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Научные открытия

Часть 1
Сборник текстов для чтения и заданий по английскому языку
для бакалавров
Института биологии и биомедицины

Практикум

Рекомендовано методической комиссией Института филологии и журналистики
для бакалавров 4 курса Института биологии и биомедицины
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Настоящий практикум предназначен для бакалавров 4 курса Института биологии и биомедицины, изучающих английский язык. Цель данного пособия – совершенствование навыков просмотрового и поискового чтения, расширение лексического запаса, развитие устной речи, реферирование статей.

Ответственный за выпуск:
зам. директора Института филологии и журналистики по методической работе
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CONTENTS

Unit 1

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

Read the introduction to check your ideas.

2. Mind the following words and word combinations:

an inkling – подозрение, намек

be confined to sth/sb – быть ограниченным

assortative mating – ассортативное скрещивание (скрещивание между неслучайно подобранными партнёрами)

variance – различие, отклонение от вида

to probe – пытаться вникнуть

be adept at – сведущий

nurture – воспитание

to reason – делать вывод, рассуждать

to strive to do smth – стремиться

in the aftermath – последствия

a ration – паек, рацион, норма

transient – мимолетный, временный

to yield – производить, приносить

threshold – порог, предел

plausible – правдоподобный

implication(s) – последствие

an escalation – обострение, рост

3. Read the passage.

Are we Getting Smarter?

15 March 2006

Posted by **Emma Jarvis**

I. For the last 75 years the average IQ (intelligence quotient) test score has been increasing in every industrialised country in the world. Some suggest that this increase could be as much as 25 points. So are we really more intelligent than our grandparents? The first *inkling* of this effect dates from the early part of last century. In 1949 the Scottish Council for Research in Education looked at scores from two different generations of people of the same age. Comparing the IQ test scores of 11 year olds in 1933 and 1947 suggested that the average IQ score had increased by 2–3 points. But the effect wasn't solely *confined to* Scotland. James Cattell carried out a similar study on schoolchildren in the English city of Leicester between 1936 and 1949, which showed an increase of 1.28 IQ points, and in 1948, using databases of

US Army recruits from the first and second world wars, Reid Tuddenham also found that IQ scores had increased significantly over this time. Subsequent studies carried out on the same groups of people by researcher James Flynn, using two styles of intelligence tests, have also shown that the average IQ in America appears to have risen by 15 points between 1930 and 1980.

But why should this rise in IQ have come about?

II. Could this be a result of genetic changes? The process of *assortative mating* occurs when there is selective mating between individuals with similar characteristics, and there is evidence this occurs in the context of intelligence. In other words, individuals of similar intelligence are more likely to mate with each other. But, rather than increase the intelligence of the population as a whole, this should only increase the *variance*, or range, of IQ scores because a child is the result of genes from both parents, half coming from the mother and half from the father. If we think of intelligence as partly being a product of various genes, then the offspring of two intelligent people, who are likely to have even more 'good genes' for intelligence than their parents (as they will receive these good genes from both their mother and their father), are likely to be even more intelligent than their parents. So, over time, one would expect the higher and lower ends of the IQ scale to be stretched as those humans with the highest (and lowest) IQ scores mate and reproduce.

III. A further, more damning piece of evidence against the genetic argument is that if the effect were down to genes, any change they produced should be in the opposite direction, that is, making the population appear less intelligent. This is because the association between fertility and IQ shows a negative correlation. In other words, if IQ score were just down to genes, then the fact that individuals with lower IQs are having more children than people with higher IQs ought to decrease the average IQ of a population. It seems, then, that the answer to the riddle of the rising IQ score does not lie in genetics.

IV. But before we *probe* more deeply for the reason, let's first consider what is 'intelligence'? Is it the ability to understand and profit from experience? The faculty of thought and reason? Should short term memory, which is 'measured' in IQ tests, be part of our definition of 'intelligence'? The technology boom that we have observed since the industrial revolution may have made people more *adept at* many of the skills which IQ tests measure, but intelligence is surely more than simply the ability to perform well on a test. Perhaps the increase in IQ merely reflects an improved exam technique?

V. Whatever intelligence actually is, if nature (genes) isn't responsible for boosting our brain power, then it must be down to *nurture* – the environment of our upbringing – and one hotbed of contention is that of education. Since 1920 the number of years that people spend at school has increased significantly, as too has the proportion of students going on to higher education. But significant increases in IQ

test scores were seen in children below the school leaving age as early as 1920, and both six year olds in Japan and nine year olds in Canada have been found to have IQ scores higher than their representatives in earlier generations. Perhaps the way that education has changed in style in the last 60 years has acted to increase the IQ of children receiving formal schooling? It is easy to see that the change in emphasis from 'parrot-fashion' learning to learning by discovery and conceptual understanding may make children better at solving problems (such as the Ravens Matrices subtest, which seeks to measure an individual's ability *to reason* clearly. The test is normally presented in a symbolic format, where the individual is required to perceive the pattern or link between the symbols, and predict the appropriate continuation of the sequence). But what does the increase we are looking at actually represent? Does this change in teaching style actually increase the intelligence of children, or just their performance in IQ tests? Of course, IQ tests *strive* to measure intelligence itself, but such a complex and multi-factorial entity is extremely difficult to quantify in a meaningful way.

VI. For instance, Ulric Neisser has highlighted the example of Chinese schoolchildren, pointing out that they improved by 22 IQ points on Ravens Matrices between 1936 and 1986, a period when literacy in China was increasing dramatically following urbanisation. Learning to read Chinese characters involves memorising complex symbols and combining them to alter their meaning and to signal pronunciation. Of course this may help performance on tests such as Raven's Matrices, but should we view this as a gain in intelligence or just an increase in IQ score performance?

VII. Researchers now think that changes in socio-economic status may have played a significant part in the rising IQ phenomenon. In the last 60 years there has been an increase in the proportion of the population who are in middle-class professions. Since we know that IQ correlates very strongly with social class, many have suggested that this increase in class has caused the increase in IQ test scores. Indeed, when we study the correlations between IQ tests and socio-economic status, we find that verbal abilities play the leading role, and as socio-economic status increases, so we see an accompanying increase in verbal IQ test scores. (A verbal IQ score is taken from the performance on language related tests, such as vocabulary, comprehension of written material and general knowledge. The non-verbal IQ score relates to tests of spatial ability, pattern recognition and other subtests that do not encompass any use of language.) But if we study the raw data for IQ tests we find that the rise is much more pronounced in non-verbal tests, and a very small increase, if any, is observed for verbal IQ tests. So, if socio-economic status is most strongly linked to verbal IQ, and the most significant rises in IQ score are for non-verbal IQ, then the change we have seen in socio-economic status cannot underlie the rising IQ scores. Moreover, this rising IQ seems to be occurring across all social classes, rather

than merely a group phenomenon, and if it were due to a change in social status we ought to find different IQ rises in different social groups.

VIII. A more universal environmental change that we have experienced since the First World War is an improvement in public health and nutrition. This is especially relevant *in the aftermath* of the Second World War when *rations* were removed and more food was available. Indeed, in this time Japan saw an average height increase in the population of 2–4cm, and the latter half of the century saw an increase in both head and brain size, indicating that this nutritional improvement had a real physiological effect. In 1970, Michael Rutter and his colleagues found a significant correlation between birth weight and later IQ, so we can imagine that better nutrition for pregnant mothers may have resulted in more intelligent offspring. We also see a very significant effect on children of very low birth weight, who are likely to produce relatively low IQ scores. However, it is difficult to know whether the effect of nutrition on IQ scores is very significant. A study of 1-year-old infants showed a positive correlation with maternal nutrition during pregnancy, but one of 18-20 year old men showed no correlation at all, so it is possible that any effects of maternal nutrition on IQ are only *transient*. Studies on the relationship between post-natal nutrition and IQ scores *yield* a variety of different results, making it difficult to draw a reliable conclusion. However, studies of the severely malnourished show a correlation with very low IQ scores, implying that there may be a *threshold* below which nutrition is very important and above which it makes little difference.

IX. James Flynn, after whom the rise in IQ scores is named 'The Flynn Effect', suggests the 'multiplier effect' as the cause of rising IQ scores. He proposes that as the average IQ rises, parents create an environment for their children which is increasingly constructive for developing their mind from a very early age. He claims that a person's IQ develops partly in relation to the IQs of the people he or she comes into contact with. As IQ rises in this way, so will this effect be multiplied in the following generation, thus causing a fairly rapid and ongoing increase. This is a *plausible* hypothesis and the effect may well contribute to the significant IQ score rise.

X. The *implications* of these increases in IQ scores may be one of two things: either the populations of industrialised countries are becoming more intelligent, or IQ scores are not in fact measuring intelligence and we are merely adapting to score highly on these tests. The fact that the most significant increases in test score are seen for non-verbal test components, and that these gains do not appear to have been accompanied by an *escalation* in other cognitive skills, might suggest that we are not measuring 'real world' intelligence. IQ tests certainly measure something similar to intelligence, and they do measure some of the manifestations of it. Yet it is possible that they measure factors that we would not define as intelligence, whilst equally missing out some of its fundamental areas. Tests have become more sophisticated

over time and we believe that they are close to measuring intelligence, but disputes about what they measure and indeed the nature of intelligence continue.

So maybe we're not becoming more 'intelligent' after all, despite what the rise in scores of IQ tests would initially seem to imply!

4. Answer the questions.

1. What causes of rising IQ scores are discussed in the article? Name them.
2. Which cause does the author consider to be a plausible hypothesis?
3. Is the author sure that we've become more intelligent? Justify your answer.
4. What conclusions does the author draw?

5. Divide into 4 groups and answer the question.

Group 1 focus on paragraphs II and III. Why can't genetics be responsible for boosting our brain power?

Group 2 focus on paragraphs V and VI. Why can't education be responsible for boosting our brain power?

Group 3 focus on paragraph VII. Why can't socio-economic status be responsible for boosting our brain power?

Group 4 focus on paragraph VIII. Why can't improvements in public health and nutrition be responsible for boosting our brain power?

6. Complete the summary. Fill in the gaps with suitable words.

The 'multiplier effect' is a _____ hypothesis for the significant IQ score rise. James Flynn suggests that a person's IQ partly _____ the IQs of the people he or she interacts with. Over the years the _____ IQ has risen. Modern parents create an increasingly _____ environment for their children to develop their mind. This effect will be _____ in the following generation. Thus, fast and _____increase is being caused.

Now summarize the information on every possible cause of rising IQ scores in writing.

7. Paraphrase.

Find as many synonyms as you can for every word in the sentence as in the example.

Many students choose to attend university outside their home countries.

many: myriad, countless, <u>an increasing number</u>

students: pupils, <u>young people</u>, scholars

choose to: <u>decide to</u>, opt to, prefer

attend: <u>join</u>, enroll in, apply to, pursue undergraduate studies

university: academic centres/programmes; institutes of higher learning; educational institutions; schools, colleges, academies

outside home countries: abroad, overseas, in a foreign country, away from their homeland

1. James Cattell carried out a similar study on schoolchildren in the English city of Leicester.

2. For the last 75 years the average IQ (intelligence quotient) test score has been increasing in every industrialised country in the world.

3. Researchers now think that changes in socio-economic status have may have played a significant part in the rising IQ phenomenon.

8. Make up a plan to summarize the text.

9. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. What further questions do you have about this topic?

6. What is your opinion on the topic?

7. Why do you consider this article to be important/ not important?

10. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 2

1. Read the title of the text and study the key vocabulary. Can you predict what the reading passage is going to be about?

increase dramatically – резко увеличиться
demand for food – спрос на продовольствие
food security – продовольственное обеспечение
tackle the challenge – решить проблему
sustainable – устойчивый
natural habitat – естественная среда обитания
refuge – убежище
resilient [rɪˈzɪlɪənt] crops – устойчивые культуры
have the impact on – иметь влияние
consumption – потребление
fertilizer – удобрение
surpluses – излишки
resistant to pests, drought – устойчивый к вредителям, засухе

2. Read the passage.

The Future of Food

Agricultural production has increased dramatically in the last 20 years and crop yields have never been as high as those we achieve today. **However**, demand for food across the globe continues to rise, driven by growing populations and ever increasing wealth.

