобность действия (в силу определенных обстоятельств) | Приходится, вынужден  |
| Was/were to | Am/is/are to | – | Необходимость совершения действия согласно предварительной договоренности или по расписанию | Должен |
| – | Should | – | Наставление, увещевание, рекомендация совет | Следует  |
| – | Ought to | – | Моральный долг, обязанность говорящего | Следует  |
| – | Need | – | Нужность, надобность | Нужно, надо, необходимо |

**Значения, выражаемые модальными глаголами**

**в английском языке**

Модальные глаголы в английском языке имеют одну форму для всех лиц и чисел. Вопросительная форма образуется без вспомогательных глаголов. Отрицательная форма образуется при помощи частицы not.

I can’t do it. – Я не могу этого сделать.

May I use your phone? – Могу я воспользоваться вашим телефоном.

Модальных глаголов в английском языке сравнительно немного и каждый из них имеет свое значение.

Модальный глагол **can** употребляется для:

– выражения возможности или способности совершения действия;

I can type very fast. – Я могу печатать очень быстро.

– выражения сомнения, удивления.

Can they arrive tomorrow? – Неужели они приедут завтра?

Модальный глагол **could:**

– для выражения возможности, способности в прошлом;

I could type very fast. – Я умела печатать очень быстро.

– в главной части условных предложений.

If I had much money I could buy a new car. – Если бы у меня было много денег, я бы мог купить машину.

Модальный глагол **may:**

– для выражения разрешения;

You may use my phone. – Вы можете воспользоваться моим телефоном.

– для выражения предположения.

He may know her. – Возможно, он знает её.

Модальный глагол **might:**

– для выражения предположения в настоящем и будущем с большей степенью сомнения.

He might know her. – Он, может быть, знает её (а может и нет).

Модальный глагол **must:**

– для выражения долженствования;

You must do it. – Ты должен сделать это.

– для выражения предположения;

It must be him. – Это должно быть он.

– для выражения запрета.

You musn’t touch it. – Тебе запрещается трогать это.

Модальный глагол **ought to:**

– для выражения морального долга, совета в отношении настоящего и будущего.

He ought to help me. – Он должен мне помочь.

Модальный глагол **need:**

– для выражения необходимости. Употребляется в форме Present Simple в вопросительных и отрицательных предложениях.

Need I do it? – Мне нужно делать это?

No, you needn’t do it. – Нет, не нужно делать этого.

Эквивалент **to be to** употребляется для:

– выражения необходимости совершения действия, согласно предварительной договоренности

My friend is to call you tomorrow. – Мой друг должен позвонить вам завтра.

**–** выражения необходимости совершения действия по расписанию

The train is to arrive at 7 p.m. – Поезд должен прибыть в 7 вечера.

Эквивалент **to have to** используется для выражения совершения действия в силу определенных обстоятельств.

She had to go there. – Ей пришлось поехать туда.

Глагол **should** используется для выражения рекомендации или совета.

Tom shouldn’t have done it. – Тому не следовало делать этого.

**Unit1**

**WATER** **FOR LIFE**

**READING**

**Text A**

**The Water of the Earth**

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

1) water, to water, water table, water crisis, water balance, water resources, water problem, water conditions;

2) evaporation, evaporation process, to evaporate;

3) land, from the ocean to the land and back, to land, mainland;

4) pure, pure water, to purify, to repure;

5) to distribute, distribution, uneven distribution of water resources.

***2. Read the text and answer the questions:*** *1. How much moisture is involved in the giant cyclical process of ocean-atmosphere-land-ocean? 2. What is the mechanism of this conveyer thanks to which moisture gets from the ocean to the land and back?*

It has been estimated that a total of 577,000 cu km of water annually evaporates on our planet, chiefly from the surface of the ocean. This is a process of tremendous energy. It would take 44 million power stations, each with a capacity of 1,000 million kW, to artificially produce the amount of energy involved in the evaporation process.

Hydrologists made several interesting discoveries. For instance, they established that there is another important link in the external rotation of moisture – the flow of moisture from the mainlands to the ocean through the atmosphere. Prior to this it was believed that all moisture coming from the ocean falls to the ground as rain or snow and then is carried back to the ocean by the rivers. It turns out that the sky is literally furrowed by powerful and deep rivers, Every year, for example, 4,000 cu km of water “flows” above the Volga area - tins is tantamount to twenty rivers such as the Volga.

The data on the transfer of steam in the atmosphere can be used for calculating the water balance of the main lands, large river basins, and for analyzing how water conditions are shaped over large territories.

According to the calculations, the reserves of water on the planet total 1,386 million cu km, of which only 2.5 per cent is freshwater. The most sizeable part of it is conserved in the ice covers of the Antarctic and the Arctic. Only 0.25 per cent of the reserves is to be found in lakes and only 0.006 per cent in rivers. Scientists maintain that the bulk of water resources are within the “secular” category, that is, they replenish their reserves at an extremely slow rate and cannot be used without running the risk of upsetting the balance of nature. For many years water reserves on the planet were considered to be unlimited, but it's not so. A water crisis is becoming obvious. The reason lies not in the uneven distribution of water resources, but also in growing pollution of water.

The most realistic way to solution of the water problem is the rationalization of the use of water. The water on the planet can and must repure.

Notes:

|  |  |
| --- | --- |
| steam –  | nap |
| to estimate –  | подсчитывать |
| to evaporate –  | испаряться |
| capacity –  | мощность, емкость |
| artificially –  | искусственно |
| to turn out –  | оказаться |
| tantamount –  | равносильный |
| sizeable –  | значительный |
| bulk –  | объем |
| annually –  | ежегодно |
| obvious –  | очевидный |
| uneven –  | неравномерный |
| to repure –  | очищать |

***3. Read the text again and do the exercises:***

**1.** **Find the English for:** гигантский циклический процесс; влага; с океана на землю и обратно; огромная энергия; мощность; процесс испарения; искусственно; интересное открытие; важная связь; материк; выпадать на землю; мощные и глубокие реки; передвижение пара; водный баланс; большие речные бассейны; запасы воды; пресная вода; лед; крайне низкий уровень; природный баланс; водный кризис; очищать.

**2.** **a) Find the synonyms to the following words in the text:** humidity, huge, transpiration, mainly, evaluation, to purify.

**b) Find the antonyms to the following words in the text:** drought, small, rapid, shallow, unreal.

**3. Choose the right word:**

1. A total of 577,000 cu km of water annually (evaporates, penetrates, percolates) on our planet. 2. All moisture coming from the ocean (evaporates, repures, falls) to the ground as rain or snow. 3. The reserves of (polluted water, ocean water, freshwater) is 2.5 per cent. 4. The most sizeable part of water is conserved in the (ice covers, icebergs, ice caps) of the Antarctic and die Arctic. 5. The reason for a water crisis is in growing (population, pollution, distribution). 6. The water on the planet can and must (restore, repure, replenish).

**4. Complete the sentences:**

1. It has been estimated that...

2. Hydrologists established that...

3. It turned out that the sky is...

4. The reserves of water on the planet is...

5. Fresh water is...

6. The most sizeable part is...

7. Unfortunately the water crisis is...

8. The most realistic way to solve the problem is...

**5. Answer the questions:**

1. What is the text about?

2. How much water evaporates on our planet annually?

3. Is it the process of tremendous energy?

4. What interesting discoveries did hydrologists make?

5. How much water is there on the planet? Freshwater?

6. Where is the most sizeable part of water?

7. Why is water crisis becoming obvious?

8. What is the most realistic way to the solution of the problem?

***Read the text B and answer the questions below:***

**Text B**

**Water in Our Daily Life**

Every plant, animal, and human being needs water to stay alive. This is because all the life processes – from taking in food to getting rid of wastes – require water. But people depend on water for more than just to stay alive. We also need it for our way of life. We need water in our homes – to brush our teeth, cook food and wash dishes. We need water in our factories – to manufacture almost everything from automobiles to zippers. We need water for irrigation – to raise crops in regions that do not get enough rain.

People also use water to produce electric power to light homes and to run factories. Electric power stations burn coalor other fuel to turn water into steam. The steam supplies the energy to run machines that produce electricity. Hydroelectric power stations use the energy of falling water from waterfalls and dams to produce electricity.

In our homes, we use far more water than the amount we need simply to stay alive. We require water for cleaning, cooking, bathing, and carrying away wastes. For many people, such water is a luxury. Millions of homes in Asia, Africa, and South America have no running water. The people must haul water up by hand from the village well, or carry it in jars from pools and rivers far from their homes.

Industry uses water in many ways. It uses water for cleaning fruits and vegetables before canning and freezing them. It uses water as a raw material in soft drinks, canned foods, and many other products. It uses water to air-condition and clean factories. But most of the water used by industry is for cooling. For example, water cools the steam used in producing electric power from fuel. It cools the hot gases produced in refining oil, and the hot steel made by steel mills. Although industry uses a lot of water, only 6 per cent of it is consumed. Most of the water used for cooling is piped back to the rivers or lakes from which it is taken. The water consumed by industry is the water added to soft drinks and other products, and the small amount of water that turns to vapour in the cooling processes.

After people learned to build crude small boats, they began using rivers and lakes to carry themselves and their goods. Later, they built larger boats and sailed the ocean in search of new lands and new trade routes. Today, people still depend on water transportation to carry such heavy and bulky products as machinery, coal, grain and oil. People build most of their recreation areas along lakes, rivers, and seas. They enjoy water sports, such as swimming, fishing and sailing. Many people also enjoy the beauty of a quiet lake, a thundering waterfall or a roaring surf.

Most of the plants that people raise need great quantities of water. For example, it takes 115 gallons (435 liters) of water to grow enough wheat to bake a loaf of bread. People raise most of their crops in areas that have plenty of rain. But to raise enough food for their needs, people must also irrigate dry areas. The rainfall that crops use to grow is not considered a water use, because the water does not come from a country's supply. Irrigation, on the other hand, is a water use because the water is drawn from a nation's rivers, lakes or wells. The water a nation uses for irrigation is important to its water supply because none of the water remains for reuse. Plants take in water through their roots. They then pass it out through their leaves into the air as a gas called water vapour. Winds carry away the vapour, and the liquid water is gone. On the other hand, nearly all the water used in our homes is returned to the water supply. The water is carried by sewer pipes to treatment plants, which return the water to rivers so it can be used again.

Every organism needs a lot of water to carry out its life processes. Plants, animals, and human beings must take in nutrients (food substances). Watery solutions help dissolve nutrients and carry them to all parts of an organism. Through chemical reactions, the organism turns nutrients into energy, or into materials it needs to grow or to repair itself. These chemical reactions can take place only in a watery solution. Finally, the organism needs water to carry away waste products. Every living thing must keep its water supply near normal, or it will die. Human beings can live without food for more than two months, but they can live without water for only about a week. If the body loses more than 20 per cent of its normal water content, a person will die painfully. Human beings must take in about 2.4 liters of water a day. This intake can be in the form of beverages we drink or water in food.

Notes:

|  |  |
| --- | --- |
| fuel –  | топливо |
| luxury –  | роскошь |
| roaring –  | ревущий |
| beverages –  | напитки |

**Answer the questions:**

1. Why do people depend on water?

2. How do people use water to produce electric power?

3. Why water is a luxury for many people?

4. How is water used in industry?

5. Why do people build most of their recreation areas along lakes, rivers and seas?

6. How is water used for agricultural purposes?

7. Why is water needed for every organism’s life?

8. How much water must human beings take a day?

***Read and translate the text C, using a dictionary:***

**Text C**

**20 Interesting and Useful Water Facts**

Roughly 70 percent of an adult’s body is made up of water.

At birth, water accounts for approximately 80 percent of an infant’s body weight.

A healthy person can drink about three gallons (48 cups) of water per day.

Drinking too much water too quickly can lead to water intoxication. Water intoxication occurs when water dilutes the sodium level in the bloodstream and causes an imbalance of water in the brain.

Water intoxication is most likely to occur during periods of intense athletic performance.

While the daily recommended amount of water is eight cups per day, not all of this water must be consumed in the liquid form. Nearly every food or drink item provides some water to the body.

Soft drinks, coffee, and tea, while made up almost entirely of water, also contain caffeine. Caffeine can act as a mild diuretic, preventing water from traveling to necessary locations in the body.

Pure water (solely hydrogen and oxygen atoms) has a neutral pH of 7, which is neither acidic nor basic.

Water dissolves more substances than any other liquid. Wherever it travels, water carries chemicals, minerals, and nutrients with it.

Somewhere between 70 and 75 percent of the earth’s surface is covered with water.

Much more fresh water is stored under the ground in aquifers than on the earth’s surface.

The earth is a closed system, similar to a terrarium, meaning that it rarely loses or gains extra matter. The same water that existed on the earth millions of years ago is still present today.

The total amount of water on the earth is about 326 million cubic miles of water.

Of all the water on the earth, humans can used only about three tenths of a percent of this water. Such usable water is found in groundwater aquifers, rivers, and freshwater lakes.

The United States uses about 346,000 million gallons of fresh water every day.

The United States uses nearly 80 percent of its water for irrigation and thermoelectric power.

The average person in the United States uses anywhere from 80–100 gallons of water per day. Flushing the toilet actually takes up the largest amount of this water.

Approximately 85 percent of U.S. residents receive their water from public water facilities. The remaining 15 percent supply their own water from private wells or other sources.

By the time a person feels thirsty, his or her body has lost over 1 percent of its total water amount.

The weight a person loses directly after intense physical activity is weight from water, not fat.

**SPEAKING**

***Ask your partner questions about water:***

1. What comes to mind when you hear the word “water”?

2. What does water taste like?

3. When do you like drinking water?

4. Do you think water should be free?

5. Do you buy mineral water or drink tap water?

6. Do you drink enough water every day?

7. Do you ever think about how precious water is?

8. What three adjectives would you use to describe water?

9. Isak Dinesen said: “The cure for anything is salt water – sweat, tears, or the sea.” What do you think of this quote?

10. In 1732, Thomas Fuller said: “We never know the worth of water till the well is dry.” What do you think of this quote?

**GRAMMAR**

***1. Open the brackets and put the verbs into the correct form:***

1. Every Monday, Sally (drive) her kids to football practice.

2. Usually, I (work) as a secretary at ABT, but this summer I (study) French at a language school in Paris. That is why I am in Paris.