Providing food for the planet is not a new dilemma and, given the scientific advances of the last century, you might be surprised that we don't yet have an answer. This is at least in part **because** the problem has become more complicated. The aim is to make sure that everyone has access to sufficient, safe, nutritious food. **This means** not only providing enough calories but also making sure that the food we eat is healthy. "Food security is not just about starving people in Africa. It is about health, nutrition and wellbeing and all of the things that flow from those," Tim Benton, Champion of the UK Global Food Security Program, explains. In developing countries **this means** access **not only** to enough food **but also** to foods with essential vitamins and nutrients. **By contrast**, in the developed world where access to a huge variety of food is not a problem, the challenge is to tackle increasing obesity and health burdens **like** diabetes and heart disease, which have been linked to diet and lifestyle.

There are a number of ways of tackling the food security challenge. Changes need to be made throughout the food supply chain, from where your dinner originates in the field to the point it arrives on your fork. **But**, as Tim points out, "the question is

not just can we do it but can we do it in a way that is sustainable?" Currently the main way we are increasing global food production is by expanding the amount of land used for agriculture. Frequently **this means** destroying natural habitats which provide other services such as carbon and water cycling, whilst acting as refuges for biodiversity. 11% of global land area is already in agricultural production and some parts of the world have already exploited the majority of suitable areas for crop production.

An alternative option is to increase the yields of existing farmland, which can be achieved through crop development and intensification of farm management. Many breeding trials are now concentrating on making crops that produce larger yields and creating varieties that are more resistant to pests, diseases and unusual weather conditions.

"We have to also consider the environmental implications of being able to grow the maximum amount of wheat on a specific amount of land and the inputs required to do that, the insect and pest control," explains Alison Bentley from the National Institute for Agricultural Botany where researchers are working to improve the efficiency of wheat. New varieties of wheat are being developed that may require fewer pesticides and fertilizers and be more resistant to drought.

However, while more resilient crops which produce reliable harvests will help to provide a stable food system, simply producing more food will not solve the food security problem. **Particularly** in the developed world, it is often the choices of consumers which drive the agricultural industry. Reducing meat consumption would dramatically increase the efficiency of food production by massively reducing food waste and freeing up land to grow crops. If that doesn't convince you, perhaps you should consider the impact that high meat consumption can have on your health. Meat is very high in energy and fat and the quantity consumed within western diets is contributing to large increases in chronic diseases and obesity.

Alternative sources of protein and essential nutrients might not initially sound very appetizing but are a normal part of diets around the world. Vegetable based proteins, algae, jellyfish and insects are just some of the options for substituting your steak. 80% of cultures around the world eat insects as part of their normal diets.

These tasty alternatives have less saturated fat but are still packed with protein and nutrients and are increasingly available both online and in supermarkets. They require less land and resource to produce, so you would not only be improving your health but also saving the planet.

However, if the idea of replacing beef, pork and chicken with mealworms and crickets is just too much, there are ways of making meat production more sustainable. Tristram Stuart is a food waste campaigner with some innovative ideas about what we should be doing with the huge amounts of food that are wasted. His answer to the food security challenge is not to produce more food, but to make better use of it. "The surpluses produced are so far in advance of what we need to provide food security," Tristram explains. He suggests that we need to dramatically change the way that we deal with food waste and this time it's good news for those of you who love bacon! "Traditionally livestock would be fed with our leftovers," explains Tristram. Feeding food waste to pigs can be done safely on an industrial scale. **However**, in some countries, including the UK, it is instead sent to landfill. What a waste! **Instead** pigs are commonly fed with soy which is grown on valuable land that could otherwise produce food for human consumption or be left in its natural state as a rainforest.

To sum up, tackling the food waste scandal will be central to increasing food availability around the world and highlights the inefficiencies of food production and consumption. "If we want to make food available to people who really need it we can really help to do that by doing something quite simple, which is to enjoy the food that we have and not throw it away…"

3. Answer the questions.

1. What is the issue raised in the article?
2. What options are suggested to solve the problem?
3. Do you consider these ideas to be efficient? Can you suggest anything else?
4. Are you ready to substitute meat with the given alternatives?

4. Linkers.

Look at the phrases given in bold in the text. Decide which of them are used to do the following:

a) List/add points
b) Explain, exemplify
c) Show contrast
d) Introduce a conclusion

5. Study the following linkers given in the box. Match them with the appropriate function in ex. 4.

first	in summary	such as	in conclusion	what is more	
secondly	in other words	for example	to conclude	furthermore	
in addition	on the other hand	although	despite the fact that	in particular	
in contrast	moreover	on balance	that is to say	for instance	

6. Read the information to match the sentences with their functions.

The nouns **problem** and **issue** have very similar meanings and can, at times, be used interchangeably. However, there are important differences between the two nouns that need to be highlighted so you know how to use the nouns correctly.

Let's take a close look at the noun **problem** first.

We use this noun when we want to refer to a complicated situation that needs to be handled. The important distinguishing factor between problem and issue, is that problem refers to a complicated situation that can be fixed or solved. You may have come across this common expression before: there is a solution to every problem.

Problem is most often used by native English speakers and usually refers to a negative situation that needs to be solved.

For example:

"*There is a problem with the car, we better bring it to the mechanic and get it fixed" he said to his wife."*

"Is there a problem with Steve? He is arguing with everyone today, did something happen?"

"The team has a big problem and they need to find a solution fast if they want to win the competition."

On the other hand, the noun **issue** usually refers to a topic that needs to be considered, discussed, questioned or even debated.

For example:

"Global Warming is a worrying issue as it could permanently change the planet and we don't know how to solve it."

"The economic crisis is an issue for many small businesses as many consumers are spending less money."

"The issue needs to be addressed and discussed so we can move forward with the project" the team leader stated to his disgruntled team."

1. 11% of global land area is already in agricultural production.

2. Demand for food across the globe continues to rise, driven by growing populations and ever increasing wealth.

3. In developing countries people do not have enough products with essential vitamins and nutrients, by contrast in the developed world people suffer from obesity resulted from excessive consumption of food.

4. We should substitute meat with algae, jellyfish and insects, to my mind.

5. Making better use of food is the most efficient way of tackling the food security challenge.

a) Evaluation

b) Problem

c) View

d) Issue

e) Fact

7. Make up a plan to summarize the text.

8. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

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2. The author of the article is..

3. The article is taken from the newspaper…

4. The central idea of the article is about… (The main idea of the article is… the article is devoted to… the article deals with… the article touches upon… the purpose of the article is to give the reader some information on… the aim of the article is to provide a reader with some material on…)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 3

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

Read the introduction to check your ideas.

2. Mind the following words and word-combinations. Which words are familiar to you?

breakthrough research – крупное, революционное исследование
accelerate scientists' knowledge on – расширить знания ученых о
agricultural implications – сельскохозяйственные последствия
inhibit an enzyme – ингибировать, подавлять, блокировать фермент
execute decisions – реализовать решения
the halting of plant growth – прекращение роста растений
perceive stresses – ощущать воздействия
nail down – закрепить
cutthroat competition – ожесточенное соревнование, конкуренция
occur – происходить, случаться
marker-assisted breeding – разведение при помощи маркерных генов
trigger – провоцировать, вызывать
collaborate – сотрудничать

3. Read the article and say whether you've found any familiar, new, surprising facts.

How Crops Survive Drought

Breakthrough research done earlier this year by a plant cell biologist at the University of California, Riverside has greatly accelerated scientists' knowledge on how plants and crops can survive difficult environmental conditions such as drought.

Working on abscisic acid (ABA), a stress hormone produced naturally by plants, Sean Cutler's laboratory showed in April 2009 how ABA helps plants survive by inhibiting their growth in times when water is unavailable – research that has important agricultural implications.

The Cutler lab, with contributions from a team of international leaders in the field, showed that in drought conditions certain receptor proteins in plants perceive ABA, causing them to inhibit an enzyme called a phosphatase. The receptor protein is at the top of a signaling pathway in plants, functioning like a boss relaying orders to the team below that then executes particular decisions in the cell.

Now recent published studies show how those orders are relayed at the molecular level. ABA first binds to the receptor proteins. Like a series of standing dominoes that begins to knock over, this then alters signaling enzymes that, in turn,

activate other proteins resulting, eventually, in the halting of plant growth and activation of other protective mechanisms.

"I believe Sean's discovery is the most significant finding in plant biology this year and will have profound effects on agriculture worldwide," said Natasha Raikhel, the director of UC Riverside's Center for Plant Cell Biology, of which Cutler is a member. "Because the ABA receptor is so fundamentally important for understanding how plants perceive various environmental stresses, I am sure the strings of research that Sean's discovery sparks will be endless."

In only months since Cutler's discovery, six research papers in journals such as *Science* and *Nature* have been published that build on his work, a testament to the interest among plant scientists to nail down how exactly the stress signaling pathway works in plants. This intense activity in the field was expedited by Cutler's willingness to share information with colleagues before his own research was published – an open approach that is at odds with the often cutthroat competition in hot scientific areas.

"This intense interest by the scientific community will certainly accelerate the development of new agrichemicals that can be used to control stress responses in crops, and I believe we need to work openly to tackle problems of such great importance," said Cutler, an assistant professor of plant cell biology in the Department of Botany and Plant Sciences. "There is also tremendous interest from industry, and we are moving closer to designing both improved chemicals that can control drought tolerance in crops and improved receptor proteins that can be used to enhance yield under drought conditions. Ultimately, my vision is to combine protein and chemical design to usher in a fundamentally new approach to crop protection. These recent papers are an important step towards realizing that goal."

Determining how the chemical switch works

One of the six research papers that builds on Cutler's work is published online Nov. 18 in *Nature*. The research, led by Jian-Kang Zhu, a professor of plant cell biology at UCR, fleshes out the domino pathway from the receptor down to the proteins that control plant growth.

"Freshwater is a precious commodity in agriculture," Zhu said. "Drought stress occurs when there is not enough freshwater. We wanted to understand how plants cope with drought stress at the molecular level. Such an understanding is necessary if we want to improve the drought tolerance of crop plants through either genetic engineering or marker-assisted breeding."

In their *Nature* paper, Zhu and his colleagues report on how they reconstituted in a test tube the process of information transfer from receptor to phosphatase, and all the way downstream to the protein that turns the gene on or off, and then ultimately to the gene itself.

"The ABA signaling pathway we reconstituted is arguably the most important pathway for plants to cope with drought stress." Zhu said. "This is the first time the whole pathway has been reconstituted *in vitro*. What is emerging is a clear picture of how the chemical switch works – useful knowledge for designing improved chemical agents for application in crop fields."

Zhu explained that *in vivo* studies (done in the living body of the plant) involve thousands of proteins, which can complicate data interpretation. By doing the study *in vitro* (outside the living body of the plant) his lab avoids this problem, making it possible to determine the minimal number of components necessary and sufficient for the ABA response pathway.

Next in its research, the Zhu lab will use the knowledge of the ABA response pathway to make transgenic plants that will have substantially higher levels of drought tolerance, achieved by manipulating the levels and activities of the key components of the pathway. The lab also plans to investigate how drought stress triggers the production of ABA.

Zhu was joined in the research by Cutler and UCR's Hiroaki Fujii, Viswanathan Chinnusamy, and Sang-Youl Park. Americo Rodrigues, Silvia Rubio, Regina Antoni and Pedro L. Rodriguez of the Instituto de Biología Molecular y Celular de Plantas, Spain; and Jen Sheen of the Massachusetts General Hospital also collaborated on the study.

Zhu was funded by a grant from the National Institutes of Health. Currently, he has an appointment also at the King Abdullah University of Science and Technology, Saudi Arabia.

The other five research papers that Cutler's research inspired discuss the molecular structure of the ABA receptor, showing in atomic detail how ABA functions to trigger signaling.

Source: University of California – Riverside

4. In two groups make 7 questions based on the information given in the text. Ask and answer the questions.

5. Find a topic sentence in each paragraph.

In expository writing, a topic sentence is a sentence that summarizes the main idea of a paragraph. It is usually the first sentence in a paragraph.

6. Make up a plan to summarize the text.

7. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. What further questions do you have about this topic?

6. What is your opinion on the topic?

7. Why do you consider this article to be important/ not important?

8. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ..., The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 4

1. Read the title of the text. What can you predict about the topic of the reading passage from the title? What information is highlighted by the headline?

2. Study the vocabulary of the article.

carbon dioxide emissions – выбросы двуокиси углерода
make news on a daily basis – ежедневно делать новости
blind – ослеплять
pose a threat – угрожать
lead to immense costs to – приводить к огромным затратам на
an essential part of life – неотъемлемая часть жизни
main source – основной источник
to utilize – использовать, утилизировать
converting it into – превращать в
compound – соединение
shortage – нехватка
far-reaching consequences – далеко идущие последствия
affect the nitrogen balance – влиять на баланс азота
large-scale – крупномасштабный
fossil fuels – ископаемое топливо
fertilizer – удобрение
destroy the ozone layer – разрушать озоновый слой
dissolve – растворяться
cause for concern – основания для беспокойства
be at risk – подвергаться риску
algal blooms – цветение водорослей
suffocate aquatic life – задушить водную жизнь
extinct – вымерший
knock-on effects – эффект домино
contribute to – способствовать
cause havoc – причинять вред
a by-product – побочный продукт

3. Read the passage.

Nitrogen – The Bad Guy of Global Warming

Carbon dioxide emissions, rising global temperatures, melting ice caps and climate change make news on a daily basis. But is our love affair with carbon dioxide blinding us to the threat posed by a more dangerous agent? The global warming

culprit in question is nitrogen, and ignoring it could lead to immense costs to both human health and the environment.

Natural Nitrogen

Nitrogen is an essential part of life. Plants, animals and bacteria all use nitrogen in fundamental building blocks called amino acids, and these are joined together to make proteins. Proteins not only allow us to grow and function properly, but they form the basis of almost every chemical reaction in the human body. Our main source of nitrogen is the atmosphere, where it is present as nitrogen gas (formula N_2). However in its gaseous form, nitrogen is very inert (unreactive) and only a small number of organisms are able to utilise it. The natural process of taking nitrogen gas and converting it into useful compounds is known as nitrogen fixation, and is carried out by nitrogen-fixing bacteria (and more occasionally, lightning). These 'fix' nitrogen into another nitrogen-containing compound: ammonia (NH_3). Ammonia is more biologically accessible than nitrogen gas and is used by nitrifying bacteria to form nitrites (NO_{2-}) and then nitrates (NO_{3-}). These nitrates are the form of nitrogen that plants can process, and thus the form that introduces nitrogen into our food chain. But if all atmospheric nitrogen eventually ended up in plants or animals, there would soon be a shortage. Fortunately there are denitrifying bacteria that complete the cycle and convert nitrates back into the inert and unreachable N_2. This cycle is naturally regulated by the speed at which bacteria can change one compound into another, and by the amount of bacteria available in the soil. In the past this led to a natural upper limit of nitrogen available for use in the biosphere at any one time. However, technological advances have dramatically increased this natural limit, and the consequences have been far-reaching. So what happened?

Causes of the nitrogen overdose

The dawning of the Industrial Revolution heralded a major change that greatly affected the nitrogen balance. Large-scale burning of fossil fuels such as coal and oil released high levels of nitrogen oxides (including nitrous oxide or N_2O) as fumes. The nitrogen problem escalated further by World War I with the development of the Haber-Bosch Process, which allowed inert N_2 gas to be made into ammonia without the use of slow nitrogen-fixing bacteria. The ammonia produced became a valuable resource and could be used to make cheap fertilisers for use on crops. Other contributors to increased levels of nitrogen compounds were the burning of trees and plants for agriculture, and the manufacture of nylon. But seeing as successful industry and agriculture are crucial across the globe, do we really want to stop artificially creating our own useful nitrogen compounds? Why would we want to go back to the natural limits of the nitrogen cycle?

Why should we worry?

There are two main things that these nitrogen compounds affect: the environment and human health. When nitrous oxide (N_2O) reaches the stratosphere it

helps destroy the ozone layer, resulting in higher levels of UV radiation and increasing the risk of skin cancer and cataracts. Ironically, when N_2O is nearer to the Earth's surface it can actually make ozone, which can become smog on a still and sunny day. Smog has been linked to respiratory problems, lung damage, increased risks of cancer and a weakening of the immune system.

As well as its tricks with ozone, nitrogen oxides dissolve in atmospheric water to make acid rain, which corrodes stone and metal work and damages buildings. In 1967 a bridge over the Ohio River collapsed due to acid rain corrosion, killing 46 people. But it's not only building damage that's cause for concern; plants (including our food crops) and even humans are at risk. Links between acid rain, Alzheimer's disease and brain damage have been suggested, as well as with many respiratory problems. So, overall, not good news! But the problems extend further. The overuse of fertilisers on fields and of nitrogen compounds in animal feed leads to nitrogen leaching into streams and rivers. Algae, whose growth is usually limited by nitrogen availability, use this flood of nitrogen to grow out of control, leading to big algal blooms. These use up all the oxygen in the water and block out the light, suffocating aquatic life and preventing underwater plants from photosynthesising. Worryingly, nitrate levels in the Norwegian lakes have doubled in the last ten years, and in northern Europe we are depositing nitrogen compounds at over 100 times the natural rate. The outlook for these lakes seems bleak. Returning to the land, higher nitrogen levels in the soil mean that a few plants are able to out-compete the rest. These tend to be plants able to quickly utilise the excess nitrogen for rapid growth, leaving fewer resources and more shade for other species. This can lead to many species of plant becoming extinct, and will in turn have knock-on effects on all the animals, insects and birds that use them. Many species-rich heathlands in the Netherlands have been taken over by species-poor forests for precisely this reason.

Finally, nitrogen oxides contribute to global warming. Although the concentration of nitrous oxide in the atmosphere is considerably lower than that of carbon dioxide, the global warming potential of nitrous oxide is over 300 times greater. So although carbon dioxide causes climate change and its associated problems, nitrogen compounds are arguably worse. They have a greater global warming potential, could lead to more exaggerated climate change problems, and cause havoc with health and the environment to boot! So what can we do about it?

The remedies

Currently, 80% of the nitrogen compounds in the atmosphere are from human sources. This problem is a by-product of our highly technology-driven societies, but therein lies the solution. The same technological innovation can be used to reduce emissions, and catalytic converters can convert nitrogen oxides into harmless nitrogen gas. Legislation can also play a role. In California, large farms with over a thousand dairy cows must now apply to the Air Resources Board for a license,

controlling the levels of concentrated leaching from animals. Ultimately though, there is one solution guaranteed to deal with this nitrogen problem: reduce the amount of nitrogen we use to fuel our daily lives. This is all well and good, but as with all solutions to big problems, it's going to be very, very hard work...

4. Answer the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.
2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?
3. What do you feel after reading the article?
4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?
5. What further questions do you have about this topic?
6. What is your opinion on the topic?
7. Why do you consider this article to be important/ not important?

5. Make a summary of each paragraph.

6. Underline words or phrases that introduce opinions.

7. Underline the cause and the effect in the article and write a C above the cause and an E above the effect. Some sentences may include more than one cause or effect.

8. Discuss the following statements using vocabulary from the article.

1. Nitrogen is an essential part of life.
2. It is crucial to go back to the natural limits of the nitrogen cycle.
3. Nitrogen compounds affect the environment and human health.
4. This problem is a by-product of our highly technology-driven societies.
5. Technological innovation can be used to reduce emissions.

9. Discuss the questions.

1. What do you know about nitrogen? What are the characteristics of nitrogen?
2. Why should we pay special attention to nitrogen?
3. Why is nitrogen an essential part of life?
4. What is the role of proteins?
5. What is the main source of nitrogen?
6. What are the characteristics of nitrogen in its gaseous form?

7. What is the way of taking nitrogen gas and converting it into useful compounds?

8. What causes the dramatic increase of the natural limit of nitrogen?

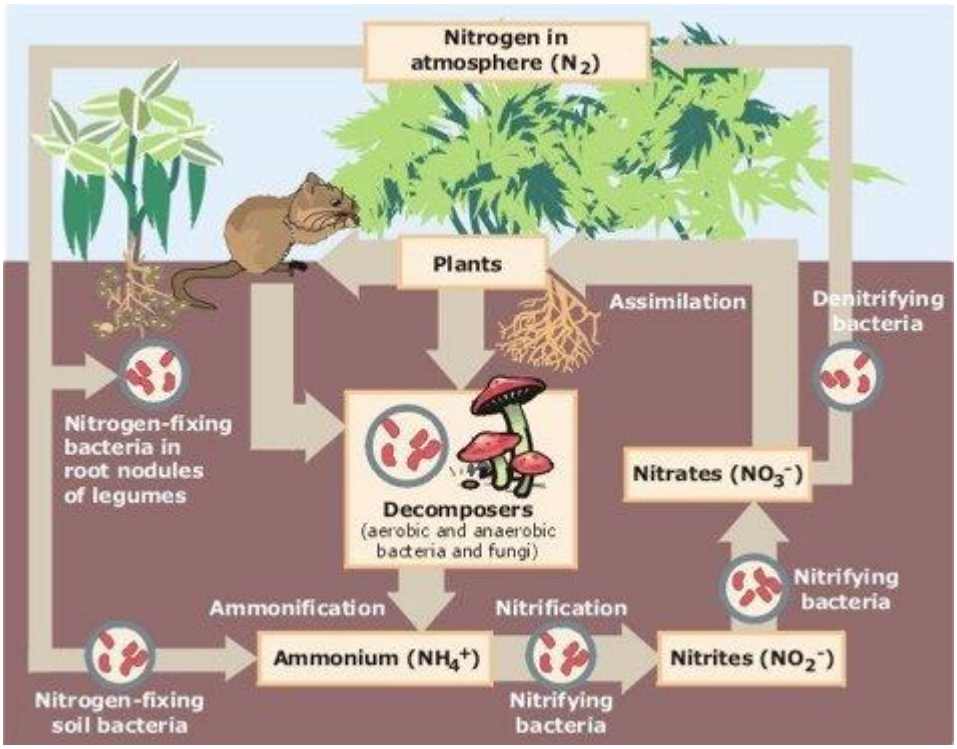
9. What are the causes of the nitrogen overdose?

10. Why should we worry?

11. What negative impact do nitrogen compounds have?

12. How can we change the situation?

10. Give a brief description on how the nitrogen cycle works.



- How much of the atmosphere of the Earth is “free” nitrogen?
- Why is nitrogen so important to living things?
- Why is free nitrogen a problem for many organisms?
- What forms must the nitrogen be in?
- What organisms are responsible for producing nitrogen compounds?
- Where can nitrogen fixing bacteria be found?
- What are decomposers?
- What part do they play in the nitrogen cycle?
- Where does the free nitrogen produced by bacteria eventually go?
- How does the nitrogen cycle affect humans? What is something that we learn from the nitrogen cycle that could enhance or harm human life?

11. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ..., The headline of the article I've read is...)

2. The author of the article is..

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 5

1. Read the title of the text. What can you predict about the topic of the reading passage from the title? What information is highlighted by the headline?

2. Study vocabulary of the article.

remarkable – выдающийся
fin – плавник
scales –чешуя
bay – бухта, залив
inhabit – населять
served as a repository for – служит хранилищем для
the water also received run-off from – в воду поступают стоки из
sewage treatment plant – завод по очистке сточных вод
feel a moral obligation to – считать себя морально обязанным
the mess left behind – оставленный мусор
have a clue – знать ответ
contaminated water – загрязненная вода
a multi-pronged approach to – многосторонний подход
severely fouled water – сильно загрязненная вода
plan, which was tweaked and redrawn – план, который был изменен и переделан
implement a kind of bioremediation – внедрение своего рода биоремедиации
thrive – разрастаться
food chain – пищевая цепь
serve as a lure to – служить в качестве приманки
to restore oxygen to the water – восстановить кислород в воде
had an amazing effect – иметь удивительный эффект
to prevent further leaching – предотвратить дальнейшее выщелачивание
carry out – проводить
the water habitat – водная среда обитания
species – вид, виды

3. Read the passage.

Cleaning Wilson Bay

There's nothing remarkable about the fish of Wilson Bay in Jacksonville, North Carolina. They have fins, two eyes, and scales in all the right places. But the mere presence of healthy, edible marine life in the bay constitutes a man-made miracle, because until recent years any life forms inhabiting the dirty bay water grew stunted

and misshapen. No one dared fish, swim or waterski there. Researchers even donned special gloves to handle the water.