3. Shhhhh! Be quiet! John (sleep).

4. Don't forget to take your umbrella. It (rain).

5. I hate living in Seattle because it (rain) always.

6. I'm sorry I can't hear what you (say) because everybody (talk) so loudly.

7. Justin (write, currently) a book about his adventures in Tibet. I hope he can find a good publisher when he is finished.

8. Jim: Do you want to come over for dinner tonight?

Denise: Oh, I'm sorry, I can't. I (go) to a movie tonight with some friends.

9. The business cards (be, normally ) printed by a company in New York. Their prices (be) inexpensive, yet the quality of their work is quite good.

10. This delicious chocolate (be) made by a small chocolatier in Zurich, Switzerland.

***2. 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.

***3. Fill in the present simple or the present progressive:***

1. Mr Cooper always \_\_\_ a pound of sugar. (buy)

2. The shop assistant \_\_\_ the door now. (close)

3. Kevin and Alan never \_\_\_ away glass bottles. (throw)

4. Look! Freddy \_\_\_ two baskets. (carry)

5. Now Mrs Caveman \_\_\_ out of the window. (look)

6. Mrs Bingham \_\_\_ shopping every Saturday. (go)

7. I \_\_\_ the money at the moment. (count)

8. Mr Root always \_\_\_ a box of eggs before buying them. (open)

9. Mum often \_\_\_ her change. (forget)

10. Listen! The manager \_\_\_ to a customer. (talk)

11. Sara usually (put) \_\_\_ on black shoes but now she (wear) \_\_\_ white trainers.

12. And look, she (take) \_\_\_ an umbrella because it (rain) \_\_\_.

13. Hurry up! Everybody \_\_\_ (wait) for you.

14. Look at the river. It \_\_\_ (flow) very fast today - much faster than usual.

***4. Read the text and use the verbs in brackets in a suitable tense:***

Today (be) the second day of my trek around Mount Annapurna. I am exhausted and my legs (shake), I just hope I am able to complete the trek. My feet (kill, really) me and my toes (bleed), but I (want, still) to continue.

Nepal is a fascinating country, but I have a great deal to learn. Everything (be) so different and I (try) to adapt to the new way of life here. I (learn) a little bit of the language to make communication easier; unfortunately, I (learn, not) foreign languages quickly. Although I (understand, not) much yet, I believe that I (improve, gradually).

I (travel, currently) with Liam, a student from Leeds University in England. He (be) a nice guy, but impatient. He (walk, always) ahead of me and (complain) that I am too slow. I (do) my best to keep up with him, but he is younger and stronger than I am. Maybe, I am just feeling sorry for myself because I am getting old.

Right now, Liam (sit) with the owner of the inn. They (discuss) the differences between life in England and life in Nepal. I (know, not) the real name of the owner, but everybody (call, just) him Tam. Tam (speak) English very well and he (try) to teach Liam some words in Nepali. Every time Tam (say) a new word, Liam (try) to repeat it. Unfortunately, Liam (seem, also) to have difficulty learning foreign languages. I just hope we don't get lost and have to ask for directions.

**Unit 2**

**WATER SUPPLY**

**READING**

**Text A**

**Water Supply**

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

1) supply, to supply, water supply, sources of supply, supply systems, to obtain water supplies, natural water supply, artificial water supply, to supply water through a pipe, public water supplies;

2) demand, to demand, to demand water, to meet the demands, to meet the very modest sanitary demands, public demands, freshwater demands;

3) to pump, to pump water, water pumping, the development of pumping methods, to pump water for irrigation, to pump water for domestic needs;

4) to deliver, to deliver the water into the homes of the citizens, to deliver the water into the fields, to deliver the water from watersheds, to deliver water from distant sources;

5) pollution, water pollution, to pollute, to pollute water, dangerous pollution, dangerously polluted watersheds.

***2. Read the text A and answer the question:*** *How was water delivered into the homes of the citizens?*

During all the ages large cities have been concerned with their water supply. Even the important ancient cities soon found that the local sources of supply-shallow wells, springs and brooks – were inadequate to meet the very modest sanitary demands of the day, and the inhabitants were constrained to build aqueducts which would bring water from distant sources. It cannot be said, however, that such supply systems could compare with modern types, for only a few of the wealthier citizens had private outlets in their homes or gardens, and most citizens carried water in vessels to their homes from a few fountains or public outlets. The medieval cities were smaller than the ancient cities and public water supplies were practically nonexistent.

It was in the seventeenth century that the first experiments were made with cast iron pipes. They were successful, but it was not until the middle of the eighteenth century that cast iron pipes were cheap enough for wide use. The durability of cast iron and its freedom from breaks and leakages soon made its use almost universal, although steel and other materials were also used.

This forward stride, together with the development of pumping methods, made it economically possible for all but the smallest villages to obtain water supplies and to deliver the water into the homes of the citizens.

Although some cities were able to collect safe water from uninhabited regions and thereby reduce water-borne disease to a low level, many others found that their supplies were dangerously polluted and that the danger was increasing as population increased upon watersheds.

Accordingly treatment methods were developed that, when properly applied, have eliminated the hazard.

***3. Read the text again and do the exercises:***

**1. Find the English for:** мелкие колодцы, древние города, жители, родники и ручьи, несуществующий, дешевый, широкого использования, собирать чистую воду, незаселенные районы, низкий уровень, искоренить опасность.

**2. a) Find the synonyms to the following words in the text:** decent, population, resident, ship, threat, tube.

**b) Find the antonyms to the following words in the text:** increase, old, full, popular, illness, expensive.

**3. Choose the right word:** 1) most citizens carried water in (boats, pails, bottles, vessels) to their homes from a few fountains or public outlets. 2) only a few of the wealthier citizens had private (wells, fountains, outlets, brooks) in their homes or gardens. 3) cast iron pipes were (expensive, cheap, possible, popular) enough for wide use. 4) when properly applied, treatment methods have eliminated the (threat, danger, hazard, water-borne disease).

**4. Answer the questions:**

1. Why were inhabitants constrained to build aqueduct to meet the very modest sanitary demands of the days?

2. Who had private outlets in their homes or gardens?

3. How did most citizens carry water to their homes from a few fountains or public outlets?

4. When were the first experiments made with cast iron pipes?

5. Why did some cities collect safe water from uninhabited regions?

***Read the text B and do the exercises below:***

**Text B**

**Pipes**

The idea of carrying water through a pipe is very old, and the earliest pipes, made from hollow tree trunks, suggest the probable origin of this invention. Tree trunk pipes were in use for many centuries, indeed until the invention of the comparatively modern iron and steel tubing, wood was the only suitable material for this purpose.

Thousands of elms were cut and hollowed to provide pipes for water from the New River Canal which was made at the beginning of the seventeenth century to bring water to London, and quite recently ”trunk pipes” in a remarkably good state of preservation have been dug up during excavations.

The large-scale manufacture of iron and steel pipes as well as of pottery and other materials, has introduced a new era during which water and gas are brought to every house through pipes, while other pipes take away waste water.

The ground under big cities is a vast network of conduits of all kinds, carrying water, gas and telephone cables to homes and factories.

The most astonishing development of transport by pipe has been in connection with oil and gas. Thousands of miles of pipe-line are laid beneath the ground to bring crude oil from oil fields to the refineries.

**Say if a sentence is True or False:**

1. Tree trunk pipes were in use for many centuries, indeed until the invention of the comparatively modern iron and steel tubing, wood was the only unsuitable material for this purpose.

2. The large-scale manufacture of iron and steel pipes has introduced a new era during which water and gas are brought to every house through pipes, while other pipes take away waste water.

3. The ground under big factories is a vast network of conduits of all kinds, carrying water, gas and telephone cables to homes and factories.

4. Thousands of miles of pipe-line are laid beneath the ground to bring crude oil from oil fields to the cities.

***Read and translate the text C, using a dictionary:***

**Text C**

**Sewerage**

Man’s sewerage practice has been known from ancient times. Explorations revealed sewers in Babylon dating from the 7-th century before our era. Remains of sanitary sewers are to be found in the ruins of the prehistoric cities of Crete and the ancient cities of Assyria. Rome also had sewers, but they were primarily drains to carry away storm water.

Sewerage was practically unknown during the middle ages, and not until modern times the construction of sewers was resumed. At first, however, they were storm sewers not designed to carry domestic sewage.

The water courses in or near towns apparently were used as convenient places of refuse disposal. The offensive and dangerous materials were discharged into streams where they decomposed to cause discomfort and danger to rural populations or to cities located down streams. Most cities, therefore, soon found it necessary to treat the sewage before releasing it.

The history of the progress of sanitation in London probably shows a typical picture of what took place quite generally about the middle of 19-th century in the largest cities of Great Britain and the United States. Sanitation was little considered and execution of sewage work was impossible. There were hundreds of streets in London that had no sewers. All through London’s history until modern time, the question of water supply continued to be a problem. In the 18-th century even with the appearance of larger water companies the water supply was far from being satisfactory. Water taken from the river Thames was offensive to the sight as the intake was only three yards from the outlet of a great sewer. But the feeling that public health depends largely upon sewerage was the deciding factor in the growing recognition of good sewerage system. In 1885 after two outbreaks of cholera British Parliament passed an act which laid the basis for the sanitation of London. On the continent a marked progress in sewerage began in 1842 when a severe fire destroyed the old part of Hamburg. It was decided to rebuild this part according to the modern ideas of convenience. As a result Hamburg was the first city which had a compete systematic sewerage system throughout built according to modern ideas.

**SPEAKING**

***Ask your partner questions about water:***

1. Do you like water?

2. Do you worry about the future availability of water?

3. What do you think it would be like to have no fresh drinking water?

4. What do you think of the fact that most of the world’s population is without clean water, yet rich countries spend billions on oil, brand goods, tourism, etc?

5. What are the best and worst things about tap water and bottled water?

6. How does water form?

7. What different things can you do with water?

8. What do you know about water?

9. Henry David Thoreau said: “I believe that water is the only drink for a wise man.” What do you think of this quote?

10. Jacques Cousteau said: “Water and air, the two essential fluids on which all life depends, have become global garbage cans.” What do you think of this quote?

**GRAMMAR**

***1. Put the verbs into the correct tense (simple past or present perfect):***

1. I (just / finish) \_\_\_ my homework.

2. Mary (already / write) \_\_\_ five letters.

3. Tom (move) \_\_\_ to his home 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 holidays in Paris last summer?

10. (you / ever / see) \_\_\_ a whale?

***2. Put the verbs into the correct tense (simple past or past perfect):***

1. When he (wake up) \_\_\_, his mother (already /prepare) \_\_\_ breakfast.

2. We (go) \_\_\_ to London because our friends (invite) \_\_\_ us.

3. He (hear) \_\_\_ the news, (go) \_\_\_ to the telephone and (call) \_\_\_ a friend.

4. When she (start) \_\_\_ learning English she (already /learn) \_\_\_ French.

5. Jane (already / type) \_\_\_ three pages when her computer (crash) \_\_\_.

6. By the time the doctor (arrive) \_\_\_ at the house the patient (die) \_\_\_.

7. Before that day we (never / think) \_\_\_ of traveling to Japan.

8. I (know) \_\_\_ him a long time before I (meet) \_\_\_ his family.

9. They (not / know) \_\_\_\_ where to meet because nobody (tell) \_\_\_ them.

10. It (be) \_\_\_ cloudy for days before it (begin) \_\_\_ to rain.

***3. Complete the sentences with the past simple or past progressive:***

1. When I \_\_\_ to school, I \_\_\_ John. (walk/see)

2. When I \_\_\_ in the kitchen, Mary \_\_\_. (help/come)

3. While she \_\_\_ the soup, the children \_\_\_. (cook/play)

4. While they \_\_\_ cards, the baby \_\_\_. (play/sleep)

5. When I \_\_\_ in the garden, my uncle \_\_\_. (work/call)

6. Carol \_\_\_ TV while Bob and Peter \_\_\_ football. (watch/play)

7. When she \_\_\_ her hair, the baby \_\_\_ to cry. (wash/begin)

8. A strong wind \_\_\_ when the plane \_\_\_. (blow/land)

9. When she \_\_\_ tennis, it \_\_\_ to rain. (play/began)

10. When I \_\_\_ TV, the lights \_\_\_ out. (watch/go)

11. While he \_\_\_ the piano, she \_\_\_ to him. (play/listen)

12. While she \_\_\_ up her room, he \_\_\_ his car. (tidy/wash)

13. The boys \_\_\_ in the garden while she \_\_\_ the flowers. (help/water)

14. He \_\_\_ Mary when he \_\_\_ through the park. (meet/walk)

15. We \_\_\_ computer games while she \_\_\_ a book. (play/read)

***4. Fill in Past simple, past progressive or past perfect simple:***

1. When they were sleeping (sleep), thieves broke (break) in and stole (steal) their jewelry.

2. After he had repaired (repair) his bike, he drove (drive) to his grandparents.

3. Before she had (have) dinner, she had worked (work) in the garden.

4. I saw (see) him yesterday in front of the cinema.

5. When they were listening (listen) to music, they heard (hear) a loud noise.

6. He had not visited (not visit) me before he (fly) to Greece.

7. He (hear) a loud cry from outside and (rush) out.

8. The boys (break) a window when they (play) football in the garden.

9. Mary (not work) yesterday. She (be) ill.

10. After she (help) me with the housework, she (go) to meet her friends.

11. When we (meet) Jane at the party, she (wear) a red dress.

12. After they \_\_\_ (see) the Tower, they \_\_\_ (go) to Westminster Abbey.

13. He \_\_\_ (ask) me which animals I \_\_\_ (hunt) in Africa.

14. After Columbus \_\_\_ (discover) America, he \_\_\_ (return) to Spain.

**Unit 3**

**AGRICULTURAL WATER USE**

**READING**

**Text A**

**Irrigation Systems**

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

gravity flow; the success of an irrigation system; storage capacity; trunk, distributive and irrigation canals; to build a barrage; pumped groundwater, subterranean sources; permanently constructed; to convey irrigation water; seasonal requirements, temporary ditches; interfarm and farm distributors.