Not only had the bay served as a repository for the coastal city's human waste for half a century, but the water also received run-off from a nearby housing project. A U.S. military base had a further impact. The wooden pilings supporting the structure were coated in the timber preservative, creosote, which had gradually polluted the water.

When Jacksonville officials shut down the bay's sewage treatment plant in 1998 and started a new inland waste system, they felt a moral obligation to clean up the mess left behind. But the biggest problem was that no one had a clue where to start processing such seriously contaminated water.

That's where Jay Levine stepped in. Levine, a professor of veterinary science at North Carolina State University, had recently returned from France, where he had seen an aquaculture project involving oysters. From what he had observed he proposed using bivalve mollusks such as oysters and clams as part of a multi-pronged approach to cleaning the water. City officials liked the concept, but many in the public and press were not only sceptical, but downright derisive of the idea that a humble oyster could clean such severely fouled water.

Levine's plan, which was tweaked and redrawn many times as the project progressed, was to implement a kind of bioremediation – using nature to heal itself. In this case, however, nature had a kick start from science.

Levine placed plastic mesh bags of oysters high enough in the water to allow them to be bathed in sunlight. The idea was that the oysters would thrive in the warm, shallow waters and eat the material floating in the bay. The removal of unwanted waste would allow the return of the smaller links in the bay's food chain, which would then serve as a lure to increasingly larger creatures, such as fish, turtles and seabirds.

Bubbling aeration units were used to restore oxygen to the water to help the returning species breathe. 'The original goal was to pull water into the bay, but the most important benefit was delivering oxygen to the bottom,' says Pat Donovan-Potts, who became involved as a field scientist with the project. 'It had an amazing effect – it supercharged the oysters [and helped to stabilise] the bottom of the bay.'

The clean-up project didn't stop there. The team built channels and rain gardens in adjacent neighbourhoods in order to filter the contaminated run-off from the housing projects. In addition, the pilings from the military base were removed to prevent further leaching of creosote into the water. In a related project, scientists supervised the restoration of wetlands, which was carried out by local teachers and students.

Despite predictions that the oysters would die and the project fail, the oysters not only lived, but grew fat on their dubious diet. Along with this, the water habitat

showed signs of revival. Faecal coliform counts (the measure of human sewage contamination) began a steady downward spiral, while marine life and birds began to return to the bay. Normal fish reappeared and key species, such as ospreys and golden eagles, were spotted nesting in the area.

Under the auspices of the Sturgeon City Institute, established to educate residents and others on environmental issues, the project has expanded from the bay into other nearby bodies of water. Staffed mostly by teenage volunteers, the institute helps test and measure how the water and wetlands respond to change. And now, the Wilson Bay Initiative, as the overall project is known, is preparing to cash in on America's passion for sushi.

A world-class aquaculturist at Wilmington's University of North Carolina, Wade Watanube, is working with Jacksonville officials to launch his first marine aquaculture project outside the university walls. The project will rear black sea bass, harvest their eggs and grow more. A recent study found there is a high demand for black sea bass for use in sushi, one of the country's most popular restaurant dishes. Initial tests will gauge whether a freestanding, profitable venture can operate successfully. Jacksonville's projects director, Glenn Hargett, is optimistic: 'If it does, then this project will have found another unintended benefit for our community.'

4. Decide whether the statements are TRUE(if the statement agrees with the information), FALSE (if the statement disagrees with the information), NOT GIVEN (if there is no information on this).

1. It is surprising that Wilson Bay now supports healthy marine life.
2. The public supported Levine's proposal for reviving the bay.
3. The plan required a number of modifications during its implementation.
4. Levine's team was the first to realise that the pilings added to the pollution.
5. Teenagers are paid to work on the project.
6. Further research is needed into the profitability of fish farming in the area.

5. Complete the following sentences. Choose NO MORE THAN TWO WORDS from the article for each answer.

1. _____ were put into the bay inside special bags.
2. _____ was mechanically added to the water and had a significant impact on the habitat.
3. Drains and _____ were used to remove contaminants from domestic waste water.
4. The creosote problem was solved by taking away wooden _____.
5. School groups improved _____ in the area.

6. According to the writer, which TWO of the following happened as a result of the clean-up of Wilson Bay?

Recreational use of the bay increased.

Healthy fish reappeared.

Important bird species were seen in the area.

Oysters were farmed.

A new housing project was built.

7. Answer the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. What further questions do you have about this topic?

6. What is your opinion on the topic?

7. Why do you consider this article to be important/ not important?

8. Make a summary of the article according to the tips given.

- Ask yourself why the article was written and who is the intended audience.

- Consider the author's background. Does he have a special bias or point of view?

- Compare the opening and closing paragraphs.

- Read the entire article more than once, if necessary.

- Underline key or repeated words and phrases.

- Distinguish the author's main idea from details which support that idea or are repetitions and variations on the same theme.

- Draft a several-sentence summary which defines the author's main idea broadly enough to account for most of the supporting material introduced.

9. Discuss the following statements using vocabulary from the article.

1. We never know the worth of water till the well is dry.

2. Pollution is nothing but the resources we are not harvesting. We allow them to disperse because we've been ignorant of their value.

3. Water and air, the two essential fluids on which all life depends, have become global garbage cans.

4. We forget that the water cycle and the life cycle are one.

5. Man is a complex being: he makes deserts bloom – and lakes die.

6. Water is life's matter and matrix, mother and medium. There is no life without water.

10. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ..., The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 6

1. Read the tittle of the text. What can you predict about the topic of the reading passage from the tittle? What information is highlighted by the headline?

2. Study the vocabulary of the article.

adenoids
antibody
appendix
be in charge of
benign
beneficial
bloodstream
bone marrow
catch a disease
cold
cure (v)
defend (v)
defended
defense
detect (v)
digest (v)
dismantle (v)
flu
germ
harmful
infection
inflammation
influenza
invade (v)
large intestine
lymph nodes
lymphatic duct
make smb sick
mutate (v)
payer's patches
prevent (v)
protection
release (v)
reproduce (v)
shut down (v)
small intestine spleen
subclavian vein wide
thoracic duct
throat
thymus
tonsil
vaccine [vaeksi:n]
virulentstrain

3. Read the passage.

A Magnificent Protector

Inside your body there is an amazing protection mechanism called the immune system. It is designed to defend you against millions of bacteria, microbes, viruses, toxins and parasites that would love to invade your body. To understand the power of the immune system, all that you have to do is to have a look at one's death. That sounds gross, but it will show you important things about your immune system.

When something dies, its immune system (along with everything else) shuts down. In a matter of hours, the body is invaded by all sorts of bacteria, microbes, parasites... None of these things are able to get in when your immune system is working, but the moment your immune system stops the door is wide open. Once you

die it only takes a few weeks for these organisms to completely dismantle your body and carry it away, until all that's left is a skeleton. Obviously your immune system is doing something amazing to keep all of that dismantling from happening when you are alive.

When a virus or bacterium (also known generically as a germ) invades your body and reproduces, it normally causes problems. Generally the germ's presence produces some side effect that makes you sick. For example, the strep throat bacteria (Streptococcus) releases a toxin that causes inflammation in your throat. The polio virus releases toxins that destroy nerve cells (often leading to paralysis). Some bacteria are benign or beneficial (for example, we all have millions of bacteria in our intestines and they help digest food), but many are harmful ones; they get into the body or the bloodstream.

The job of your immune system is to protect your body from these infections. The immune system protects you in three different ways. First and foremost, it creates a barrier that prevents bacteria and viruses from entering your body. Then, if a bacterium or virus does get into the body, the immune system tries to detect and eliminate it before it can make itself at home and reproduce. Thirdly, when the virus or bacterium is able to reproduce and start causing problems, your immune system is in charge of eliminating it.

There are many diseases that, if you catch them once, you will never catch again. Measles is a good example, as is chicken pox. What happens with these diseases is that they make it into your body and start reproducing. The immune system gears up to eliminate them. Cells recognize the virus and produce antibodies for it. This process takes time, but the disease runs it course and is eventually eliminated.

A vaccine is a weakened form of a disease. It is either a killed form of the disease, or it is a similar but less virulent strain. Once inside your body your immune system mounts the same defense, but because the disease is different or weaker you get few or no symptoms of the disease. Now, when the real disease invades your body, your body is able to eliminate it immediately.

Many diseases cannot be cured by vaccines, however. The common cold and influenza are two good examples. These diseases either mutate so quickly or have so many different strains in the wild that it is impossible to inject all of them into your body. Each time you get the flu, for example, you are getting a different strain of the same disease. Thus, it's only our immune system which helps us to be defended.

4. Answer the questions.

1. What is the immune system? What is the basic function of the immune system?

2. How can we understand the power of the immune system?

3. What happens when somebody dies?
4. What are the synonyms of the word "virus"?
5. What happens when the germ invades one's body?
6. What are benign bacteria?
7. How many ways of the immune system protection can you name?
8. Are there the diseases which you catch once and then never again?
9. What is a vaccine? How does it work?
10. Are there any diseases unable to be cured by vaccines?
11. What happens each time you get flu?

5. Translate the following sentences from Russian into English using the words from ex. 2.

1. Ученые считают, что возникновение вредоносных раковых опухолей – это следствие многоклеточного строения организма.
2. При попадании в организм бактерии начинают активно размножаться, а продуктами их жизнедеятельности являются токсины, несущие огромный вред.
3. У пациента поднялась температура, все симптомы говорили о воспалении, вызванном инфекцией.
4. Доктор, у меня есть риск заболеть полиомиелитом?
5. Еще в детстве вам должны были поставить вакцину против этой болезни. Если вы проходили вакцинацию, вы исключаетесь из группы риска.
6. Вирус гриппа быстро мутирует.
7. Более 30 лет назад были открыты антитела, и доказано, что они способствуют ускорению иммунного ответа при повторном контакте с антигеном.
8. Селезенка тоже является частью иммунной системы.

6. ***Give the definitions to at least three of the following terms:***

Adenoids, bone marrow, large intestine, lymph nodes, lymphatic duct, payer's patches, small intestine, spleen, subclavian vein, thoracic duct, throat, thymus.

7. Fill in the gaps in these sentences:

1. Inside your body there is an amazing _____ called the immune system.
2. When _____ invades your body and reproduces, it normally causes problems.
3. The strep throat bacteria releases a _____ that causes inflammation in your throat.
4. The job of your immune system is to protect your body from these _____.
5. If a bacterium or virus does get into the body, the immune system tries to _____ and it before it can make itself at home and reproduce.

6. _____ recognize the virus and produce antibodies for it.

7. A vaccine is a weakened form of a _____.

8. Many diseases cannot be _____ by vaccines.

9. These diseases either _____ quickly or have so many different strains in the wild.

8. Speak on the new facts you found in the text. What wondered you or what information was new for you? Can you add any other information about the immune system?

9. Do you agree with the following statements? Choose one of them, explain and expand your idea.

- The strep throat bacteria (Streptococcus) releases a toxin that causes inflammation in your throat.
- The Immune system doesn't work against viruses. It deals only with cells.
- Bacteria have no nucleus.
- Erythrocytes are not the part of immune system.
- Bacteria and viruses work in the same way.
- A vaccine is a form of a disease.

10. Make a plan of the article. Render the article using your plan.

Unit 7

1. Read the title of the text. What can you predict about the topic of the reading passage from the tittle? What information is highlighted by the headline?

2. Study the vocabulary of the article.

asexual reproduction
biological blueprint
break apart (v)
concern
consumption
counterpart
derive (v)
fertilization
fragment (v)
fragmentation
genetic fingerprinting
glue (v)
identical
inoculation
insert (v)
inter-gamete contact
large scale
ligation
multicellular organism
non-coding sequence
occur (v)
oppose (v)
premature
protect (v)
randomly
resemble (v)
result (v)
strand
transfect (v)
transfection
unicellular organism

3. Read the passage.

Cloning and Concerns about It

Cloning in biology is the process of producing similar populations of genetically identical individuals that occurs in nature when organisms such as bacteria, insects or plants reproduce asexually. Cloning in biotechnology refers to processes used to create copies of DNA fragments (molecular cloning), cells (cell cloning), or organisms. Molecular cloning refers to the process of making multiple molecules. It is used in a wide array of biological experiments and practical applications ranging from genetic fingerprinting to large scale protein production.