***2. Read the text A and answer the following questions:***

*1) What does success of irrigation depend on? 2) Where may irrigation projects obtain water from? 3) What are the most common means of conveying irrigation water?*

There are four main areas of water use in agriculture: growing of crops, supplying drinking water to livestock, cleaning farm buildings and animals, and supplying drinking water for those who work on the farm. The amount of each category varies according to the type of a farm. There are farms that usually receive enough rainfall and water from melting snow to meet most of the water needs. But drier areas and some mountainous regions do not receive sufficient natural moisture. On these farms water must be supplied through irrigation.

The success of every irrigation project rests largely on the adequacy and dependability of its water supply. Irrigation projects may obtain water from artesian or pumped groundwater, lift from lakes and rivers, gravity flow diversion from rivers (without storage), diversion from rivers with storage, and springs and other subterranean sources.

Large scale storage capacity is provided by dams which may be of rock fill, earth fill or concrete types.

As to water intake, the irrigation systems are classified as gravity flow and pumping. The biggest and most widespread are the gravity flow systems, where water is drawn from the source by gravity and supplied to the irrigated areas by means of canals. In the case with pumping irrigation systems, the intake is affected by means of pumping plants from a source whose water level is below the irrigated area.

The gravity irrigation system consists of a head water intake arrangement, a network of canals (main, distributive, irrigation) with control (water dividing) installations on them, a farm distribution system and an escape drainage system to remove excess water from the irrigation network, from the surface of the watered fields and from the soil. The farm distribution system must be designed to carry enough water to meet the demands of the crop to each field without erosion and allow for efficient application.

Open ditches are the most common means of conveying irrigation water. In many areas the ditches to each field are permanently constructed and maintained. In areas where the seasonal requirements are low and only one or two irrigations are required, it is often useful to utilize temporary ditches for distributing the water to the fields.

In some irrigated areas of the world concrete flumes (troughs) raised above the ground are used to convey water to the fields. Sometimes water is delivered to the fields by underground, pipes interrupted at definite intervals by hydrants which release water to the surface.

If it is necessary to irrigate territories lying above the water source level, and in cases when it is not expedient, for this or other reason, to build a barrage, the intake is effected by means of pumps. Sometimes pumping plants are used to raise water from sections of the main (trunk) canal or distributor lying below the irrigated fields.

At present pumping from rivers, reservoirs or from underground sources is more and more used in many countries of the world.

Notes:

|  |  |
| --- | --- |
| artesian –  | артезианский |
| gravity –  | гравитация |
| subterranean sources –  | подземные источники |
| intake –  | принимать |
| concrete flumes (troughs) –  | бетонные лотки (желоба) |
| ditches –  | рвы |
| a barrage –  | заграждение |

***3. Read the text again and do exercises:***

**1. Arrange the following words and word combinations in pairs of synonyms:**

to convey, by means of, baggage, to allow, ditch, necessary, to transport, main canals, to permit, to meet the demands, trench, with the help of, to supply, needful, pump irrigation, underground, to meet the needs, trunk canals, lift irrigation, subterranean, dam, to provide.

**2. Arrange the following words in pairs of antonyms:**

to raise, failure, temporary, uncommon, success, impervious, common, impermeable, open, pervious, inefficient, closed, to lower, permeable, constant, efficient.

**3. Give one word for the following**:

an artificial watercourse; agricultural plants in the fields; to find use for; a wall built to keep back water; to arrange in classes; to take into another place; changing with the season; large pipe or waterway; lasting only for a time; to a great extent.

(irrigation, crops, to utilize, a dam, to classify, to intake, seasonable, canal, temporary, largely)

**4. Answer the following questions:**

l. How may irrigation project obtain water?

2. What is necessary to provide large scale storage capacity?

3. How are the irrigation systems classified?

4. What does the gravity irrigation system consist of?

5. How must the farm distribution system be designed?

6. When is the intake affected by means of pumps?

***Read the text B and do the exercises below:***

**Text B**

**Applying Irrigation Water to Crops**

Proper application of irrigation water requires considerable skill. A farmer must know when to irrigate different crops and how much water to use. In general, plants need irrigation only after they have used up most of the moisture in the soil. But a farmer also must consider other factors before irrigating. These include the amount of water available for irrigation, the type of crop, the distance of the water table from the surface, and the ability of the soil to hold water.

There are four general methods of applying irrigation water: (1) surface irrigation, (2) sprinkler irrigation, (3) trickle or drip irrigation, and (4) subirrigation.

**Surface irrigation** is considered to be the most common method of irrigation. In surface irrigation, the farmer runs water over the surface of the field. There are two chief types of surface irrigation, flood irrigation and furrow irrigation.

Flood irrigation covers the entire surface of a field with water, which soaks into the soil. Small soil walls called dikes or levees hold the water on the field. On many farms, the dikes divide the field into sections. The farmer floods each section individually.

**Flood irrigation** works best on level or gently rolling terrain where water is plentiful. The soil should be deep and able to hold a large amount of water. This method is generally used on crops of alfalfa and rice, wheat, and other grains. Rice grown in paddies (fields enclosed by dikes) is flooded continuously. Other crops are flooded for only a few hours at a time.

**Furrow irrigation**. Most crops that are planted in rows, such as corn, cotton, and potatoes, are irrigated by water from narrow ditches called furrows. In this method, rows of furrows are dug across a field. The farmer plants seeds in the ridges between the furrows. As water enters the furrows, it seeps into the ridges. Furrow irrigation is used on many soils and terrains.

**Sprinkler irrigation** provides water through pipes that lie on or are mounted above the ground. This method became popular with the development of inexpensive plastic and aluminum pipe in the 1940s.In sprinkler irrigation a pump forces water through a pipe to nozzles called sprinkler heads. The sprinkler heads distribute water to the crops in a spray or mist, in most cases, the farmer can move the pipe to irrigate the entire field. Self-propelled sprinkling systems have an engine and wheels built into the sprinkler unit. These systems move across a farm under their own power.

Sprinkler irrigation can be used on most crops and soils and on level or rolling terrain. It provides an efficient way to irrigate farms with a small water supply. Sprinkling systems may require large amounts of energy, and so their use is limited to areas with ample energy supplies. But some systems use low-pressure sprinkler heads, which require much less energy.

**Trickle irrigation** also called drip irrigation, furnishes water through plastic tubes that lie on or under the ground. The tubes have small openings called emitters at points corresponding to the location of the plants. As water flows through the tubes, it trickles out of the emitters into the soil. Only the soil directly around the plants receives moisture. As a result, trickle irrigation wastes little water.

Trickle irrigation can be used on all crops, soils, and terrains. Its efficient use of water makes it ideal for areas with small water supplies. But the high cost of installing and maintaining trickle irrigation makes it impractical for most farming. The method generally is used only for high-value crops, such as fruits and vegetables.

**Subirrigation** applies water from beneath the roots of plants. The water comes from ditches or underground pipes and the surface of the ground remains dry. Subirrigation requires a watertight layer of soil or rock below the plant roots. Water collects above this layer and moistens the roots.

Notes:

ridges – гребни, гряды

nozzles – наконечники

paddies – сырые места (сырости)

dikes – насыпи

furrows – борозды

trickle – ручеек

**Match the English word combinations (1–12) with their Russian equivalents (A–L):**

|  |  |
| --- | --- |
| 1. irrigation engineering | A. орошение,ирригация; поливка |
| 2. irrigation canal | B. ирригационная установка |
| 3. irrigation farming | C. бороздковый полив |
| 4. irrigation plant | D. ирригационная система, оросительный канал |
| 5. irrigation station | E. поверхностное орошение |
| 6. surface irrigation | F. орошаемое земледелие |
| 7. food irrigation | G. капельное орошение |
| 8. furrow irrigation | H. дождевание |
| 9. trickle irrigation | I. подпочвенное орошение |
| 10. sprinkler irrigation | J. полив непосредственно под культуры |
| 11. subirrigation | K. оросительная станция |
| 12. irrigation | L. мелиорация |

***Read and translate the text C, using a dictionary:***

**Text C**

**Why do We Need Dams?**

In ancient times, dams were built for the single purpose of water supply or irrigation. As civilizations developed, there was a greater need for water supply, irrigation, flood control, navigation, water quality, sediment control and energy. Therefore, dams are constructed for a specific purpose such as water supply, flood control, irrigation, navigation, sedimentation control, and hydropower. A dam is the cornerstone in the development and management of water resources development of a river basin. The multipurpose dam is a very important project for developing countries, because the population receives domestic and economic benefits from a single investment.

Demand for water is steadily increasing throughout the world. There is no life on earth without water, our most important resource apart from air and land. During the past three centuries, the amount of water withdrawn from freshwater resources has increased by a factor of 35, world population by a factor of 8. With the present world population of 5.6 billion still growing at a rate of about 90 million per year, and with their legitimate expectations of higher standards of living, global water demand is expected to rise by a further 2-3 percent annually in the decades ahead.

But freshwater resources are limited and unevenly distributed. In the high-consumption countries with rich resources and a highly developed technical infrastructure, the many ways of conserving, recycling and re-using water may more or less suffice to curb further growth in supply. In many other regions, however, water availability is critical to any further development above the present unsatisfactorily low level, and even to the mere survival of existing communities or to meet the continuously growing demand originating from the rapid increase of their population. In these regions man cannot forego the contribution to be made by dams and reservoirs to the harnessing of water resources.

Seasonal variations and climatic irregularities in flow impede the efficient use of river runoff, with flooding and drought causing problems of catastrophic proportions. For almost 5 000 years dams have served to ensure an adequate supply of water by storing water in times of surplus and releasing it in times of scarcity, thus also preventing or mitigating floods

With their present aggregate storage capacity of about 6 000 km3, dams clearly make a significant contribution to the efficient management of finite water resources that are unevenly distributed and subject to large seasonal fluctuations.

*The purposes of dams:*

Most of the dams are single-purpose dams, but there is now a growing number of multipurpose dams. Using the most recent publication of the World Register of Dams, irrigation is by far the most common purpose of dams. Among the single purpose dams, 48 % are for irrigation, 17 % for hydropower (production of electricity), 13 % for water supply, 10 % for flood control, 5 % for recreation and less than 1 % for navigation and fish farming.

*Irrigation:*

Presently, irrigated land covers about 277 million hectares i.e. about 18 % of world’s arable land but is responsible for around 40 % of crop output and employs nearly 30 % of population spread over rural areas. With the large population growth expected for the next decades, irrigation must be expanded to increase the food capacity production. It is estimated that 80 % of additional food production by the year 2025 will need to come from irrigated land. Even with the widespread measures to conserve water by improvements in irrigation technology, the construction of more reservoir projects will be required.

**SPEAKING**

**Case study**

Этапы работы студентов с кейсом:

– ознакомление с ситуацией;

– анализ информации;

– поиск решения;

– выявление преимуществ и недостатков каждого предложенного решения;

– оценка альтернатив;

– презентация результатов;

– оценивание участников;

– подведение итогов.

***1. Ознакомление с ситуацией:***

**Irrigation Types Efficiency in Russia**

Drip (or micro) irrigation, also known as trickle irrigation, functions as its name suggests. In this system water falls drop by drop just at the position of roots. Water is delivered at or near the root zone of plants, drop by drop. This method can be the most water-efficient method of irrigation, if managed properly, since evaporation and runoff are minimized. The field water efficiency of drip irrigation is typically in the range of 80 to 90 percent when managed correctly.

In sprinkler or overhead irrigation, water is piped to one or more central locations within the field and distributed by overhead high-pressure sprinklers or guns. A system utilizing sprinklers, sprays, or guns mounted overhead on permanently installed risers is often referred to as a solid-set irrigation sys-tem. Higher pressure sprinklers that rotate are called rotors and are driven by a ball drive, gear drive, or impact mechanism. Rotors can be designed to rotate in a full or partial circle. Guns are similar to rotors.

Center pivot irrigation is a form of sprinkler irrigation con-sisting of several segments of pipe (usually galvanized steel or aluminium) joined together and supported by trusses mounted on wheeled towers with sprinklers positioned along its length. The system moves in a circular pattern and is fed with water from the pivot point at the center of the arc. These systems are found and used in all parts of the world and allow irrigation of all types of terrain.

Sub-irrigation has been used for many years in field crops in areas with high water tables. It is a method of artificially raising the water table to allow the soil to be moistened from below the plants' root zone.

Most commercial and residential irrigation systems are “in ground” systems, which mean that everything is buried in the ground. With the pipes, sprinklers, emitters (drippers), and ir-rigation valves being hidden, it makes for a cleaner, more pre-sentable landscape without garden hoses or other items having to be moved around manually. This does, however, create some drawbacks in the maintenance of a completely buried system.

***2. Анализ информации***

The task is:

– Analyze the information and suggest the most effective way would water irrigation

– Prove your advantages. Highlight the advantages and disad-vantages of those that currently have found wide practical ap-plication.

***3. Поиск решения:***

Students in the process should pay attention to the following aspects:

1. The problem of irrigation in Russia.

2. Drip (or micro) irrigation, also known as trickle irrigation, functions as its name suggests.. Advantages or disadvantages in this system when water falls drop by drop just at the position of roots.

3. Sprinkler irrigation or center pivot irrigation. Which method is better?

4. The effect of sub-irrigation.

5. Irrigation “in ground” systems.

6. Alternative methods of drip, sprinkler, center pivot, sub-irrigation or “in ground” irrigation.

***4. Презентация результатов:***

Useful language bank for communication expressing opinion:

My point of view is that…

It seems/appears to me that…

I think/believe…/must…/

In my opinion/view…

To me…/may/might

From my point of view…

To my mind/ way of thinking…

As far as I am concerned…

I am totally against…

I (do not) agree that /with…

I (completely) agree /disagree that /with…

I want to ask a question.

Sorry, could you repeat that?

I think we should leave this point and come back to it later.

So what you’re saying is you will …

Can we just summarize the points we’ve agreed so far?

***5. Оценивание участников***

***6. Подведение итогов.***

**GRAMMAR**

***1.*** ***Put the verbs into the correct tense (simple future, future progressive or future perfect):***

Ex. 1

1. Tomorrow I think I (start) \_\_\_ my new project.

2. I (finish) \_\_\_ it by the end of this month.

3. The teacher (probably/assign) \_\_\_ a test to his students next Monday.

4. He (correct) \_\_\_ it by the end of next week.

5. My friend (certainly/get) \_\_\_ a good mark.

6. By 9 o'clock, we (finish) \_\_\_ our homework.

7. They (leave) \_\_\_ the classroom by the end of the hour.

8. I think I (start) \_\_\_ my trip tomorrow.

Ex. 2

*Samantha:* Just think, next week at this time, I (lie) on a tropical beach in Maui drinking Mai Tais and eating pineapple.

*Darren:* While you are luxuriating on the beach, I (stress) out over this marketing project. How are you going to enjoy yourself knowing that I am working so hard?

*Samantha:* I'll manage somehow.

*Darren:* You're terrible. Can't you take me with you?

*Samantha:* No. But I (send) you a postcard of a beautiful, white sand beach.

*Darren:* Great, that (make) me feel much better.

Ex 3

1. Right now, I am watching TV. Tomorrow at this time, I (watch) TV as well.

2. Tomorrow after school, I (go) to the beach.

3. I am going on a dream vacation to Tahiti. While you (do) paperwork and (talk) to annoying customers on the phone, I (lie) on a sunny, tropical beach. Are you jealous?

4. We (hide) when Tony (arrive) at his surprise party. As soon as he opens the door, we (jump) out and (scream), "Surprise!"

5. We work out at the fitness center every day after work. If you (come) over while we (work), we will not be able to let you into the house. Just to be safe, we (leave) a key under the welcome mat so you will not have to wait outside.

6. While you (study) at home, Magda (be) in class.

7. When I (get) to the party, Sally and Doug (dance), John (make) drinks, Sue and Frank (discuss) something controversial, and Mary (complain) about something unimportant. They are always doing the same things. They are so predictable.

8. When you (get) off the plane, I (wait) for you.

9. I am sick of rain and bad weather! Hopefully, when we (wake) tomorrow morning, the sun (shine).

10. If you (need) to contact me sometime next week, I (stay) at the Sheraton in San Francisco.

**Unit 4**

**INDUSTRIAL WATER USE**

**READING**

**Text A**

**Industrial Use of Water**

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

worldwide water, industrial users, hydroelectric dams, a solvent, oil refineries, thermoelectric power plants, withdrawal, renewable, low-cost, non-polluting, artificial lake, water consumption, safe, wildlife, fertilizer production, untreated water, purification techniques, grey water, water for cooling, power plant.

***2. Read the text A and answer the question:*** *How is water used in industry?*

It is estimated that 22 % of worldwide water is used in industry. Major industrial users 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. Significantly, hydroelectric power can also be used for load following unlike most renewable energy sources which are intermittent. 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 use grid electricity to 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 briefly 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 water blasting and water jet cutters. Also, very high pressure water guns are used for precise cutting. It works very well, is relatively safe, and is not harmful to the environment. It is also used in the cooling of machinery to prevent overheating, or prevent saw blades from 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, and natural gas extraction from shale rock. 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 utilizes a variety of purification techniques both in water supply and discharge. Most of this pure water is generated on site, either from natural freshwater or from municipal grey water. 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. Thermoelectric power plants using cooling towers have high consumption, nearly equal to their withdrawal, as most of the withdrawn water is evaporated as part of the cooling process. The withdrawal, however, is lower than in once-through cooling systems.

***3. Read the text again and do exercises:***

**1. Find the English for:**промышленные пользователи, промышленные предприятия, источник возобновляемой энергии, скачкообразный, применение и использование, чистая вода, производство удобрений, гидроэлектростанция, перегрев, добыча природного газа, загрязнение, методы очистки волы, использованная промышленными предприятиями вода, потребление воды промышленными предприятиями, увеличение температуры воды.

**2. Match the words (1–10) with the definitions (A–J):**

|  |  |
| --- | --- |
| 1. a solvent | A. safe for drinking |
| 2. withdrawal | B. to have need of, depend upon |
| 3. precise | C. a liquid capable of dissolving another substance |
| 4. purification | D. an act or process of removal or detachment |
| 5. to evaporate | E. to furnish with smth that is required |
| 6. to supply | F. to change from a liquid or a solid state to a vapor |
| 7. to require | G. making free of extraneous, contaminating or debasing matter |
| 8. to remove | H. injurious |
| 9. harmful | I. to take away and place elsewhere |
| 10. freshwater | J. exact |

**3. Answer the questions:**

1. What do major industrial uses include?

2. How much water is used in industry?

3. Why does hydroelectric power derive energy from the force of water?

4. What do hydroelectric power plants require?

5. Where is pressurized water used?

6. What other industrial processes is water used for?

***Read the text B and do the exercises below:***

**Text B**

**Hydropower**

Hydroelectric power plants generally range in size from several hundred kilowatts to several hundred megawatts, but a few enormous plants have capacities near 10,000 megawatts in order to supply electricity to millions of people. World hydroelectric power plants have a combined capacity of 675,000 megawatts that produces over 2.3 trillion kilowatt-hours of electricity each year; supplying 24 percent of the world’s electricity.

In many countries, hydroelectric power provides nearly all of the electrical power. In 1998, the hydroelectric plants of Norway and the Democratic Republic of the Congo (formerly Zaire) provided 99 percent of each country’s power; and hydroelectric plants in Brazil provided 91 percent of total used electricity.

Electricity generated from dams is by very far the largest renewable energy source in the world. More than 90 % of the world’s renewable electricity comes from dams. Hydropower also offers unique possibilities to manage the power network by its ability to quickly respond to peak demands. Pumping-storage plants, using power produced during the night, while the demand is low, is used to pump water up to the higher reservoir. That water is then used during the peak demand period to produce electricity. This system today constitutes the only economic mass storage available for electricity.

**Complete the sentences:**

1. Hydroelectric power plants generally range in size…

2. Hydroelectric power provides…

3. …the largest renewable energy source in the world.

4. Hydropower also offers…

5. …is used to pump water up to the higher reservoir.

6. This system today constitutes…

***Read and translate the text C, using a dictionary:***

**Text C**

**Waste Water**

A few statistics illustrate the scale of the problem that waste water (chemicals washed down drains and discharged from factories) can cause. Around half of all ocean pollution is caused by sewage and waste water. Each year, the world generates perhaps 5–10 billion tons of industrial waste, much of which is pumped untreated into rivers, oceans, and other waterways. In the United States alone, around 400,000 factories take clean water from rivers, and many pump polluted waters back in their place. However, there have been major improvements in waste water treatment recently. Since 1970, in the United States, the Environmental Protection Agency (EPA) has invested about $70 billion in improving water treatment plants that, as of 2015, serve around 88 percent of the US population (compared to just 69 percent in 1972). However, another $271 billion is still needed to update and upgrade the system.

Factories are point sources of water pollution, but quite a lot of water is polluted by ordinary people from nonpoint sources; this is how ordinary water becomes waste water in the first place. Virtually everyone pours chemicals of one sort or another down their drains or toilets. Even detergents used in washing machines and dishwashers eventually end up in our rivers and oceans. So do the pesticides we use on our gardens. A lot of toxic pollution also enters waste water from highway runoff. Highways are typically covered with a cocktail of toxic chemicals – everything from spilled fuel and brake fluids to bits of worn tires (themselves made from chemical additives) and exhaust emissions. When it rains, these chemicals wash into drains and rivers. It is not unusual for heavy summer rainstorms to wash toxic chemicals into rivers in such concentrations that they kill large numbers of fish overnight. It has been estimated that, in one year, the highway runoff from a single large city leaks as much oil into our water environment as a typical tanker spill. Some highway runoff runs away into drains; others can pollute groundwater or accumulate in the land next to a road, making it increasingly toxic as the years go by.

These are the most common forms of pollution – but by no means the only ones. Heat or thermal pollution from factories and power plants also causes problems in rivers. By raising the temperature, it reduces the amount of oxygen dissolved in the water, thus also reducing the level of aquatic life that the river can support.

Another type of pollution involves the disruption of sediments (fine-grained powders) that flow from rivers into the sea. Dams built for hydroelectric power or water reservoirs can reduce the sediment flow.

**SPEAKING**

Total industrial water use in the world is about 22 %, with high-income countries using 59 %, and low-income countries using a minuscule 8 %. These figures will rise with industrial production.

Annual water volume use by industry is increasing at an enormous rate. Annual water volume use will most likely increase from 752 km3/year in 1995 to 1,170 km3/year by the year 2025.

Industry is reliant on water for all levels of production…

***Make a report about the major uses of water in industry.***

**GRAMMAR**

***1. The first sentence is in the ACTIVE VOICE. Choose the most correct way of saying the same thing in the PASSIVE VOICE:***

1. They were interviewing her for the job.

She \_\_\_ for the job.

was being interviewed

was interviewed

has been interviewed

2. Tom is writing the letter.

The letter \_\_\_ by Tom.

was written

is being written

has been written

3. Everyone understands English.

English \_\_\_ by everyone.

is understood

has been understood

was understood

4. The employees brought up this issue during the meeting.

This issue \_\_\_\_ by the employees during the meeting.

has been brought up

is brought up

was brought up

5. The professor told him not to talk in class.

He \_\_\_\_ by the professor not to talk in class.

has been told

was told

was being told

6. They say that women are smarter than men.

Women \_\_\_ to be smarter than men.

were being said

were said

are said

7. The fire has destroyed the house.

The house \_\_\_ by the fire.

has been destroyed

was being destroyed

is destroyed

8. This surprises me.

I \_\_\_ by this.

would have been surprised

will be surprised

am surprised

***2. Drag the correct sentence beginnings and match them with the endings to make passive sentences:***

The actor… After his parents died, he… I am afraid that particular product… All members of the staff… Parents… Job applicants… Examination candidates… The decorations… The lifeboatman… The city centre premises…

1.\_\_\_ are requested not to smoke anywhere in the building.

2. \_\_\_\_ are currently being refurbished.

3. \_\_\_ was awarded a medal for bravery.

4. \_\_\_ are expected to arrive fifteen minutes before the start of the test.

5. \_\_\_ had already been offered the part twice before.

6. \_\_\_ was brought up by an aunt in New Zealand.

7. \_\_\_ will be informed of the result of the interview on Wednesday.

8. \_\_\_ has been discontinued.

9. \_\_\_ will be taken down at the end of the month.

10. \_\_\_ should always be told of the severity of their condition.

**Unit 5**

**WATER CONTAMINATION**

**READING**

**Text A**

**Water Pollution**

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

water pollution, unpleasant to look at, unsafe to eat, point source and nonpoint source, harmful substances, biodegradable, contaminated animals, to suffer cancers, nutrients, disease causing organisms, thermal pollution, household wastes.

***2. Read the text A and answer the question:*** *When does water pollution occur?*

Water pollution occurs mostly when people overload the water environment with wastes. It’s defined as contamination of streams, lakes, underground water, bays or oceans by substances harmful to living things.

Water is necessary to life on earth. All organisms contain it, some drink it and some live in it. Plants and animals require water that is moderately pure, and they cannot survive if their water is loaded with toxic chemicals or harmful microorganisms. If severe, water pollution can kill large numbers of fish, birds and other animals, in some cases killing all members of a species in an affected area.

Pollution makes streams, lakes and coastal waters unpleasant to look at, to smell and to swim in. Fish and shellfish harvested from polluted waters may be unsafe to eat. People who ingest polluted water can become ill and, if they’re exposed for a long time, may develop cancers or have children with birth defects.

There are two types of water pollution: point source and nonpoint source. Point sources of pollution occur when harmful substances are put directly into a body of water (such as an oil spill). A nonpoint source is when pollutants enter the water indirectly through environmental changes (like when fertilizer is carried into a stream by rain).

The major water pollutants are chemical, biological and physical materials that lessen the water quality.

Pollutants can be separated into eight different classes:

1. Petroleum Products – oil and chemicals from oil are used for fuel, lubrication, plastics manufacturing and many other purposes. The petroleum products get into water by accidental spills from ships, tanker trucks and leaky underground storage tanks. Many petroleum products are poisonous if ingested by animals and spilled oil damages the feathers of birds and the fur of animals, often causing death.

2. Pesticides and Herbicides – chemicals used to kill unwanted animals and plants may be carried into streams by rainwater. The chemicals in these that are not biodegradable can remain dangerous for a long time.

When an animal eats a plant that’s been treated with certain non-degradable chemicals, the chemicals are absorbed into the tissues or the organs of the animals. When other animals feed on a contaminated animal, the chemicals are passed up to them. As it goes up through the food chain, the chemical becomes more harmful, so animals at the top of the food chains may suffer cancers, reproductive problems and death.

Nitrates can cause a lethal form of anemia called blue baby syndrome in infants.

3. Heavy Metals – heavy metals, such as copper, lead, mercury and selenium get into the water from industries, automobile exhausts, mines and natural soil. Heavy metals also become more harmful as they follow the food chain. When they reach high levels in the body, they can be immediately poisonous or can result in long-term health problems. They can sometimes cause diarrhea and, over time, liver and kidney damage. Children exposed to lead in water can suffer mental retardation.

4. Hazardous Wastes – chemical wastes that are toxic, reactive, corrosive or ignitable. If not treated or stored properly, they can pollute water supplies. They can reach toxic levels when animals eat one another.

5. Excess Organic Matter – fertilizers and other nutrients used to promote plant growth on farms and in gardens may find their way into water. At first the nutrients will help the plants and algae in the water grow, but when they die and settle underwater, microorganisms decompose them, while decomposing them the microorganisms take in oxygen that is dissolved in the water. The oxygen levels in the water may drop so low that fish and other oxygen-dependent animals in the water suffocate and die.

6. Sediment – soil particles carried to a stream bed, lake or ocean, if in large amounts, can also be a pollutant. Soil erosion can damage a stream or lake by adding too much nutrient matter. Sedimentation can also cover stream bed gravel where many fish lay their eggs.

7. Infectious Organisms – many disease causing organisms that are present in small numbers in most natural waters are considered pollutants when found in drinking water. These parasites can cause illness, especially in people who are very young or very old and in people who are already suffering from other diseases.

8. Thermal Pollution – water is often taken from rivers, lakes, or the ocean to be used in factories and power plants. The water is usually returned to the source warmer than when it was taken. Even a small temperature change in a body of water can drive away the fish and other species that were originally there, and attract other species in place of them. Fish and other wildlife near the discharge source may die.