Cloning of any DNA fragment essentially involves four steps. First is fragmentation – breaking apart a strand of DNA; second is ligation – gluing together pieces of DNA in a desired sequence; third is transfection – inserting the newly formed pieces of DNA into cells and the last is screening or selection – selecting out the cells that were successfully transfected with the new DNA. Cloning a cell means to derive a population of cells from a single cell. In the case of unicellular organisms such as bacteria and yeast, this process is remarkably simple and essentially only requires the inoculation of the appropriate medium.

However, in the case of cell cultures from multicellular organisms, cell cloning is an arduous task as these cells will not readily grow in standard media.

Organism cloning (also called reproductive cloning) refers to the procedure of creating a new multicellular organism, genetically identical to another. In essence this form of cloning is an asexual method of reproduction, where fertilization or inter-gamete contact does not take place. Asexual reproduction is a naturally occurring phenomenon in many species, including most plants (vegetative reproduction) and some insects. Scientists have made some major achievements with cloning, including the asexual reproduction of sheep and cows.

There is a lot of ethical debate over whether or not cloning should be used. However, in the United States, the human consumption of meat and other products from cloned animals was approved by the FDA (The Food and Drug Administration) on December 28, 2006, with no special labeling required.

Cloned beef and other products have since been regularly consumed in the US without distinction.

Because of recent technological advancements, the cloning of animals (and potentially humans) has been an issue. The Catholic Church and many religious organizations oppose all forms of cloning, on the grounds that life begins at conception. They concern about the protection of the identity of the individual and the right to protect one's genetic identity. Another concern is that the biotechnologies used on animals may someday be used on humans. Researchers have found several abnormalities in cloned organisms, particularly in mice. The cloned organism may be born normal and resemble its non-cloned counterpart, but majority of the time will express changes in its genome later on in life. The concern with cloning humans is that the changes in genomes may not only result in changes in appearance, but in psychological and personality changes as well. The theory behind this is that the biological blueprint of the genes is the same in cloned animals as it is in normal ones, but they are read and expressed incorrectly.

Results of these abnormally expressed genes in the cloned mice were premature death, pneumonia, liver failure and obesity.

4. Answer the questions.

1. What does cloning in bio terminology refer to?
2. What does molecular cloning refer to?
3. What are the steps of DNA fragment cloning?
4. What does organism cloning refer to?
5. What is meant by asexual cloning?
6. What is the main cause of the ethical debates related to cloning?
7. What is the attitude of the Catholic church to cloning? What do they concern about?

8. What other concerns are mentioned by the author of the article?
9. What is the attitude of the Russian Orthodox church to cloning?

5. Make up a summary of the article.

6. Fill in the gaps in the sentences according to the text you have read.

1. Cloning in biotechnology refers to processes used to create copies of _____, _____, or _____.
2. Cloning is commonly used to amplify DNA fragments containing whole _____.
3. In the case of unicellular organisms such as bacteria and yeast, this process is remarkably simple and essentially only requires _____ of the appropriate medium.
4. Organism cloning refers to the procedure of creating a new _____, genetically identical to another.
5. _____ is a naturally occurring phenomenon in many species, including most plants and some insects.
6. Researchers have found several abnormalities in _____, particularly in mice.

7. Make sentences in Russian with the words from ex.2 and give them to your partner to translate into English.

8. Put these ideas in the order as they were given in the text.

- Religious organizations oppose cloning
- There are 3 types of cloning
- Diseases caused by cloning
- Cloning produces similar populations or identical individuals
- Organism cloning creates new multicellular organism asexually
- Multiple molecules can be made by molecular cloning
- Cloned meat have been consumed in the US without distinction
- Cell cloning derives a population of cells from a single cell

9. Make 10 questions on the text.

10. Retell the text from the point of view of:

- a scientist
- a producer of cloned meat
- a religious official

Add your reasons pro or contra cloning.

11. Translate into English.

1. Большой масштаб в изучении клонировании человека будет достигнут в будущем.

2. *Клонирование* широко распространено в природе у различных организмов.

3. Молекулярное клонирование занимается молекулами *ДНК,* их частями и даже отдельными генами.

4. Принимай это лекарство регулярно, оно *защитит* тебя от рецидива болезни.

5. По мере того как молекулярная *цепь* удлиняете, меняются и свойства веществ, состоящих из этих молекул.

6. В книге профессора В.М. Беликова «Пища будущего» затрагивается вопрос потребления мяса и этики отношения к животным.

7. Фрагменты ДНК будут разрезаны в случайных местах.

8. ДНК представляет собой несколько цепочек, состоящих из нуклеотидов.

9. Во время трансфекции генетическая информация переносится в эукариотические клетки с помощью очищенной ДНК.

10. Нить ДНК состоит из фрагментов и разрывается на части при процессе размножении.

11. Бесполое размножение защищает организм от введения другой биологической программы.

Unit 8

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

2. Study the vocabulary of the article.

AVP – антидиуретический гормон
insipidus – несахарный
dilute – разбавленный
intact – неповрежденный
lesion – поражение
tumor – опухоль
autosomal – аутосомный

3. Read the passage.

Diabetes Insipidus

The disease *diabetes insipidus* (DI), in which the secretion of AVP is impaired or absent, illustrates the crucial role of AVP in controlling the volume of water in the body. An eighteenth century English physician, Thomas Willis, named the disease diabetes insipidus, or insipid urine, to distinguish it from *diabetes mellitus*, or sweet urine, in which abnormally high concentrations of glucose in the blood result in glucose appearing in the urine.

AVP is the only known antidiuretic substance in the body. In its absence, the kidney is unable to concentrate urine maximally to conserve water. The result is a continued excretion of copious amounts of very dilute urine. Patients with severe cases of DI, in whom the ability to excrete AVP is completely lost, can excrete up to 25 liters of urine each day. Such patients urinate almost hourly, which renders the completion of even simple tasks and activities of daily living, including sleeping, exceedingly difficult.

Patients with DI can quickly become dehydrated if their urinary fluid losses are not replaced by drinking water. Fortunately, thirst remains intact in most patients with DI because lesions that destroy the magnocellular neurons in the SON and PVN that synthesize AVP generally leave intact the osmoreceptors in the anterior hypothalamus as well as the higher brain centers that control thirst. Consequently, extreme thirst is one of the hallmarks of this disease, leading to the characteristic symptoms of polydipsia (excessive drinking) and polyuria (excessive urination). If drinking water is unavailable, or if a person with DI is unable to drink, then the unreplaced urinary water loss leads to dehydration and death in the absence of medical intervention.

DI can be caused when tumors and infiltrative diseases of the hypothalamus destroy the magnocellular neurons that produce AVP. Because four nuclei contain magnocellular neurons, and 10 to 20% of AVP-producing neurons are sufficient for normal urine concentration, brain lesions that cause DI are generally large. Less commonly, DI is idiopathic (of unknown cause), most likely from an autoimmune basis. DI can also be genetic, transmitted as an autosomal-dominant trait. Some patients with DI do not have any defect in AVP secretion but rather have defects in the V2 AVP receptors in the kidney that respond to circulating AVP. These cases are called *nephrogenic* (of kidney origin) DI.

The treatment for DI, like that of other endocrine deficiency disorders, is replacement of the deficient hormone, in this case AVP. The short half-life of AVP in the circulation allows mammals to have minute-to-minute control of their urine output. However, longer acting synthetic analogs of AVP are more convenient for treatment because they need not be taken as frequently as short-acting drugs (Robinson, 1985). These agents can restore urinary concentration and allow a person with DI to lead a more normal life.

Edward M. Stricker and Joseph G. Verbalis

4. Answer the questions.

1. What is the difference between *diabetes insipidus* and *diabetes mellitus*?
2. What happens to patients unable to excrete AVP?
3. What is one of the hallmarks of DI?
4. What causes DI?
5. What treatment can be suggested for DI?

5. Match the words from the text in column A with their synonyms in B and antonyms in C.

column A	**column B**	**column C**
crucial	protect	moisten
distinguish	copious	nonintervention
appear	categorize	hardly
conserve	desiccate	hide
exceedingly	interference	confuse
dehydrated	acute	deficient
hallmarks	arise	neglect
intervention	indication	trivial
sufficient	excessively	

6. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. What further questions do you have about this topic?

6. What is your opinion on the topic?

7. Why do you consider this article to be important/ not important?

7. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the information of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Look through the text for figures, which are important for general understanding.

9. Speak on the conclusion the author comes to.

10. Point out the facts that turned out to be new for you.

11. State what places of the article contradict your former views.

12. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

13. Express your own point of view on the problem discussed.

Unit 9

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

2. Study the vocabulary of the article.

correlate – соотносить
impair – ухудшать
lesion – поражение
implicated – участвующий
enhance – усиливать
boost – увеличивать
designation – обозначение
abstention – воздержание
induce – вызывать
subsequent – последующий

3. Read the passage.

Logic of Methodology Used in Behavioral Neuroscience

Theorists (e.g., Hoebel, 1974) have defined principles for identifying the involvement of particular brain regions in motivational (and other behavioral) functions. For example, electrophysiological, neurochemical, or metabolic activity may be observed in a structure correlated with a behavioral response of interest, which suggests an involvement of that structure with the function under study. However, this correlative relationship does not establish whether the functioning of that region is causally important for the behavior. This issue may be addressed by an intervention that disrupts (impairs or improves) the function under study. For example, if the function is lost following selective lesioning, this suggests that the brain structure is implicated in that function. Similarly, if the function is enhanced following a boosting of neurotransmission in that region (e.g., via mild levels of electrical or chemical stimulation through implanted electrodes or cannulae), this is similarly converging evidence of a causative role. However, it is important to realize that the use of these techniques is each associated with interpretative problems, and their effects must be critically appraised. For example, the designation of the lateral hypothalamic region as a “feeding center” was based on the following:

1. Electrolytic lesions produced profound aphagia (abstention from eating).

2. Electrical stimulation of the brain through electrodes implanted in the lateral hypothalamus induced eating in sated rats (Hoebel, 1974).

3. Infusions of the neurotransmitter norepinephrine into the hypothalamus also induced eating in sated rats (Leibowitz, 1980).

4. Electrophysiological recording showed that when monkeys were deprived of food, individual neurons in the lateral hypothalamus were sensitive to the sight and taste of food (Rolls, 1985).

Although many of these experimental observations have remained valid, subsequent evidence has suggested that the lateral hypothalamus has a much more specific role in feeding motivation, as a result of using improved techniques. Moreover, many of the effects associated with diminishing and increasing activity within the lateral hypothalamus have been shown subsequently to depend upon coincidental influences on axons within the medial forebrain bundle that merely passes through the lateral hypothalamus (e.g., between midbrain and striatum or between prefrontal cortex and brainstem) and had little to do functionally with the lateral hypothalamus itself. Only through the use of several neurobiological techniques providing converging evidence can the relationships between brain and behavior become more certain.

4. Answer the questions.

1. What are the principles for identifying the involvement of particular brain regions in motivational (and other behavioral) functions?
2. Does correlative relationship establish whether the functioning of that region is causally important for the behavior?
3. What is it important to realize while using these techniques?
4. What was the designation of the lateral hypothalamic region as a “feeding center” based on?
5. What do many of the effects within the lateral hypothalamus depend upon?

5. Match the words from the text in column A with their synonyms in B and antonyms in C.

column A	**column B**	**column C**
involvement	evoke	separate
establish	successive	invalid
cause	inclusion	uninvolved
implicated	activate	previous
converge	assemble	unsettle
induce	supply	outcome
valid	attested	deprive
subsequent	create	exclusion
provide	involved	prevent

6. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that support the main idea of the article.

2. What is the opinion or point of view expressed by the writer? What evidence does the writer give to support his or her point of view?

3. What do you feel after reading the article?

4. What did you learn from examining the article? Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. What further questions do you have about this topic?

6. What is your opinion on the topic?

7. Why do you consider this article to be important/ not important?

7. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the information of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Look through the text for figures, which are important for general understanding.