Another cause of pollution, pathogens (bacteria, viruses, and protozoan) can cause many illnesses from typhoid and dysentery to minor respiratory and skin diseases. They enter waterways through untreated sewage, storm drains, septic tanks, runoff from farms and boats that dump sewage.

Notes:

|  |  |
| --- | --- |
| to occur –  | происходить, случаться, совершаться |
| stream –  | река, ручей |
| bay –  | залив, бухта |
| harmful –  | вредный |
| quantity –  | количество |
| shellfish –  | моллюск, ракообразное |
| feathers of birds –  | перья птиц |
| to ingest –  | глотать, проглатывать |
| to lessen –  | уменыпать(ся), сокращать(ся) |
| petroleum products –  | нефтепродукты |
| accidental –  | случайный |
| to spill –  | проливаться), разливать(ся),) |
| lubrication –  | смазка, смазочные материалы |
| tanker truck –  | грузовой танкер |
| leak –  | течь, протечка, утечка |
| underground storage tank –  | подземные хранилища (резервуары) |
| poisonous –  | ядовитый |
| to remain –  | оставаться |
| to absorb –  | всасывать, впитывать; поглощать |
| tissue –  | ткань |
| contaminated –  | зараженный, загрязненный |
| exhausts –  | выхлопные газы |
| liver –  | печень |
| kidney –  | почка |
| nutrient –  | питательное вещество |
| sewage –  | сточные воды, нечистоты |
| storm drains – to penetrate –  | дренажипроникать |

***3. Read the text again and do the exercises:***

**1. Find the English for*:*** вредный для живых организмов, в некоторых случаях, вредные вещества, ядовитый, снизить качество воды, случайные утечки, страдать от заболеваний, летальный исход, разрушение почвы, питьевая вода, русло реки, снизить уровень кислорода в воде, респираторные и кожные заболевания, разрушение печени и почек, термальное загрязнение, ускорить биологические процессы.

**2. Arrange the following words and word combinations in pairs of synonyms:**

Pure, illness, polluted, velocity, harmful, to happen, heavy, amount, to lessen, disease, quantity, to demand, fresh, contaminated, dangerous, to lower, light, to require, to occur, speed.

**3. Answer the questions:**

1. Why do plants and animals require pure water?

2. What are the major water pollutants?

3. How can pollutants be separated?

4. How do petroleum products affect the animals?

5. Why can pesticides and herbicides be dangerous if they penetrate into streams, rivers and lakes?

6. What do heavy metals result in?

7. How do fertilizers penetrate to water?

8. What damage can thermal pollution cause?

***Read the text B and do the exercises below:***

**Text B**

**What are the Causes of Water Pollution?**

Most water pollution doesn’t begin in the water itself. Take the oceans: around 80 percent of ocean pollution enters our seas from the land. Virtually any human activity can have an effect on the quality of our water environment. When farmers fertilize the fields, the chemicals they use are gradually washed by rain into the groundwater or surface waters nearby. Sometimes the causes of water pollution are quite surprising. Chemicals released by smokestacks (chimneys) can enter the atmosphere and then fall back to earth as rain, entering seas, rivers, and lakes and causing water pollution. That's called atmospheric deposition. Water pollution has many different causes and this is one of the reasons why it is such a difficult problem to solve.

*Sewage*

With billions of people on the planet, disposing of sewage waste is a major problem. According to 2015 and 2016 figures from the World Health Organization, some 663 million people (9 percent of the world’s population) don’t have access to safe drinking water, while 2.4 billion (40 percent of the world's population) don't have proper sanitation (hygienic toilet facilities); although there have been great improvements in securing access to clean water, relatively little progress has been made on improving global sanitation in the last decade. Sewage disposal affects people’s immediate environments and leads to water-related illnesses such as diarrhea that kills 525,000 children under five each year. In developed countries, most people have flush toilets that take sewage waste quickly and hygienically away from their homes.

Yet the problem of sewage disposal does not end there. When you flush the toilet, the waste has to go somewhere and, even after it leaves the sewage treatment works, there is still waste to dispose of. Sometimes sewage waste is pumped untreated into the sea.

In theory, sewage is a completely natural substance that should be broken down harmlessly in the environment: 90 percent of sewage is water. In practice, sewage contains all kinds of other chemicals, from the pharmaceutical drugs people take to the paper, plastic and other wastes they flush down their toilets. When people are sick with viruses, the sewage they produce carries those viruses into the environment. It is possible to catch illnesses such as hepatitis, typhoid and cholera from river and sea water.

*Nutrients*

Suitably treated and used in moderate quantities, sewage can be a fertilizer: it returns important nutrients to the environment, such as nitrogen and phosphorus, which plants and animals need for growth. The trouble is sewage is often released in much greater quantities than the natural environment can cope with. Chemical fertilizers used by farmers also add nutrients to the soil, which drain into rivers and seas and add to the fertilizing effect of the sewage. Together, sewage and fertilizers can cause a massive increase in the growth of algae or plankton that overwhelms huge areas of oceans, lakes, or rivers.

*Waste water*

A few statistics illustrate the scale of the problem that waste water (chemicals washed down drains and discharged from factories) can cause. Around half of all ocean pollution is caused by sewage and waste water. Each year, the world generates perhaps 5–10 billion tons of industrial waste, much of which is pumped untreated into rivers, oceans, and other waterways.

Factories are point sources of water pollution, but quite a lot of water is polluted by ordinary people from nonpoint sources; this is how ordinary water becomes waste water in the first place. Virtually everyone pours chemicals of one sort or another down their drains or toilets. Even detergents used in washing machines and dishwashers eventually end up in our rivers and oceans. So do the pesticides we use on our gardens. A lot of toxic pollution also enters waste water from highway runoff. Highways are typically covered with a cocktail of toxic chemicals – everything from spilled fuel and brake fluids to bits of worn tires and exhaust emissions. When it rains, these chemicals wash into drains and rivers. It has been estimated that, in one year, the highway runoff from a single large city leaks as much oil into our water environment as a typical tanker spill.

*Radioactive waste*

People view radioactive waste with great alarm – and for good reason. At high enough concentrations it can kill; in lower concentrations it can cause cancers and other illnesses. The biggest sources of radioactive pollution in Europe are two factories that reprocess waste fuel from nuclear power plants: Sellafield on the north-west coast of Britain and Cap La Hague on the north coast of France. Both discharge radioactive waste water into the sea, which ocean currents then carry around the world.

*Oil pollution*

When we think of ocean pollution, huge black oil slicks often spring to mind, yet these spectacular accidents represent only a tiny fraction of all the pollution entering our oceans. Even considering oil by itself, tanker spills are not as significant as they might seem: only 12 percent of the oil that enters the oceans comes from tanker accidents; over 70 percent of oil pollution at sea comes from routine shipping and from the oil people pour down drains on land.

*Plastics*

If you've ever taken part in a community beach clean, you'll know that plastic is far and away the most common substance that washes up with the waves. There are three reasons for this: plastic is one of the most common materials, used for making virtually every kind of manufactured object from clothing to automobile parts; plastic is light and floats easily so it can travel enormous distances across the oceans; most plastics are not biodegradable (they do not break down naturally in the environment), which means that things like plastic bottle tops can survive in the marine environment for a long time. (A plastic bottle can survive an estimated 450 years in the ocean and plastic fishing line can last up to 600 years.)

While plastics are not toxic in quite the same way as poisonous chemicals, they nevertheless present a major hazard to seabirds, fish, and other marine creatures.

*Other forms of pollution*

These are the most common forms of pollution – but by no means the only ones. Heat or thermal pollution from factories and power plants also causes problems in rivers. By raising the temperature, it reduces the amount of oxygen dissolved in the water, thus also reducing the level of aquatic life that the river can support.

Another type of pollution involves the disruption of sediments (fine-grained powders) that flow from rivers into the sea.

Notes:

|  |  |
| --- | --- |
| sewage –  | сточные воды, нечистоты |
| smokestacks (chimneys) –  | дымовые трубы (дымоходы) |
| deposition –  | отложение, осадок |
| hygienically –  | гигиенически |
| to overwhelm –  | сокрушать |
| to pour –  | лить |
| discharge –  | выделение, освобождение |
| to float –  | плавать, плыть |

**Find the English equivalents in the text:**

1. Около 80 % загрязнений попадает в моря с земли.

2. Загрязнение воды имеет много причин.

3. 9  % населения земли не имеют доступа к питьевой воде.

4. 90 процентов всех нечистот составляет вода.

5. К нечистотам относятся и удобрения.

6. Вместе, сточные воды и удобрения могут привести к значительному увеличению роста водорослей или планктона, которые поражают огромные площади океанов, озер или рек.

7. Заводы являются точечными источниками загрязнения воды, но довольно много воды загрязняют простые люди из неточечных источников.

8. Только 12 % нефти попадает в моря и океаны из-за аварий танкеров; более 70 % загрязнений морей нефтью происходит из-за судоходства и из-за нефтяников, чья нефть проливается на землю.

9. Существуют три причины для этого: пластик является одним из самых распространенных материалов, используемых для производства практически любого вида изготавливаемого предмета, от одежды до автомобильных деталей; пластик легкий и плавает легко, так что он может путешествовать на огромные расстояния через океаны, большинство пластмасс не разлагаются (они не разлагаются естественным путем в окружающей среде), что означает, что такие вещи, как пластиковая бутылка, могут жить в морской среде в течение длительного времени.

10. В результате повышения температуры, уменьшается количество кислорода в воде, таким образом снижается уровень водной жизни.

***Read and translate the text C, using a dictionary:***

**Text C**

**How can We Stop Water Pollution?**

There is no easy way to solve water pollution; if there were, it wouldn't be so much of a problem. Broadly speaking, there are three different things that can help to tackle the problem – education, laws, and economics – and they work together as a team.

*Education*

Making people aware of the problem is the first step to solving it. In the early 1990s, when surfers in Britain grew tired of catching illnesses from water polluted with sewage, they formed a group called Surfers against Sewage to force governments and water companies to clean up their act. People who’ve grown tired of walking the world’s polluted beaches often band together to organize community beach-cleaning sessions. Anglers who no longer catch so many fish have campaigned for tougher penalties against factories that pour pollution into our rivers. Greater public awareness can make a positive difference.

*Laws*

One of the biggest problems with water pollution is its transboundary nature. Many rivers cross countries, while seas span whole continents. Pollution discharged by factories in one country with poor environmental standards can cause problems in neighboring nations, even when they have tougher laws and higher standards. Environmental laws can make it tougher for people to pollute, but to be really effective they have to operate across national and international borders. This is why we have international laws governing the oceans, such as:

– the 1982 UN Convention on the Law of the Sea signed by over 120 nations),

– the 1972 London Dumping Convention,

– the 1978 MARPOL International Convention for the Prevention of Pollution from Ships,

– the 1998 OSPAR Convention for the Protection of the Marine Environment of the North - East Atlantic.

The European Union has water-protection laws known as directives that apply to all of its member states. They include the 1976 Bathing Water Directive updated 2006, which seeks to ensure the quality of the waters that people use for recreation. Most countries also have their own water pollution laws.

*Economics*

Most environmental experts agree that the best way to tackle pollution is through something called the polluter pays principle. This means that whoever causes pollution should have to pay to clean it up, one way or another. Polluter pays can operate in all kinds of ways. It could mean that tanker owners should have to take out insurance that covers the cost of oil spill cleanups, for example. It could also mean that shoppers should have to pay for their plastic grocery bags, as is now common in Ireland, to encourage recycling and minimize waste. Or it could mean that factories that use rivers must have their water inlet pipes downstream of their effluent outflow pipes, so if they cause pollution they themselves are the first people to suffer. Ultimately, the polluter pays principle is designed to deter people from polluting.

*Our clean future*

Life is ultimately about choices – and so is pollution. We can live with sewage-strewn beaches, dead rivers, and fish that are too poisonous to eat. Or we can work together to keep the environment clean so the plants, animals, and people who depend on it remain healthy. We can take individual action to help reduce water pollution, for example, by using environmentally friendly detergents, not pouring oil down drains, reducing pesticides, and so on. We can take community action too, by helping out on beach cleans or litter picks to keep our rivers and seas that little bit cleaner.

To help, we need to learn about ways for disposing harmful household wastes so they don’t end up in sewage treatment plants or landfills. In our yards, we should determine whether or not we need to add nutrients before fertilizers are applied and look for alternatives where fertilizers may run off into surface waters. We need to preserve existing trees and plant new trees and shrubs to help prevent soil erosion. Around the house we should keep litter, pet waste, leaves and grass clippings out of gutters and storm drains, and buy as many heavily packaged foods, certain boxes, cartons, bottles, etc. that are made without polluting dyes. And we can take action as countries and continents to pass laws that will make pollution harder and the world less polluted. Working together, we can make pollution less of a problem – and the world a better place.

**SPEAKING**

***1. Read the conversation of two friends about the water pollution problems and act the dialogue:***

**A Dialogue**

***Mike:*** Hello Derek, how are you? Why do you look so worried?

***Derek:*** You are right. I am somewhat worried about water pollution.

***Mike:*** Oh, Yes! Water is in a great danger. It is being polluted severely.

***Derek:*** The problem of water pollution has become a major threat for the human beings as well as the animals.

***Mike:*** Exactly! But what are you thinking about its impact?

***Derek:*** The impact of water pollution is serious. It gives rise to ecological imbalance and brings about natural disasters.

***Mike:*** Absolutely! Chemicals released by smokestacks (chimneys) can enter the atmosphere and then fall back to earth as rain, entering seas, rivers and lakes and causing water pollution. That's called atmospheric deposition. Sewage and fertilizers, industrial wastes, much of which are pumped untreated into rivers, oceans and other waterways make the water polluted and dangerous. What is your idea about it?

***Derek:*** I agree with you. Besides, I think the plants and animals are likely to be extinct on account of the water pollution. Heat or thermal pollution from factories and power plants also causes problems in rivers. By raising the temperature, it reduces the amount of oxygen dissolved in the water, thus also reducing the level of aquatic life that the river can support.

***Mike:*** Yes, of course. Besides, due to water pollution we are suffering from various kinds of diseases.

***Derek:*** You are right! It is possible to catch illnesses such as hepatitis, typhoid and cholera from river and sea water.

***Mike:*** How can we stop water pollution?

***Derek:*** There is no easy way to solve water pollution; if there were, it wouldn't be so much of a problem. Broadly speaking, there are three different things that can help to tackle the problem – education, laws and economics – and they work together as a team. The people from all walks of life should come forward to stop polluting the environment. They should be made aware of its harmful effect.

***2. Make up your own dialogues.***

**GRAMMAR**

***1. Choose a suitable verb form to complete a sentence:***

1. Their new house \_\_\_ yet.

hasn't been finished

wasn't finished

2. I don't agree that you \_\_\_ to show your ID.

will be asked

are being asked

3. Most of the students \_\_\_ easily to the boat.

were swum

were swimming

4. When \_\_\_ about the party?

have you been told

were you told

5. The winning car \_\_\_ by Sienna.

was driving

was driven

6. By the time we got there, the rain \_\_\_.

had been stopped

had stopped

7. She told me her baby \_\_\_ two weeks earlier than expected.

had been born

is born

8. I looked again for the young boy, but he \_\_\_.

had vanished

was vanishing

9. If there is too much snow, the match \_\_\_.

has been cancelled

will be cancelled

10. The burglars \_\_\_ as soon as they got into the car.

have been arrested

were arrested

***2. Complete the sentences using the correct form of the Passive Voice***

1. The authorities decided that the meeting (hold) next Wednesday.

2. The goods (transport) to our house in the Midlands every Friday.

3. The larger portrait (paint) by a well-known Flemish artist.

4. When I arrived I (hand) a note by one of the delegates.

5. Nothing (see) of Pauline since her car accident last spring.

6. I'll have to stay at home because our new furniture (deliver).

7. For the past few days I had to work in Jack's office because mine (redecorate) at the moment.

8. A major new oil deposit (discover) in the North Sea recently.

**Unit 6**

**WATER PURIFICATION**

**READING**

**Text A**

**Water Purification**

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

an essential ingredient, desalinated sea water, contaminating liquids, to purify water, to condense into water droplets, distilled water, to contain non-toxic additives, original liquid, to break free, the newly formed mixture.

***2. Read the text again and answer the question:*** *Why should water be purified?*

Fresh water is an essential ingredient of modern life. Though it’s often available as the result of natural processes, there are times when it must be extracted from impure water, typically salt water. In some countries where rain water is scarce, desalinated sea water is the main source of drinking water. Any extraction process that purifies water must separate water molecules from contaminating liquids, solids or gases. You can purify water in your own kitchen. If you boil salt water in a pot, you’ll create steam and will see mist forming above the water as that steam condenses into water droplets in the air. If you place a cold surface in the steam, the steam will condense on that surface. The condensed steam is nearly pure water – distilled water. While the water in the pot contained salt, the distilled water does not. However, before you taste the distilled water, make sure that the water in the pot contained only non-toxic additives. Distillation isn’t perfect at removing contaminants and it can even concentrate them in some situations.

One way to purify water is by distillation. Distillation is a general technique for separating various chemicals from one another. The chemicals are heated to form a vapor and that vapor is condensed to form a new mixture of chemicals. In some cases, the condensed liquid contains primarily a single chemical – all of the other chemicals are left behind in the original liquid. To understand how distillation can purify water, let’s remember the phases of water. At any temperature above absolute zero, there’s a possibility of finding gaseous water molecules above the surface of ice or water. These water molecules have acquired enough thermal energy to break free of the solid or liquid and become a gas.

***3. Read the text again and do the exercises:***

**1. Find the synonyms in the text:** to treat, fresh water, potable water, steam, moisture, to include, natural, various, random.

**2. Give one word for the following:** water without contaminants and salt; separating various chemicals from one another; to create steam and see mist forming above the water; to form a vapor.

(pure, distillation, to boil, to heat)

**3. Answer the questions:**

1. What is fresh water?

2. What must fresh water be extracted from?

3. What is the main source of drinking water in some countries?

4. How can you purify water in your kitchen?

5. What is distillation?

6. How can distillation purify water?

***Read the text B and do the exercises below:***

**Text B**

**World Water Day**

World Water Day is observed on March 22 since 1993. It was declared as such by the United Nations General Assembly. This day was first formally proposed in Agenda 21 of the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. Observance began in 1993 and has grown significantly ever since.

The UN and its member nations devote this day to implementing UN recommendations and promoting concrete activities within their countries regarding the world’s water resources. Each year, one of various UN agencies involved in water issues takes the lead in promoting and coordinating international activities for World Water Day.

In addition to the UN member states, a number of NGOs promoting clean water and sustainable aquatic habitats have used World Day for Water as a time to focus public attention on the critical water issues of our era. Every three years since 1997, for instance, the World Water Council has drawn thousands to participate in its World Water Forum during the week of World Day for Water. Participating agencies and NGOs have highlighted issues such as a billion people being without access to safe water for drinking and the role of gender in family access to safe water.

**Say if a sentence is True or False:**

1. World Water Day was first proposed in 1993 in Rio de Janeiro.

a. True

b. False

2. Only UN member states are involved in the promoting World Water Day.

a. True

b. False

3. Not everybody has access to drinking water.

a. True

b. False

***Read and translate the text C, using a dictionary:***

**Text C**

**Water Treatment Devices for Disinfection of Drinking Water**

Water treatment devices can be divided into two groups according to function. There are several types of devices within these two groups, each suited to a specific water quality problem. Water treatment devices that disinfect water will be discussed here. Those that improve the overall taste, smell and appearance of the water or remove undesirable chemicals and minerals are discussed in the Health Canada “It's Your Health” publication entitled Water Treatment Devices for the Removal of Taste, Odour and Chemicals.

Point-of-use devices are portable, plumbed-in or faucet-mounted and are used to treat the water at a single tap or multiple taps for drinking and cooking only. Point-of-entry devices are installed on the main water supply and treat all the water entering the home.

Chlorinators, iodinators and ultraviolet light (UV) devices are most practical when it is necessary to disinfect water that serves a whole dwelling. Chlorine and iodine kill most disease-causing organisms and require short to moderate contact times. In fact, the use of chlorine on municipally treated water systems has virtually eliminated waterborne infectious diseases such as typhoid and cholera. Chlorine or iodine treatment alone, however, may not provide adequate protection against protozoa such as Giardia lamblia and Cryptosporidium parvum. If protozoa are present or suspected, it is recommended that the water be first passed through a filter with a 0.1-micrometre or smaller pore size to remove these parasites and then chemically treated with chlorine or iodine to kill bacteria and viruses.

Iodine disinfection of drinking water, however, should be reserved for emergency and occasional use (e.g., at a weekend cottage or in recreational vehicles). Iodine should not be used for long-term continuous disinfection because it is physiologically active, and ingestion in excessive amounts may be harmful.

UV devices are also effective against bacteria, viruses and protozoa, add nothing to water and produce no taste or odour; in addition, only a few seconds' exposure to UV light is required if the water is clear. They do not, however, ensure the safety of the water beyond the point of application, so that flushing of the system is recommended after periods of non-use. Point-of-use UV light devices are also available. A pre-filter, however, should always be employed to reduce turbidity, thus improving the effectiveness of the UV light.

Ceramic or glass fibre filters handle smaller amounts of water and are useful when water from just one tap is to be treated for drinking and cooking or to provide drinking water while camping, boating or hiking. Such filters can remove bacteria and protozoa from mildly contaminated waters. However, they are not suitable for removing viruses or for treating highly contaminated water. Therefore, when treating surface waters, it is recommended that these filters be used in conjunction with disinfection. Portable glass fibre or ceramic filters with iodine-releasing resins are available to disinfect water for campers, etc., or for travellers in countries where the safety of the drinking water is questionable. Some iodine-releasing devices contain an activated carbon filter to remove excess iodine from the water.

Distillers and ozonators are point-of-use devices suitable where electric power is available, and where there is sufficient space to install the equipment. Distillation is commonly used to reduce the levels of all chemicals in drinking water. These distillation devices are effective for the removal of inorganic chemicals, including heavy metals, and some organic chemicals, but are often combined with activated carbon for the removal of certain “volatile” chemicals (e.g., trihalomethanes, tetrachloroethylene). The boiling process also kills any microorganisms (viruses, bacteria and protozoa) present in the water. There are not known beneficial or harmful health effects associated with the ingestion of demineralized or distilled water.

Ozonators produce small quantities of ozone, a strong oxidizing agent that is effective in killing pathogens over a short period of time. Ozonation produces no taste or odour in the water. The process is dependent, however, on good mixing of ozone with the water. Unlike chlorine and iodine, ozone does not protect the water after application. Ozonation is often combined with activated carbon filtration to achieve more complete water treatment.

Conclusions

When camping, canoeing or hiking, you should assume that all waters contain disease- causing organisms, and you should disinfect the drinking water before use. Care must also be taken to avoid ingestion of untreated water during other activities (for instance, when brushing your teeth).

**SPEAKING**

**Case study**

Этапы работы студентов с кейсом:

– ознакомление с ситуацией;

– анализ информации;

– поиск решения;

– выявление преимуществ и недостатков каждого предложенного решения;

– оценка альтернатив;

– презентация результатов;

– оценивание участников;

– подведение итогов.

***1. Ознакомление с ситуацией:***

**Water Disinfection Problems in Russia**

Water is everywhere. It’s an integral part of all living beings but there is no ocean or sea in the whole world which wouldn’t be used as a dump. Water pollution not only damages large populations of birds, fish and animals but also affects people in different ways. In several years there will be no beaches and recreational zones to have a rest and no safe water to drink.

There are different types of water pollution. One of the worst ones is petroleum products such as oil, fuel and plastic which are accidentally spilled from ships and tankers as a result of the leak. They are very dangerous for our sea world and often cause massive death.

Another type of pollutants is poisonous chemicals. When they get into rivers and lakes they may infect fish and animals and when harvested they become a serious threat to people’s health.

Pollutants represented by heavy metals such as uranium, radium, selenium and some others result from industry, car fumes and mines. When their concentration in the organism reaches quite a high level they may cause long-term health problems.

One more class of harmful pollutants is pathogens which penetrate into water by means of sewage, storm drains and runoff from farms.

Finally, thermal pollution is a great concern. Very often water used in factories and power plants is poured back into lakes and seas being much warmer which is not optimal for many species of fish, so they go away from those places. As a result, the whole balance is broken.

If people want to save our planet’s water resources, urgent measures must be taken to protect it.

In Russia drinking water is disinfected with chlorine. Derivatives of chlorine (chloroform, horfe-Nol, chlorides, etc.) have oncogenic (carcinogenic and mutagenic, i.e., capable of influencing the human genetic system. American and Finnish scientists Doc showed that chlorine derivatives cause from 5 to 15% of all cancers. High chlorine content in water and its compounds often provokes respiratory disease, pneumonia, gastritis. We use chlorine and as a defense against microbial infection when the passer-Denia miles of water pipelines in the city, despite the fact that many Viru-si to the effects of chlorine resistant.

Onother water disinfection method is its ionization.

***2. Анализ информации:***

The task is:

Analyze the information and suggest the most effective way would water disinfection. Prove your advantages. Highlight the advantages and disadvantages of those that currently have found wide practical application.

***3. Поиск решения:***

Students in the process should pay attention to the following aspects:

1. The problem of water disinfection in Russia.

2. Chlorination: the advantages and disadvantages. Methods of chlorination of drinking water. In-ranks various bactericidal effectiveness of chlorine-containing reagents.

3. Ozonation as a method of disinfection of drinking water.

4. The effect of silver ions on the pathogens of various diseases.

5. Oxidizing properties of potassium permanganate.

6. Alternative methods of disinfection of drinking water: an integrated method (lge-plan and chlorination), disinfection by ultraviolet rays, by using physical methods.

***4. Презентация результатов:***

Useful language bank for communication expressing opinion:

My point of view is that…

It seems\appears to me that…

I think\believe…\must…\

In my opinion\view…

To me…\may\might

From my point of view…

To my mind/ way of thinking…

As far as I am concerned…

I am totally against…

I (do not) agree that \with…

I (completely) agree \disagree that \with…

I want to ask a question.

Sorry, could you repeat that?

I think we should leave this point and come back to it later.

So what you’re saying is you will …

Can we just summarize the points we’ve agreed so far?

***5. Оценивание участников.***

***6. Подведение итогов.***

**GRAMMAR**

***Open the brackets to complete the sentences:***

1. The space probe Explorer (launch) from Cape Canaveral last year.

2. Breakfast (not serve) in this hotel before 7 am.

3. Up to now no decision (make) on the future of the company.

4. As we speak the suspect (question) by the police.

5. A lot of meetings (hold) but nothing has been decided yet.

6. The door (not open) for at least twenty years.

7. Bicycles (use) widely in this city instead of public transport.

8. Elections (hold) in Britain every five years.

9. Your drinks (bring) to you in a minute. Please wait.

10. The Olympic Games (organize) in South Korea for the first time in 2018.

**Unit 7**

**WATER SCARCITY**

**READING**

**Text A**

**Water Scarcity**

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

a lack of drinkable water, arid and deserted areas, too polluted to drink, water scarcity, over-consumption, water stress, water crisis, harvests fail, biodiversity.

***2. Read the text and answer the question:*** *What is the result of water scarcity?*

Water scarcity is a lack of drinkable water available in a given area. It mostly affects arid and deserted areas, and places where the water is too polluted to drink. It is a social, environmental and economic problem in many countries. Water scarcity can be the result of both human and natural causes. Changes in climate and weather patterns can cause the availability of water to drop. Common human causes include over-consumption, bad governance, pollution and increases in the demand for water.

Different terms are used to describe different types of water scarcity:

– A water shortage is when there is not enough water to meet demands. Changes in the weather, such as drought can cause water shortage.

– Water stress is the difficulty of finding sources of fresh water for use.

– A water crisis is a situation where the available supply of potable, clean water within an area is less than the demand for it.

The Food and Agriculture Organization (FAO) estimates that by 2025, 1.9 billion people will be living in countries or regions with total water scarcity, and two-thirds of the world population could be under stress conditions. The World Bank has said that climate change could heavily change the future of water availability and use, and therefore increase water stress on a global scale.

Water scarcity has negative effects on ecology, biodiversity, agriculture and human health. It has also led to armed conflicts in several cases.

The causes of water scarcity are varied. Some are natural and others are as a result of human activity. The current debate sites the causes as largely deterministic in that scarcity is a result of identifiable cause and effect. However, if water scarcity is the point at which water stress occurs (the point at which various conflicts arise, harvests fail and the like), then there are also less definable sociological and political causes.