9. Speak on the conclusion the author comes to.

10. Point out the facts that turned out to be new for you.

11. State what places of the article contradict your former views.

12. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

13. Express your own point of view on the problem discussed.

Unit 10

1. Read the title of the text. What can you predict about the topic of the passage from the title?

2. Study the vocabulary of the article.

infectious diseases – инфекционные заболевания
orchestrated response – организованный ответ
to discriminate – определять, различать, выделять
to trigger – запускать
to elicit – вызывать
grafts – трансплантаты
vertebrates – позвоночные
to encompass – охватывать
innate – врожденный
acquired – приобретенный
smallpox – оспа
lymphocytes – лимфоциты
leukocytes – лейкоциты
lysozyme – лизоцим
complement system – система комплемента
to eradicate – уничтожать, искоренять
glycoproteins – гликопротеины
to recruit cells – набирать клетки
determinant – определитель, решающий фактор
domain isotypes of antibodies – доменные изотипы антител
differentiate into plasma cells – дифференцировать в плазму клетки
anamnestic response – анамнестический ответ
serum immunoglobulin – сывороточный иммуноглобулин
intravascular space – внутрисосудистое пространство
fungi – грибки, плесень
colostrum – молозиво
musosal surfaces – поверхности слизистой оболочки
basophils – базофилы
mast cells – тучные клетки
helminth species – виды гельминтов
humoral activities – гуморальная деятельность
cytokines – цитокины

3. Read the passage.

Part 1. What is Immunity?

Historically the term *immunity* has meant protection against disease and more specifically, infectious diseases. The various cells and proteins responsible for immunity constitute the *immune system,* and their collective and orchestrated response to the introduction of foreign substances (also called "non-self" substances) is the *immune response.* Nowadays, we know that the same basic mechanisms of resistance to infections are also involved in the individual's response to non-infectious foreign substances. Thus, when an individual has a primary contact with a molecule or cell, the immune system will first discriminate if this is a "self" or a "non-self" agent. Under normal conditions, if this substance/cell is the same found in the organism, the immune system will not react and we say that the individual is *tolerant* to that agent. However, if the agent is recognized as a "non-self" substance/cell it will trigger a specific immune response, in addition to a non-specific one, in an attempt to destroy it. These foreign substances that elicit a specific immune response and react with the product of this response are generically called *antigens.* The mechanisms that normally protect individuals from infections and eliminate foreign substances are themselves capable of causing tissue injury and disease (e.g., auto-immune diseases, rejection of grafts, allergies) in some situations. Thus, Immunology deals with understanding how the body distinguishes between "self" and "non-self" molecules; the remainder is technical detail...

Part 2. Innate and Acquired Immunity

Vertebrates present two main types of immunity: *innate* (also known as natural immunity) and *acquired* or adaptive immunity.

Innate immunity encompasses the cells and molecules with which an individual is born and it is potentially ever-present, available on short notice and non-specific; also, innate immunity is the first line of defense against foreign cells or substances. The innate immune system provides an immediate, non-lasting resistance which is not improved by repeated infection.

Acquired immunity, on the other hand, is specific to the foreign molecule or cell, thus being an adaptive response to a given "non-self" substance and also presents memory (i.e., the immune system "remembers" a previous encounter with a foreign microbe or molecule, so that subsequent encounters increasingly stimulate defense mechanisms). The immunological memory is the basis of the protective vaccination against infectious diseases. For example, infection or vaccination against smallpox, diphtheria or pertussis produce a persistent immunity following infection or vaccination and the development of "memory lymphocytes," which in turn will induce a more effective, long-lasting and stronger immune response after a subsequent infection or vaccination.

The innate and specific immune systems consist of a variety of molecules, cells and tissues.

The most important cells are the leukocytes which fall into two broad categories: phagocytes (including macrophages and neutrophyls) and natural killer cells, which belong to the innate immune system, and lymphocytes (specially T lymphocytes), which mediate the adaptive immunity.

The most important soluble factors that mediate the innate immune response are: lysozyme, a complex of substances generically called the complement system and the so called acute-phase proteins (e.g., interferons and C-reactive protein). The main soluble proteins responsible for the acquired immune response are the *antibodies.*

If the first innate defenses are breached, the specific immune mechanisms are activated and produce a specific reaction to each infectious agent in an attempt to erradicate that agent. Also the specific immune response amplifies the protective mechanisms of natural immunity, thus reinforcing the body's ability to eliminate the antigenic molecules.

Part 3. Antibodies

Antibodies, generically referred to as immunoglobulins, are glycoproteins found in the blood and other biological fluids as soluble proteins and as membrane-bound proteins on the surface of cells, especially on B lymphocytes. Each immunoglobulin is essentially bifunctional: it binds specifically to molecules (antigen) from a pathogen/foreign substance that elicited the immune response and recruits other cells and molecules to destroy the pathogen or non-self molecule, to which the antibody is bound.

Each function is accomplished in separate structural regions of the antibody molecule. The region which binds the antigen is the variable region (which displays an aminoacid sequence which varies considerably, according to the antigenic determinant which specifically can "fit" into it) and the part which recruits cells and other molecules is the constant region. Some characteristic variations in the aminoacid sequences of the constant parts (also called domains) of the immunoglobulins distinguish different classes or isotypes of antibodies. The different classes of immunoglobulins have different characteristics and functions.

Once a B cell expressing a specific antibody interacts with an antigen, it will divide many times and some of them will differentiate into plasma cells and produce antibodies, while others will differentiate into long-lived B cells, called **memory cells**. These memory cells will rapidly expand and secrete high amounts of specific antibody after encountering the same antigen again; this type of response is known as secondary response or anamnestic response. Secondary responses explain why a second encounter with an antigen is much more effective and explains why we become immunized after having some types of infection or when we are vaccinated.

In addition, the antibody produced in the secondary anamnestic response is of a different isotype than the antibody produced in the primary response. There are five isotypes of antibody in humans: **IgG**, **IgM**, **IgA**, **IgD**, **IgE**.

IgG antibodies account for about 75% of the total serum immunoglobulin in normal adults and are the predominant antibodies produced in the secondary anamnestic response. IgG antibodies are found as soluble immunoglobulins in serum and other biological fluids, and can bind to certain types of cells, such as macrophages, via a receptor specific to the constant region of the IgG molecule. The binding of antigen to IgG so bound to macrophages can induce the cell to phagocyte the antigen/antibody complex.

IgM antibodies account for about 10% of the total serum antibodies and are largely confined to the intravascular spaces. IgM molecules are the first antibodies to appear after a primary immune response. Antibodies of this class are very effective at activating the complement system by a pathway dependent on the antigen-antibody interaction, the so called classical pathway, and in this way, are very effective at clearing bacteria and some fungi from the blood.

IgA is the main immunoglobulin class in secretions, such as the tears, milk, colostrum, and mucosal surfaces. It is also the second most abundant immunoglobulin class in serum but its effectiveness at mucosal surfaces is unique. IgA antibodies do not fix complement, although they are important in the neutralization of some toxins and microorganisms, such as bacterial toxins and viruses.

IgD immunoglobulins are detected in blood at very low concentrations by using very sensitive methods. They are mainly present as membrane-bound immunoglobulins on the surface of mature B cells where they are co-expressed with IgM molecules. At present, the function of IgD is somewhat unclear.

IgE immunoglobulins are found in extremely low concentrations in the blood. However, they are found on the surface membrane of basophils and mast cells. IgE molecules are bound to the mast cells and basophils via special receptors on the surface of these cells, specific for the amino terminal region of IgE molecule. IgE antibody levels in serum are highly increased in patients infected with helminthic diseases, such as *Ascaris lumbricoides* and so there are indications that this immunoglobulin class plays an important role in the defense against some helminth species.

All of these antibody molecules act co-operatively along with a number of other recognition molecules (the MHC molecules, the TCR, CD4 and CD8 molecules, various cytokines, the complement system and other molecules not mentioned in this brief overview). Also the various cells of the immune system cooperate to bring together the effector cells and/or humoral activities with the microorganism, their toxins, or the host infected cells. The end result is, provided

antigen has been recognized and processed appropriately, the killing of the microorganism or the infected cell.

4. Answer the questions.

1. What does the term immunity mean?
2. What is the immune response?
3. Under what conditions will the immune system trigger a specific immune response?
4. What foreign substances are called antigens?
5. What does the innate immune system provide?
6. What is the role of "memory lymphocytes"?
7. What are the main soluble proteins responsible for the acquired immune response called?
8. Where are antibodies found?
9. In what way is each immunoglobulin essentially bifunctional?
10. How many isotypes of antibody are there in humans? What are they?
11. What does each antibody isotype account for?

5. Divide into 4 groups and answer the question.

Group 1 focus on Part 1. What will the immune system first discriminate when an individual has a primary contact with a molecule or cell?

Group 2 focus on Part 2. What are two main types of immunity?

Group 3 focus on Part 3. What parts of the immunoglobulins distinguish different classes of antibodies?

Group 4 focus on Part 3. What is the function of memory cells?

6. Make a summary of each part of the text.

7. Complete the summary. Fill in the gaps with suitable words.

Innate immunity _____ the cells and molecules with which an individual is born and it is potentially ever-present, available on short notice and non-specific; also, innate immunity is the first line of _____ against foreign cells or substances. The innate immune system provides an immediate, non-lasting resistance which is not improved by _____ infection.

Acquired immunity, on the other hand, is specific to the foreign molecule or cell, thus being an _____ response to a given "non-self" substance and also presents memory (i.e., the immune system "remembers" a previous _____ with a foreign microbe or molecule, so that subsequent encounters increasingly stimulate defense mechanisms). The immunological _____ is the basis of the protective

vaccination against infectious diseases. (encounter, defense, repeated, encompasses, memory, adaptive)

8. Discuss the questions.

1. What is the article about? List several facts or arguments that support the main idea of the article.

2. Is it important to know basic mechanisms of resistance to infections? What evidence does the author give?

3. What do you feel after reading the article?

4. Does any new information you learned contradict or support your prior knowledge about the topic of this article?

5. Do you have further questions about the innate and specific immune systems?

6. What is the role of memory cells?

7. Why do you consider this article to be important/ not important?

9. Match the columns:

1) elicit	a) запускать
2) discriminate	b) вызывать
3) grafts	c) охватывать
4) trigger	d) определять
5) encompass	e) уничтожать
6) acquired	f) последующий
7) eradicate	g) приобретенный
8) subsequent	h) трансплантаты
9) amplify	i) усиливать

10. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 11

1. Read the title of the text. What can you predict about the topic of the passage from the title?

Read the introduction to check your ideas.

2. Mind the following words and word combinations:

sequencing – последовательность действий
to impact – воздействовать
diverse range – разнообразный ассортимент
to alter – изменять
renewable biomass – возобновляемая биомасса
to designate – обозначать, определять, устанавливать
harsh environmental conditions – суровые условия окружающей среды
acids and bases – кислоты и основания
implications – *зд.* последствия, причастность
funding allocations – *зд.* ассигнования на финансирование
host organism – организм-хозяева
assemblies and circuits – сборки и схемы
biobrick parts – биокирпичики
eventual output – конечный результат
scaling-up production – наращивание производства
to avoid disrupting – во избежание нарушения
circumventing toxicity – *зд.* обход токсичности
scaling up processes – *зд.* расширение процесса
terpenoid production – терпеноидная продукция
gene deletion – удаление гена
fine chemicals – тонкие химикаты (чистые химикаты)

3. Read the passage.

Introduction. Synthetic Biology: Hope or Hype?

Products like beer, wine and yoghurt would not be possible without microorganisms. For thousands of years humans have exploited these 'cell-factories' in industry for the production of many commercial goods. Increased knowledge of microbes, such as Baker's yeast *Saccharomyces cerevisiae* and the bacterium *Escherichia coli*, has allowed scientists to manipulate these organisms for use in the biotechnology industry. Advancements in DNA sequencing (technology used to analyse DNA), the ease of gene synthesis and our knowledge of genetics has opened the doors to a whole new age of (bio)synthesis, which has impacted a diverse range of industries including pharmaceuticals, biomedicine, fine chemicals, biofuels and

biopolymers. The advancements in these areas have paved the way for synthetic biology.

Synthetic biology is the design of new biological systems using DNA or redesign of existing systems through altering DNA of various components within a host organism. Because DNA is a universal language across all life, taking a line of code from one species to another can in theory have the same effect. Synthetic biology requires the use of DNA manipulation in order to programme organisms to make products they don't make in nature. Hence, these organisms become living factories that produce commercially valuable products or therapeutics using cheap and renewable biomass as feedstock. This article serves to introduce the principles of synthetic biology and discuss its diverse applications: present and future.