***3. Read the text again and do the exercises:***

**1. Find the English for:** засуха приводит к дефициту воды; две трети населения земного шара находятся в стрессовом состоянии; негативное влияние на экологию; неэффективное управление; климатические изменения; приводит к вооруженным конфликтам.

**2. Match the words (1–8) with the definitions (A–H):**

|  |  |
| --- | --- |
| 1. scarcity | A. a period of dry weather especially a long one that is injurious to crops |
| 2. arid | B. growth or augmentation in numbers, size, strength, quality etc. |
| 3. drought | C. an urgent or pressing requirement |
| 4. biodiversity | D. being without moisture |
| 5. availability | E. insufficiency or shortness to supply |
| 6. pollution | F. diversity among and within plant or animal species in an environment |
| 7. demand | G. the introduction of harmful substances or products into the environment |
| 8. increase | H. readily obtainable |

**3. Answer the questions:**

1. What is water scarcity?

2. What can changes in climate and weather patterns cause?

3. What do common human causes include?

4. What are the types of water scarcity?

5. What has water scarcity negative effects on?

6. What are the causes of water scarcity?

***Read the text B and do the exercises below:***

**Text B**

**Physical and Economic Scarcity**

Water scarcity can result from two mechanisms:

– physical (absolute) water scarcity

– economic water scarcity

Around one fifth of the world's population currently live in regions affected by Physical water scarcity, where there is inadequate water resources to meet a country's or regional demand, including the water needed to fulfill the demand of ecosystems to function effectively. Arid regions frequently suffer from physical water scarcity. It also occurs where water seems abundant but where resources are over-committed, such as when there is over development of hydraulic infrastructure for irrigation. Symptoms of physical water scarcity include environmental degradation and declining groundwater as well as other forms of exploitation or overuse.

Economic water scarcity is caused by a lack of investment in infrastructure or technology to draw water from rivers, aquifers or other water sources or insufficient human capacity to satisfy the demand for water. One quarter of the world's population is affected by economic water scarcity. Economic water scarcity includes a lack of infrastructure, causing the people without reliable access to water to have to travel long distances to fetch water that is often contaminated from rivers for domestic and agricultural uses. Large parts of Africa suffer from economic water scarcity; developing water infrastructure in those areas could therefore help to reduce poverty. Critical conditions often arise for economically poor and politically weak communities living in already dry environment. Consumption increases with GDP per capita in most developed countries the average amount is around 200–300 litres daily. In underdeveloped (e.g. in African countries such as Mozambique), average daily water consumption per capita was below 10 L. This is against the backdrop of international organizations, which recommend a minimum of 20 L of water (not including the water needed for washing clothes), available at most 1 km from the household. Increased water consumption is correlated with increasing income, as measured by GDP per capita. In countries suffering from water shortages water is the subject of speculation.

Notes:

GDP – Gross Domestic Product – ВВП

***1. Give the English equivalents to the following sentences:***

1. Увеличение потребления воды связано с увеличением дохода, измеряемого ВВП на душу населения.

2. Около одной пятой населения в мире живут в регионах, страдающих от нехватки воды.

3. Экономической дефицит воды включает в себя отсутствие инфраструктуры, в результате чего людям, не имеющим доступа к воде, приходится преодолевать большие расстояния, чтобы принести воды, зачастую из загрязненных рек, для бытового и сельскохозяйственного использования.

4. С увеличением ВВП на душу населения, увеличивается потребление воды в развитых странах в среднем на 200-300 литров в день.

5. В неразвитых странах среднее потребление воды на душу населения составляет 10 литров в день.

6. Критические состояния часто возникают для экономически и политически слабых общин, живущих в засушливой среде обитания.

***Read and translate the text C, using a dictionary:***

**Text C**

**Effects of Water Crisis**

There are several principal manifestations of the water crisis:

– Inadequate access to safe drinking water for about 884 million people

– Inadequate access to sanitation for 2.5 billion people, which often leads to water pollution

– Groundwater overdrafting (excessive use) leading to diminished agricultural yields

– Overuse and pollution of water resources harming biodiversity

– Regional conflicts over scarce water resources sometimes resulting in warfare.

Waterborne diseases caused by lack of sanitation and hygiene are one of the leading causes of death worldwide. For children under age five, waterborne diseases are a leading cause of death. According to the World Bank, 88 percent of all waterborne diseases are caused by unsafe drinking water, inadequate sanitation and poor hygiene.

Water is the underlying tenuous balance of safe water supply, but controllable factors such as the management and distribution of the water supply itself contribute to further scarcity.

A 2006 United Nations report focuses on issues of governance as the core of the water crisis, saying “There is enough water for everyone” and “Water insufficiency is often due to mismanagement, corruption, lack of appropriate institutions, bureaucratic inertia and a shortage of investment in both human capacity and physical infrastructure”. Official data also shows a clear correlation between access to safe water and GDP per capita.

It has also been claimed, primarily by economists, that the water situation has occurred because of a lack of property rights, government regulations and subsidies in the water sector, causing prices to be too low and consumption too high.

Vegetation and wildlife are fundamentally dependent upon adequate freshwater resources. Marshes, bogs and riparian zones are more obviously dependent upon sustainable water supply, but forests and other upland ecosystems are equally at risk of significant productivity changes as water availability is diminished. In the case of wetlands, considerable area has been simply taken from wildlife use to feed and house the expanding human population. But other areas have suffered reduced productivity from gradual diminishing of freshwater inflow, as upstream sources are diverted for human use.

In Europe extensive loss of wetlands has also occurred with resulting loss of biodiversity. For example, many bogs in Scotland have been developed or diminished through human population expansion.

Deforestation of the Madagascar Highland Plateau has led to extensive siltation and unstable flows of western rivers.

On Madagascar's highland plateau, a massive transformation occurred that eliminated virtually all the heavily forested vegetation in the period 1970 to 2000. The slash and burn agriculture eliminated about ten percent of the total country's native biomass and converted it to a barren wasteland. These effects were from overpopulation and the necessity to feed poor indigenous peoples, but the adverse effects included widespread gully erosion that in turn produced heavily silted rivers that “run red” decades after the deforestation. This eliminated a large amount of usable fresh water and also destroyed much of the riverine ecosystems of several large west-flowing rivers. Several fish species have been driven to the edge of extinction.

**SPEAKING**

***Read the conversation between two housewives who live on two different lanes in the same area and act the dialogue:***

**A Dialogue**

***Savita:*** Hi Meena

***Meena:*** Savi, what happened? Why do you look so tensed?

***Savita:*** Well, we get water in our taps only on alternate days. That makes it very difficult to do things.

***Meena:*** Oh

***Savita:*** That's not all. Today we were supposed to get water, and it didn't come. I'm really fed up. My sink is full and clothes to be washed have also piled up!

***Meena:*** That's difficult. We got water today and I have stored water in a few buckets. Maybe I can give you a bucket.

***Savita:*** No. That's okay! I guess I just wanted to get the frustration out of my system. I won't be able to complete my work with one bucket. I have asked my husband to buy water from a water tank supplier.

***Meena:*** What a sad situation we have come to. We need to buy, even water.

***Savita:*** Yes. And it's very expensive.

***Meena:*** I've heard.

***Savita:*** It frightens me to think about the future. If this is the situation now, what will our children go through?

***Meena:*** That's true. We need to emphasize on the importance of saving, even little drops of water from now itself.

***Savita:*** Also, about not polluting water, because this also reduces water for human consumption.

**GRAMMAR**

***1. Choose the correct option:***

1. \_\_\_ you speak any foreign languages?

a. May

b. Can

c. Have

2. Liz \_\_\_ get tired of her job. It is so boring.

a. has to

b. must

c. should

3. Where's Nick? He \_\_\_ be in his office.

a. might

b. mustn't

c. is to

4.Take an umbrella. It \_\_\_ rain later.

a. has to

b. need

c. might

5. Jack \_\_\_ go to hospital yesterday.

a. must

b. had to

c. need

6. You look tired. You \_\_\_ go to bed.

a. should

b. ought

c. are to

7. You \_\_\_ do it. I've already done it.

a. must not

b. need not

c. ought not

8. \_\_\_ it be true?

a. Must

b. May

c. Can

9. \_\_\_ we stay or leave?

a. Will

b. Would

c. Shall

10. Jane was so tired. She \_\_\_ have worked days and nights.

a. should

b. must

c. need

***2. Insert the correct modal verb into the box:***

Can, couldn't, have to, might, must, ought to, shouldn't, was able.

1. It's very cold today. Do you think it \_\_\_ snow later?

2. You \_\_\_ leave your door unlocked when you go out.

3. They \_\_\_ have filled the car with petrol before they set off.

4. My motorbike broke down in the middle of nowhere, but luckily I \_\_\_ to fix it.

5. Mum says we \_\_\_ watch TV after we've finished our homework.

6. You don't \_\_\_ pick me up at the station. I can get a taxi.

7. This is impossible, it \_\_\_ be a mistake!

8. Jim \_\_\_ have seen me because he walked past without saying “Hello”.

**Unit 8**

**WATER EFFICIENCY**

**READING**

**Text A**

**Water Conservation**

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

an infinite source, to ensure proper sanitation, waterborne diseases, water conservation, to dump raw sewage, withdrawal of freshwater, natural replacement rate, to create and support life.

***2. Read the text A and answer the questions:*** *1.* *What is the role of water on our planet? 2. What should be done to conserve water?*

Water is one of the most important resources on this planet. Without water life on our planet wouldn't be possible and we should really do everything that is in our power to ensure enough water for our future generations. Though oceans cover almost three quarters of our planet that will mean very little to future thirsty generation because we need freshwater to survive, and freshwater is not an infinite source.

Will there be enough water for all in years to come? Even now there is not enough water for all people in our planet, so you can imagine what is going to happen in years to come, especially in poor countries whose population is constantly growing, and are more and more in need of water. Many of these poor countries do not ensure proper sanitation which leads to dirty, unhealthy water and many waterborne diseases (the most severe condition is in India).

We seem to be constantly forgetting that freshwater resources are limited and that water scarcity is already big problem in many parts of the world. Just imagine how would you manage even for couple of days without the water, and you will see how important water is. Globally speaking we couldn't be doing less for water conservation then we are doing it now, and if we continue doing so even countries of the developed world will learn the real importance of water. While some poor countries in Africa and Asia experience how it is to live with limited and almost no water resources, the other countries like United States use too much water.

If you think that the water in our cities is pure as can be then you are very wrong because all you need to do is take a look at the United Nations report that states how 95 percent of the world’s cities still dump raw sewage into their water supplies. Not a pleasant data as you can see it.

What should we do to conserve water? Limit the use of household water to really necessary levels; this may in the end result in things like much shorter showering but at least we'll be doing that bit extra for global water conservation, and make things a bit easier for our future generations.

Water conservation includes all the policies, strategies and activities made to sustainably manage the natural resource fresh water, to protect the water environment and to meet the current and future human demand. Population, household size, and growth and affluence all affect how much water is used. Factors such as climate change have increased pressures on natural water resources especially in manufacturing and agricultural irrigation. Many cities have already implemented policies aimed at water conservation, with much success.

The goals of water conservation efforts include:

– Ensuring availability of water for future generations where the withdrawal of freshwater from an ecosystem does not exceed its natural replacement rate.

– Energy conservation as water pumping, delivery and wastewater treatment facilities consume a significant amount of energy. In some regions of the world over 15 % of total electricity consumption is devoted to water management.

– Habitat conservation where minimizing human water use helps to preserve freshwater habitats for local wildlife and migrating waterfowl, but also water quality.

Always keep in mind that as the world population keeps growing water is becoming more and more precious resource that could in the future even become the cause for new wars. And water's original idea was to create and support life, not to destroy it.

Notes:

affluence – богатство, изобилие, достаток

waterfowl – водоплавающие птицы

***3. Read the text again and do the exercises:***

**1. Find the English for:** жизнь без воды невозможна; будущее поколение, испытывающее жажду; нам необходима вода, чтобы выжить; население постоянно растет; заболевания, передающиеся через воду; жить без источников питьевой воды; сократить использование воды для домашних нужд до минимума; качество воды; ценный ресурс; водоочистительные сооружения; не превышать природный уровень.

**2. Find the synonyms to the following words in the text:**

Residence, potable water, dirty water, rubbish, lack, to employ, to restrict, to take place, to continue to live, to guarantee, to take over.

**3. Complete the sentences:**

1. Water is one of…

2. Though oceans cover almost…

3. We seem to be constantly…

4. Globally speaking we…

5. If you think that…

6. Water conservation includes…

7. Factors such as…

8. Always keep in mind that…

***Read the text B and say if you use water-saving technology:***

**Text B**

**Household Applications**

Minor adjustments in our daily activities at home and in the garden can help make a difference. It doesn't have to cost money; it just takes a little bit of time and effort.

Water-saving technology for the home includes:

– Try not to use dishwashers and washing machines until they are completely full;

– Turn off the tap when you are brushing your teeth or shaving;

– Have showers instead of baths;

– Have shorter showers;

– Store a jug of water in the fridge instead of waiting for it to cool from the tap;

– Plug the sink when washing dishes;

– Use a basin to wash fruit and vegetables;

– Make sure nothing is leaking and if it is, fix it!

– To water your garden, use a watering can not a hosepipe;

– Use a bucket and sponge to wash your car;

– Brush your path instead of hosing it;

– Use little amounts of water at every time;

– Wash clothing or linens in washing machines rather than washing by hand;

– Put a displacement device into the toilet cistern;

– Install aerators or Flow Reducer(NFR) of less flow on taps/faucet and reduce water wastage.

– Install water efficient showers in bathrooms for bathing;

– Fix dripping taps. A dripping tap wastes thousands of litres of water a year.

– Use a full load in the dishwasher and washing machine.

***Read and translate the text C, using a dictionary:***

**Text C**

**Innovations in Water Purification**

Food and shelter are crucial for living, but nobody can survive for very long without water. That's why, since the beginning of history, civilizations have lived near abundant sources of H20.

But it's not enough just to have plenty of it. The same water that gives life can also make people sick or even kill them, if it contains dangerous substances or disease-causing microbes. And since people use water for activities such as irrigating crops, washing and waste disposal, sources of water close to a human population can easily become contaminated.

As a result, humans have been trying to purify water for thousands of years. As far back as 1500 B.C., Egyptians used the chemical alum to filter suspended sediment out of their drinking water. But it wasn't until the late 1800s and early 1900s that scientists figured out that microbes caused illnesses and that water could be treated with chlorine or ozone to eliminate them.

While the water that comes out of taps in most countries now is clean and safe, about 783 million people still doesn't have access to potable water. So scientists are developing new methods of obtaining water and purifying it. Here are some of the most promising technologies:

***Ceramic Water Filters***

Clay ceramic filters work in a fashion similar to the desalination technology described in the previous section. Basically, water flows through clay that contains a lot of really tiny holes, which are big enough to let water molecules though, but too small for bacteria, dirt, and other bad stuff. The first such device was developed by a British potter, Henry Doulton, back in the early 1800s for purifying water drawn from the Thames, which was so contaminated with raw sewage that cholera and typhoid were continual dangers.

Since Doulton, other inventors have made improvements to his basic concept, such as adding silver coatings to kill bacteria, so that today's ceramic filters do an even better job of getting rid of dangerous pathogens.

One drawback with these ceramic filters is the speed of filtration. The water seeps out the clay filter at a rate of just 2 liters (2.11 quarts) per hour. But the process needs to be slow in to give the silver solution time to kill pathogens. The filter also does not remove harmful chemicals like arsenic.

***“Super Sand”***

Sand and gravel have been used to purify water for thousands of years, and in 1804, a Scotsman named John Gibb designed and built the first filter that strained water through grains of sand to remove bigger particles of contamination. His technology worked so well that pretty soon, London and other big cities in Europe were using it to make river water look clearer and taste better.

By the late 1800s, scientists figured out that filtering made water safer to drink as well, since the particles stopped by the filtering were the ones that helped to transmit the microbes that caused water-borne diseases. The value of filtering was demonstrated in 1892, when the city of Hamburg, which got its drinking water from the River Elbe, suffered a cholera epidemic that killed 7,500 people, while the neighboring city of Altona, where water from the same river was filtered, escaped almost untouched.

But recently, researchers have figured out how to coat sand grains with graphite oxide to create "super sand" that reportedly can filter harmful substances such as mercury from water five times as effectively as ordinary sand. Work continues to find ways to make super sand absorb even more contamination, and eventually use it in developing countries where water supplies are dangerously polluted.

***Removing Arsenic with Plastic Bottles***

When arsenic contaminates drinking water, it can cause bladder, lung and skin cancer, as well as harm the nervous system, heart and blood vessels.

Unfortunately, almost 100 million people in developing countries today are exposed to dangerously high levels of arsenic in their water, and they can't afford the complex, expensive purification methods used in the U.S. to get rid of it. However, a new technology may offer a solution. Monmouth University (N. J.) chemistry professor has developed an inexpensive arsenic-removing system in which chopped-up pieces of ordinary plastic beverage bottles are coated with cysteine, an amino acid. When the plastic pieces are added to water, the cysteine binds to the arsenic, removing it and rendering the water drinkable.

***MadiDrop Ceramic Water Purification Disks***

Filters are a convenient, inexpensive way to purify water in developing countries. But a University of Virginia-based nonprofit humanitarian organization called PureMadi – “Madi” is the Tshivenda South African word for “water” – has come up with an additional easy-to-use technology that can purify a container of water simply by being immersed in it. The MadiDrop is a small ceramic disk, about the size of a hamburger patty, which contains microbe-killing silver or copper nanoparticles. Nanoparticles are basically really, really tiny objects specially designed by scientists to behave as a single unit.

The MadiDrop is cheaper, easier to use and easier to transport than the larger ceramic flowerpot filters that PureMadi already is making in an African factory. The one downside, again, is that the MadiDrop doesn't remove suspended particles that make water cloudy. So ideally, users will put water through a two-step purification process, by first using the flowerpot filter to get rid of sediment and then eradicating the microbes with MadiDrop.

***Toxin-Eating Bacteria***

Many of us probably think of algae as that gross stuff that we have to clean out of our fish tanks every now and then, but they can be a serious threat to health as well. Blooms of blue-green algae, called cyanobacteria, are found in both fresh and salt water throughout the world. They produce toxins called microcystins which are easily ingested by people who drink, swim or bathe in water that's contaminated with them. Once microcystins get into your body, they can attack your liver cells.

Unfortunately, conventional water treatment methods, such as sand filtration and chlorination, don't get rid of these tiny menaces. That's why a new purification method developed by researchers at Scotland's Robert Gordon University has so much promise. The researchers have identified more than 10 different strains of bacteria that like to have microcystins for lunch, and are capable of metabolizing them so that they break down into harmless, non-toxic materials. If the algae-killer bacteria are introduced into water sources, they should be able to get rid of the microcystins and make the water safe to drink without using any potentially harmful chemicals.

***Nanotechnology***

We've already mentioned an innovative new device, the MadiDrop, which utilizes silver or copper nanoparticles to kill bacteria. But nanotechnology – that is, the engineering of really, really small objects and structures, smaller than the width of a human hair – has a lot more potential to help clean up the world's drinking water. Researchers at India's D.J. Sanghvi College of Engineering say that filters fashioned from carbon nanotubes and alumina fibers, for example, could be capable of removing not just sediment and bacteria, but even traces of toxic elements such as arsenic.

One advantage of using nanofilters, as they're called, is that they're more efficient than conventional water filtration systems, and don't require as much water pressure.

At Massachusetts Institute of Technology, researchers are even looking at using nanotechnology for desalination. They're experimenting with using sheets of graphene, a form of carbon that's just a single-atom thick, to filter seawater. With nanotechnology, it's possible to create sheets filled with miniscule holes, just a billionth of a meter thick, which can block particles of salt but allow water molecules to pass through.

**SPEAKING**

***Ask your partner questions about efficient use of water and answer his/her questions:***

1. Do you turn off the tap when you are brushing your teeth?

2. Do you have showers instead of baths?

3. Do you have shorter showers?

4. Do you fix leaking taps?

5. Do you use little amounts of water at every time?

6. How do you wash your car?

7. How do you wash the dishes?

8. How do you wash your linens?

9. How do water your garden?

10. Do you use water efficiently?

**GRAMMAR**

***1. Read the sentences translating the modal verbs in brackets.***

I. Potatoes, corn, fruit and vegetables (могут) be irrigated by the furrow method.

2. You (можете) also run furrows across the slope.

3. Care (следует) be taken to prevent the water over-topping the furrows.

4. You (можете) use furrows with either large or small streams of water.

5. Care (следует) be exercised to limit the stream of water.

6. The initial stream (следует) be large.

***2. Complete the sentences, using modal verbs:***

1. There are plenty of tomatoes in the fridge. You \_\_\_ buy any.

2. It's a hospital. You \_\_\_ smoke.

3. He had been working for more than 11 hours. He \_\_\_ be tired after such hard work. He \_\_\_ prefer to get some rest.

4. I \_\_\_ speak Arabic fluently when I was a child and we lived in Morocco. But after we moved back to Canada, I had very little exposure to the language and forgot almost everything I knew as a child. Now, I \_\_\_ just say a few things in the language.

5. The teacher said we \_\_\_ read this book for our own pleasure as it is optional. But we \_\_\_ read it if we don't want to.

6. \_\_\_ you stand on your head for more than a minute? No, I \_\_\_.

7. If you want to learn to speak English fluently, you \_\_\_ to work hard. .

8. Take an umbrella. It \_\_\_ rain later.

9. You \_\_\_ leave small objects lying around . Such objects \_\_\_ be swallowed by children.

10. People \_\_\_ walk on grass.

11. Drivers \_\_\_ stop when the traffic lights are red.

12. \_\_\_ I ask a question? Yes, of course.

13. You \_\_\_ take your umbrella. It is not raining.

14. \_\_\_ you speak Italian? No, I \_\_\_.

15. There are plenty of tomatoes in the fridge. You \_\_\_ buy any.

**Answer Keys**

**Unit 1**

**Grammar:**

**1.**

1. drives, 2. work, am studying, 3. is sleeping, 4. is raining, 5. always rains, 6. are saying, is talking, 7. is currently writing, 8. am going, 9. are normally, are, 10. is.

**4.**

(is, are shaking, are really killing, are bleeding, still want, is, am trying, am learning, do not learn, do not understand, am gradually improving, am currently travelling, is, always walks, complains, am doing, is sitting, are discussing, do not know, just calls, speaks, is trying, says, tries, also seems.)

**Unit 2**

**Grammar:**

**3.**

1. was walking, saw 2. was helping, came 3. was cooking, were playing, 4. were playing, was sleeping 5. was working, called 6. was watching, were playing 7. was washing, began 8. was blowing, landed 9. was playing, began 10. was watching, went 11. was playing, was listening 12. was tidying, was washing 13. were helping, was watering 14. met, was walking 15. were playing, was reading.

**4.**

1. were sleeping, broke, stole 2. had repaired, drove 3. had, had worked 4. saw 5. were listening heard 6. had not visited, flew 7. heard, rushed 8. broke, were playing 9. didn't work, was 10. had helped, went 11. met, was wearing 12. had seen, went 14. asked, hunted 14. had discovered, returned.

**Unit 3.**

**Text B.**

1. – L, 2. – D, 3. – F, 4. – B, 5. – K, 6. – E, 7. – J, 8. – C, 9. – H, 10. – G, 11. – I, 12. – A.

**Grammar.**

Ex. **2**

1. will be lying, 2. will be stressing, 3. will send, 4. will make.

Ex. **3**

1. will be watching, 2. will go, 3. are doing, talking, will be lying, 4. will be hiding, arrives, are going to jump, scream, 5. come, are working out, will leave, 6. are studying, will be, 7. get, will be dancing, will be making, will be discussing, will be complaining , 8. get, will be waiting, 9. wake up, will be shining, 10. need, will be staying.

**Unit 4.**

**Text A**

***2. Match the words (1–10) with the definitions (A–J):***

1. – C, 2. – D, 3. – J, 4. – G, 5. – F, 6. – E, 7. – B, 8. – I, 9. – H,

10. – A.

**Grammar:**

**2*.***

1. All members of the staff… 2. The city centre premises… 3. The lifeboatman… 4. Examination candidates… 5. The actor… 6. After his parents died, he… 7. Job applicants… 8. I am afraid that particular product… 9. The decorations… 10. Parents…

**Unit 7**

**Text A**

***2. Match the words (1–8) with the definitions (A–H):***

1. – E, 2. – D, 3. – A, 4. – F, 5. – H, 6. – G, 7. – C, 8. – B.

**Grammar:**

**1.**

1. b, 2. b, 3. a, 4. c, 5. b, 6. a, 7. b, 8. c, 9. c, 10. b.

**2.**

1. Might, 2. Shouldn’t, 3. Ought to, 4. Was able to, 5. Can, 6. Have to, 7. Must, 8. Couldn’t

**Unit 8**

**Grammar:**

**2.**

1. Needn't; 2. Mustn't; 3. Must, may; 4. Could, can; 5. Can,

needn't; 6. Can, can't; 7. Need; 8. Might; 9. Shouldn't, may; 10.Mustn't; 11. Must; 12. May; 13. Needn't; 14. Can, can't;

15. Needn’t.

**СПИСОК ЛИТЕРАТУРЫ**

1. Англо-русский словарь синонимов. – М.: Иностранный язык. Оникс, 2005. – 411 с.

2. Дроздова Т. Ю. New Student’s Grammar Guide : учеб. пособие для студентов неязыковых вузов и учащихся школ и гимназий / Т. Ю. Дроздова, В. Г. Маилова. – 2-е изд., испр. и

доп. – СПБ: Антология, 2007. – 189 с.

3. Мюллер В. К. Новый англо-русский словарь / В. К. Мюллер. – М.: Дрофа. Русский язык медиа, 2008. – 945 с.

4. Sally Wehmeier, Oxford Advanced Learner’s Dictionary of Current English: билингвистический словарь, A. S. Hornby, Seventh edition, Oxford University Press, the UK.

5. Цебаковский С. Я. Кто боится английской грамматики? Учеб. пособие / С. Я. Цебаковский. – Обнинск: Титул,

2008. – 208 с.

6. Water Supply. Sewarage. Pipes. [Электронный ресурс]. – Режим доступа: pgsugasu.narod.ru.

7. Water Pollution [Электронный ресурс]. – Режим доступа: explainatstuff.com.

8. World Water Day [Электронный ресурс]. – Режим доступа: myenglishpages.com.

9. 10 interesting facts about water [Электронный ресурс]. – Режим доступа: beautyandtips.com.

10. Dialogues on water pollution [Электронный ресурс]. – Режим доступа: itenglishit.com.

11. 10 innovations on water purification [Электронный ресурс]. – Режим доступа: http://science.howstuffworks.com/environmental/green-tech/sustainable/10-innovations-water-purification.htm.

**ОГЛАВЛЕНИЕ**

|  |  |
| --- | --- |
| Предисловие………………………………………………... | 3 |
| Грамматический блок……………………………………... | 4 |
| Unit 1 Water for Life……………………………………….. | 22 |
| Unit 2 Water Supply……………………………………….. | 33 |
| Unit 3 Agricultural Water Use……………………………… | 41 |
| Unit 4 Industrial Water Use………………………………… | 54 |
| Unit 5 Water Contamination……………………………….. | 62 |
| Unit 6 Water Purification…………………………………… | 77 |
| Unit 7 Water Scarcity………………………………………. | 86 |
| Unit 8 Water Efficiency…………………………………….. | 95 |
| Answer Keys………………………………………………... | 105 |
| Список литературы………………………………………... | 108 |

У ч е б н о е и з д а н и е

**Тарасенко** Наталья Николаевна

**ВОДА – ИСТОЧНИК**

**ЖИЗНИ НА ЗЕМЛЕ**

*Учебное пособие*

В авторской редакции

Дизайн обложки – Н. П. Лиханская

Подписано в печать 30.11.2017. Формат 60 × 84 1/16.

Усл. печ. л. – 6,3. Уч.-изд. л. – 4,9.

Тираж 100 экз. Заказ № .

Типография Кубанского государственного аграрного университета.

350044, г. Краснодар, ул. Калинина, 13