Although a promising area of research with the potential of a huge impact on our economy, synthetic biology is still in its infancy. However, the potential benefits of the newly emerging synthetic biology technologies has been recognised by governments, with the UK and USA both designating this research as a national priority in funding investment. For example, in the United Kingdom, it has been identified as one of the eight great British technologies of the future. Through the use of biological systems, synthetic biology promises a greener, cheaper and more efficient alternative to the traditional methods currently employed in the industry, such as extraction from natural sources and chemical synthesis. The latter often requires harsh environmental conditions, such as the use of strong acids and bases, high temperatures and pressures, expensive metal catalysts and large number of reaction and purification steps. Obvious implications of synthetic biology for the UK economy and biomedical and biotechnology industries has resulted in recent major funding allocations for the set-up of several specialised synthetic biology centers across the country in Manchester, Nottingham, Cambridge and Bristol as well as another two yet centers to be announced.

1. Engineering Life

DNA is the software encoding the characteristics and processes of every cell. This means the function and identity of each cell within an organism is determined by the genes that are active or turned on in the cell. As such, synthetic biologists use DNA-level engineering to 'reprogramme' host organisms to produce new compound(s). You could reengineer the bacteria *E. coli* to make menthol (mint flavor) by synthesizing the mint plant DNA responsible for menthol production and delivering it into *E. coli*. To programme the cells, functional DNA assemblies and circuits are constructed using individual components (e.g. elements that control when a gene is turned on and to what extent it is on) known as *BioBrick* parts, just like using Lego™ building blocks. Each component serves a function that affects the eventual output (product, cell behaviour, signal etc.)

Although far from perfect, *E. coli* and *S. cerevisiae* are the prevalent choice of host-organisms, as genetic manipulation is relatively easy. Organisms such as cyanobacteria that have minimal feedstock requirements are ideal alternative factories for scaling-up production, however, these organisms are not as well known on a genetic level. When adding new genes into an organism, the challenge is to avoid disrupting the other natural processes vital to its survival. Further challenges are the engineered organism's survival against evolutionary pressures, circumventing toxicity to host organisms and balancing organism's energy requirements. Scaling up the processes from lab bench to industrial scale application presents further challenges. To ensure that engineered pathways do not disturb the host organism's own biochemical pathways, research is being conducted into engineering of minimal 'chassis' host organism, containing only the bare minimum genome required for its survival.

2. Applications in the Pharmaceutical industry

There is extensive synthetic biology research activity in the area of terpenoid production. Terpenoids are the largest and most diverse class of metabolite-compounds made and used in reactions that keep organisms alive, found extensively in nature. These compounds include herbivore-repellents, pollinator-attractants, phototoxins and photoreceptive agents such as carotenoids and sterols. The drug Paclitaxel is a terpenoid extracted from the bark of the pacific yew trees and is used in chemotherapy treatment. The native trees take 200 years to grow to only 40ft of height. The bark from one-40ft tree yields 0.5g of taxol, and as 3g of this drug is required for a single treatment; the demand of this drug exponentially exceeds supply. Furthermore, the distillation and fractionation steps required to extract these compounds from cells are costly, making the treatment very expensive. A taxol precursor, taxadiene, has been produced successfully at around 1 g/L using a synthetic biology approach. This is an improvement upon native sources, however further optimization of the product yield is needed for industrial scale production. This would result in increased availability of such drugs at lower costs, relieving the financial strain of such treatments on healthcare institutions.

Another prominent example is the anti-malarial drug, artemisinin. Artemisinin is extracted from a sweet wormwood plant called Artimisinua annua. The Keasling laboratory in Berkeley, California have designed and implemented an industrial scale production of artemisinin using the synthetic biology approach. Artemisinin is hailed as a synthetic biology success since the lab demonstrated production of a significant amount – 25g/L – of the artemisinin precursor called artemisinic acid. Pharma-giant Sanofi has licensed the engineered S. cerevisae strain for industrial scale semi-synthetic production of artemisinic acid, which is then chemically converted to artesunate for use in combination therapy for malaria. In developing countries, malaria affects up to 200 million people every year, claiming the lives of 650,000

(mostly children) every year. Therefore, synthetic biology has the potential to make a huge impact on the pharmaceutical industry in revolutionising the way drugs of the future are made.

Multi-drug resistance is among one of the biggest challenges of the 21st Century. By 2050, drug resistant infections could cost the global economy up to $100 trillion, set to claim the lives of 10 million people every year – killing more people than cancer. This is of a huge concern because the overuse of antibiotics leads to an acceleration of levels of drug-resistant pathogens. Synthetic Biology enables the design of new treatment methods to target bacterial biofilms, potentiation of current antibiotics and engineering of new antibiotics. Multi-drug resistance can be targeted through the design of circuitry that switch off bacterial resistance, engineering designer phages (organisms that kill bacteria) that destroy biofilms and reprogramming probiotic bacteria that can fight pathogens.

3. Fine Chemicals for use in cosmetics, flavourings and fragrances

Monoterpenoids (a class of terpenoids) include compounds such as limonene, which is a precursor to menthols and carvone. Limonene naturally found in citrus peels can is used in almost all cosmetics and toiletries. Menthols are valuable to the flavouring, fragrance and cosmetic industry. There is an annual turnover of 7000 tonnes of menthol, resulting in the net revenue of US $300 million which makes these compounds commercially valuable.

Menthol constitutes 0.5% of the dry-weight of mint leaves and the proportion of the different types of menthol can vary greatly between harvests depending on environmental conditions. Processes that are used to extract menthol from leaves are very costly. Chemical synthesis routes require the use of expensive catalysts and several purification steps for the separation of a single type of menthol.

Natural biochemical pathways for the production of such commercially valuable compounds can often be found in nature. These pathways usually occur at mild conditions – those needed for a mint plant to grow. Furthermore, biochemical engineering can be used to produce such pure compounds in high quantities. This makes synthetic biology a greener, more efficient and cheaper alternative to chemical synthesis for the production of fine chemicals. It can revolutionise our chemical industries by enabling the move away from petrochemicals.

Through putting the biosynthetic pathway of mint that is responsible for menthol production into *E. coli* and fine-tuning it, synthetic biologists may be able to produce pure menthol at greater concentrations than are available from natural sources, at minimal expenses. Limonene is the precursor to menthols and its anti-microbial properties make it toxic to *E. coli*; thus, the organism removes this compound as soon as it is produced. Hence, there is less of it available to be converted to menthol. Synthetic biologists face such problems when engineering organisms to make products that it does not produce in nature. Large-scale production

of menthols through this route is thus commercially desirable for the fragrance, flavour and cosmetics industry.

4. Other applications in the field of Biomedicine and Biofuels

Synthetic biology can be used to engineer biological based sensors called biosensors that can sense, analyse and activate under in-vivo conditions i.e. conditions within living organisms such as hallmarks of cancer, inflammatory responses and changes resultant from bacterial infections. One such example of an engineered biosensor is the University of Cambridge. The team engineered *E. coli* to express different pigments dependent on the in vivo conditions. This has the potential to be used for diagnostic purposes for a range of gastrointestinal diseases. Hence, synthetic biology opens the door to a completely new class of diagnostics. Another example is a protein from tissue necrotising organism (organism that destroys the human cells and tissues) Streptococcus pyogenes. The protein has two parts that search for each other and bind to each other with extremely strong covalent bonds. Research will be conducted to engineer this protein for the detection of circulating cancer cells and serve to diagnose the spread of cancer cells.

Another key area of synthetic biology research is biofuels. Extensive research has been conducted for the production of second and third generation biofuels that have high-energy content and are compatible with the current engine infrastructure. Higher alcohols and fatty-acid derived fuels and hydrocarbons are under focus. However, there are numerous hurdles to be addressed such as host-toxicity. Further exciting developments are coming forth in the production of bioplastics via synthetic biology approaches to challenge the dominance of naptha-based plastics.

As synthetic biology is an emerging research area, it is difficult to predict the ways in which it will have the most impact on the sectors discussed above. Industry interest is of paramount importance to the development in this area, which is likely to occur if the technologies resulting from synthetic biology compete in terms of costs and efficiency with the existing technologies employed by the industry. The continued research interest in this area promises significant advancements and revolution for a diverse range of industries in the coming years as well as huge impact on national and international economies. Despite the many potential benefits we can reap from synthetic biology research, we must assess the risks associated with making and manipulating organisms. An example would be terrorists making bioweapons constructing dangerous, virulent organisms such as small pox or Spanish flu. There may be the rare risk of accidental production of something dangerous that the designer is unable to control. Therefore, careful consideration needs to be given to account for responsible research and innovation.

4. Answer the questions.

1. What advancements opened the doors to a new age of biosynthesis? Name them.
2. What does synthetic biology require?
3. What are the potential benefits of the newly emerging synthetic biology technologies? Justify your answer.
4. What do synthetic biologists use DNA-level engineering for?
5. Is the scope of applications of synthetic biology in the pharmaceutical industry wide?
6. What are terpenoids?
7. What does the overuse of antibiotics lead to?
8. What makes synthetic biology a greener, more efficient and cheaper alternative to chemical synthesis?
9. What are other applications of synthetic biology in the field of biomedicine and biofuels?

5. Divide into 5 groups and answer the question.

Group 1 focus on Introduction. What does this article serve to introduce?

Group 2 focus on Engineering life. Is the function and identity of each cell within an organism determined by the genes?

Group 3 focus on Applications in the pharmaceutical industry. What compounds were successfully produced using a synthetic biology approach?

Group 4 focus on Fine chemicals for use in cosmetics, flavouring and fragrances. Can biochemical engineering be used to produce pure compounds in high quantities?

Group 5 focus on Other applications in the field of Biomedicine and Biofuels. In what way can biosensors function within living organisms?

6. Complete the summary. Fill in the gaps with suitable words.

Synthetic biology is _____ of new biological systems using DNA or redesign of existing systems through _____ DNA of various components within _____ organism. Because DNA is a universal language across all life, taking a line of code from one species to another can in theory have the same effect. Synthetic biology requires the use of DNA manipulation in order to _____ organisms to make products they don't make in nature. Hence, these organisms become living factories that produce commercially valuable _____ or therapeutics using cheap and renewable biomass as feedstock. This article serves to introduce the principles of synthetic biology and discuss its diverse _____: present and future.

(products, programme, the design, altering, applications, a host)

7. Make a summary of each part of the text.

8. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that encompass the main idea of the article.

2. What does synthetic biology promise through the use of biological systems? What evidence does the author give?

3. What do you feel after reading the article?

4. What are the challenges of specialized synthetic biology centers?

5. Does any new information you learned contradict or support your prior knowledge about the topic of this article?

6. What further questions do you have about this topic?

7. Is there extensive synthetic biology research in different spheres?

8. Why do you consider this article to be important/ not important?

9. Match the columns:

1) implications	a) воздействовать
2) alter	b) разнообразный
3) renewable	c) программная кодировка
4) avoid	d) последовательность действий
5) diverse	e) изменять
6) impact	f) последствия
7) software encoding	g) избегать
8) eventual output	h) конечный результат
9) sequencing	i) возобновляемый

10. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 12

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

2. Read the passage.

Plant Hormones

Plant hormones, known as plant growth regulators (PGRs) or phytohormones, are chemicals that regulate a plant's growth. According to a standard animal definition, hormones are signal molecules produced at specific locations, that occur in very low concentrations, and cause altered processes in target cells at other locations. Unlike animals, plants lack specific hormone-producing tissues or organs. Plant hormones are often not transported to other parts of the plant and production is not limited to specific locations.

Plant hormones are chemicals that in small amounts promote and influence the growth, development and differentiation of cells and tissues. Hormones are vital to plant growth; affecting processes in plants from flowering to seed development, dormancy, and germination. They regulate which tissues grow upwards and which grow downwards, leaf formation and stem growth, fruit development and ripening, as well as leaf abscission and even plant death.

The most important plant hormones are abscissic acid (ABA), auxins, ethylene, gibberellins, and cytokinins, though there are many other substances that serve to regulate plant physiology.

Photomorphogenesis

While most people know that light is important for photosynthesis in plants, few realize that plant sensitivity to light plays a role in the control of plant structural development (morphogenesis). The use of light to control structural development is called photomorphogenesis, and is dependent upon the presence of specialized photoreceptors, which are chemical pigments capable of absorbing specific wavelengths of light.

Plants use four kinds of photoreceptors: phytochrome, cryptochrome, a UV-B photoreceptor, and protochlorophyllide. The first two of these, phytochrome and cryptochrome, are photoreceptor proteins, complex molecular structures formed by joining a protein with a light-sensitive pigment. Cryptochrome is also known as the UV-A photoreceptor, because it absorbs ultraviolet light in the long wave "A" region. The UV-B receptor is one or more compounds not yet identified with certainty, though some evidence suggests carotene or riboflavin as candidates. Protochlorophyllide, as its name suggests, is a chemical precursor of chlorophyll.

The most studied of the photoreceptors in plants is phytochrome. It is sensitive to light in the red and far-red region of the visible spectrum. Many flowering plants

use it to regulate the time of flowering based on the length of day and night (photoperiodism) and to set circadian rhythms.

Vocabulary notes

abscission	сбрасывание, опадание (о листьях, плодах)
acid	кислота
auxin	ауксин
cell	клетка
certainty	уверенность, убежденность
chemical (n.; adj.)	химическое вещество; химический
circadian	циркадный, циркадианный (о биологическом ритме)
cytokinin	цитокинин
dormancy	состояние покоя
flowering	цветение
germination	прорастание; зарождение
gibberellin	гибберелла
leaf	лист
morphogenesis	морфогенез
photomorphogenesis	фотоморфогенез (морфогенез растений, регулируемый освещением)
photoreceptor	фоторецептор
phytochrome	фитохром
to promote	способствовать
protein	белок
protochlorophyllide	протохлорофиллид
rhythm	ритм
to ripen	созревать
seed	семя
stem	стебель
tissue	ткань
vital	жизненно важный
wavelength	длина волны

3. Find in the text the English for:

Точно не выявлены, рост стебля, светочувствительный, регулировать физиологию растения, сложные молекулярные структуры, способные поглощать, как явствует из названия, ткани, образующие гормоны.

4. Match the synonyms:

1. sort	a. realize
2. understand	b. important
3. flowering	c. study
4. humans	d. variability
5. research	e. blooming
6.differentiation	f. part
7. vital	g. people
8. role	h. kind

5. Match the antonyms:

1. identity	a. absence
2. join	b. complex
3. presence	c. least
4. simple	d. night
5. day	e. differentiation
6. most	f. dark
7. short	g. long
8. light	h. separate
9. dependent	i. free

6. Match the words on the left with the definitions on the right:

1. sensitive	a. the time when a plant starts blossoming
2. flowering	b. reacting quickly or strongly to something
3. regulate	c. facts or physical signs that help to prove something
4. substance	d. to have the power to make decisions and decide what will happen to something
5. evidence	e. to recognize something and understand exactly what it is
6. control	f. the substance that animal and plant cells are made of
7. tissue	g. growth, or improvement over a period of time
8. development	h. able to be seen
9. visible	i. to control an activity or a process
10. identify	j. with a lot of details or small parts, which makes something difficult to understand or deal with
11. plant	k. a particular type of liquid, solid, or gas
12. complex	l. a living thing that grows in soil, has leaves and roots, and needs water and light from the sun to live

7. Complete the sentences using proper words and phrases from the box.

a) photoreceptors, b) phytochrome, c) hormones, d) cells and tissues, e) flowering f) to seed development, g) serve to regulate

1. _____ regulate which tissues grow upwards and which grow downwards.
2. Many flowering plants use _____ to regulate the time of flowering.
3. Chemical pigments capable of absorbing specific wavelengths of light are called _____.
4. A lot of substances _____ plant physiology.
5. The main processes in plants are _____ dormancy, and germination.
6. Plant hormones can affect the growth and differentiation of _____.

8. Answer these questions:

1. What do plant hormones regulate?
2. What is the difference between plant hormones and phytohormones?
3. Where are hormones produced in animals' bodies?
4. How do hormones affect different organs of the animal's body
5. In what specific locations are plant hormones produced?
6. How do hormones influence plants?
7. What processes do plant hormones affect?
8. What substances serve to regulate plant physiology?
9. Why are hormones vital to plant growth?
10. Why is cryptochrome sometimes called the UV-A photoreceptor?
11. What hormone is a chemical precursor of chlorophyll?
12. What is phytochrome especially sensitive to?
13. What do flowering plants use phytochrome for?

9. Say whether the following statements are true or false. Comment on the true statements and correct the false ones.

1. Light is important for photosynthesis in plants.
2. Plant hormones are easily transported to other parts of the plant.
3. Phytochrome and cryptochrome are photoreceptor carbohydrates.
4. Photomorphogenesis is dependent upon the presence of specialized photoreceptors.
5. Production of plants is strictly limited to specific locations.
6. Photomorphogenesis does not depend on the presence of specialized photoreceptors.

10. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that encompass the main idea of the article.

2. What does synthetic biology promise through the use of biological systems? What evidence does the author give?

3. What do you feel after reading the article?

4. What are the challenges of specialized synthetic biology centers?

5. Does any new information you learned contradict or support your prior knowledge about the topic of this article?

6. What further questions do you have about this topic?

7. Is there extensive synthetic biology research in different spheres?

8. Why do you consider this article to be important/ not important?

11. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ... The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

Unit 13

1. Read the title of the text. What can you predict about the topic of the reading passage from the title?

2. Read the passage.

You Are What You Eat

All living things need food to sustain life. Plants can make their own food from soil, water, and sunshine. Some animals eat other animals, they are known as predators or carnivores. Other animals only eat plants. They are called herbivores. Human beings eat all kinds of different foods from animal and plant sources, depending on what is available where they live and sometimes, too, on the restrictions of religious customs. Food supplies nutrients, the substances needed by the body for life and growth. They are proteins, fats, carbohydrates, vitamins, minerals, and water. A healthy balanced diet must consist of all six. In prehistoric times people ate what they could find by hunting and gathering wild plants. Later they learned to keep animals and grow cereals and vegetables. Settled communities then became established. The plants that were cultivated were the plants that grew naturally in any particular climate.

Nutrition is the process by which plants and animals take in and use food. Food is needed to keep the body running smoothly. It provides energy for work and play, for breathing, and for the heart's beating.

The building material for muscles, bones, and blood comes from food. You cannot have a healthy body without healthy eating and drinking. Not enough of some foods, or too much of others, can lead to illness.

Experts on nutrition are called nutritionists. The food and drink you take in are called your diet. (This word is sometimes used in another way, to mean eating less food than normal in order to lose weight, as in "going on a diet".) A person's diet is so important because growth and health depend on it. Dieticians are people with knowledge of special diets used for sick people in hospital. We should never forget that across the world 40 million people die each year from starvation and the diseases it brings. Fifteen million of them are babies and young children. For the millions more who suffer from malnutrition (not enough of the right foods), healthy eating is out of the question. It is hard enough just to stay alive.

Vocabulary notes

body	организм
carbohydrate	углевод
carnivore	плотоядное животное
cereal	зерновая культура, крупа
dietician	диетолог

gathering	*зд.* собирательство
herbivore	травоядное животное
human being	человеческое существо
malnutrition	недоедание
muscle	мышца
nutrition	питание
prehistoric	доисторический
protein	белок
to run	*зд.* функционировать
soil	почва
starvation	голод
to supply	поставлять, обеспечивать

3. Find in the text the English for

Источник пищи животного (растительного) происхождения, сгонять вес, здоровое питание, умирать от голода, страдать от недоедания, остаться в живых, сердцебиение, правильно функционировать, недостаток продуктов

4. Match the synonyms:

1. sick	a. famine
2. baby	b. special
3. earth	c. primitive
4. prehistoric	d. grain
5. organism	e. body
6. supply	f. soil
7. starvation	g. provide
8. want	h. ill
9. cereal	i. child
10. particular	j. need

5. Match the antonyms:

1. sick	a. sea
2. life	b. healthy
3. lose	c. put on
4. earth	d. natural
5. man-made	e. death
6. work	f. special
7. common	g. play
8. another	h. alive
9. dead	i. the same

6. Match the words on the left with the definitions on the right:

1. carnivore	a. the process of taking air into the body and letting it out again
2. absorb	b. someone who is an expert on healthy eating
3. carbohydrate	c. a substance in food such as meat, eggs, and milk that people need in order to grow and be healthy
4. prehistoric	d. someone whose job is to give people advice about the kind of food they should eat
5. nutrient	e. a substance found in foods such as sugar, bread, and potatoes
6. nutritionist	f. an animal that kills and eats other animals
7. protein	g. relating to the period of time before history was first written down
8. breathing	h. the red liquid that flows around inside your body
9. herbivore	i. an animal that eats only meat
10. dietician	j. an animal that eats only plants
11. blood	k. a substance needed by the body for life and growth
12. predator	l. take in gas/heat etc.

7. Complete the sentences using proper words and phrases in the box.

a) growth and health, b) weight, c) fat foods, d) to keep the body, e) starvation, f) predators, g) grow naturally.

1. _____ are animals who eat other animals.
2. Each year 40 million people across the world die from _____.
3. A person's _____ depend on nutrition.
4. To lose _____ people try to eat less food than normal.
5. All living things need food _____ running smoothly.
6. Too much of some _____ can lead to a serious decease.
7. A lot of plants _____ in most European climatic zones.

8. Answer these questions:

1. What do all living things need food for?
2. What can plants make their own food from?
3. What foods do human beings eat?
4. Do humans eat the same foods as animals do? Why or why not?
5. What do the kinds of foods human beings eat depend on?
6. Do you eat foods restricted by religious customs? Why or why not?
7. What six substances do we call nutrients
8. What must a healthy balanced diet consist of?
9. What did people eat in prehistoric times?

10. Why did primeval people learn to keep animals and grow cereals and vegetables?

11. What do people need food for?

12. What eating do we call healthy? Why?

13. Why can food lead to a disease? Why?

14. What provides energy for the heart's beating?

15. Does the building material for muscles, bones, and blood only come from food?

16. What two meanings does the word "diet" have?

17. Why is a person's diet so important?

18. Have you ever been going on a diet? Why or why not?

19. When can dieting inevitably result in illness? Why?

20. Why do some young girls strive to lose weight?

21. In what countries do people suffer from malnutrition and starvation?

22. Do babies and young children die from starvation in Europe? Why or why not?

23. What diseases can malnutrition bring? How can they be cured?

9. Say whether the following statements are true or false. Comment on the true statements and correct the false ones.

1. A healthy balanced diet must not include carbohydrates and minerals.

2. Proteins and fats are the substances needed by the organism for life and growth.

3. Some species of herbivores often eat such animals as predators.

4. Young girls often eat less food than normal in order to put on weight.

5. Malnutrition provides energy for work and play, for breathing, and for the heart's beating.

6. Predators or carnivores often eat only plants.

7. Some religious customs strictly restrict several foods, e.g. pork and beef.

10. Discuss the questions.

1. What is the main idea of the article? List several facts or arguments that encompass the main idea of the article.

2. What does synthetic biology promise through the use of biological systems? What evidence does the author give?

3. What do you feel after reading the article?

4. What are the challenges of specialized synthetic biology centers?

5. Does any new information you learned contradict or support your prior knowledge about the topic of this article?

6. What further questions do you have about this topic?

7. Is there extensive synthetic biology research in different spheres?

8. Why do you consider this article to be important/ not important?

11. Render the article according to the plan.

1. The headline of the article is ... (The article is headlined ..., The headline of the article I've read is...)

2. The author of the article is…

3. The article is taken from the newspaper...

4. The central idea of the article is about... (The main idea of the article is... the article is devoted to... the article deals with... the article touches upon... the purpose of the article is to give the reader some information on... the aim of the article is to provide a reader with some material on...)

5. Give a summary of the article (no more than 10–20 sentences).

6. State the main problem discussed in the article and mark off the passages of the article that seem important to you.

7. Look for minor peculiarities of the article.

8. Point out the facts that turned out to be new for you.

9. Look through the text for figures, which are important for general understanding.

10. State what places of the article contradict your former views.

11. State the questions, which remained unanswered in the article and if it is possible add your tail to them.

12. Speak on the conclusion the author comes to.

13. Express your own point of view on the problem discussed.

References

1. Fundamental Neuroscience (3rd edition) edited by Larry Squire [et al.], 2008
2. https://www.thenakedscientists.com
3. https://www. the-scientist.com

Images

https://go.mail.ru/search_images

Научные открытия
Часть 1: Сборник текстов для чтения и заданий по английскому языку для бакалавров 4 курса Института биологии и биомедицины

Практикум

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