# МИНИСТЕРСТВО СЕЛЬСКОГО ХОЗЯЙСТВА

# И ПРОДОВОЛЬСТВИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

**ГЛАВНОЕ УПРАВЛЕНИЕ ОБРАЗОВАНИЯ, НАУКИ И КАДРОВ**

**Учреждение образования**

**«БЕЛОРУССКАЯ ГОСУДАРСТВЕННАЯ**

**СЕЛЬСКОХОЗЯЙСТВЕННАЯ АКАДЕМИЯ»**

Кафедра английского языка

*C.А. Носкова*

Пособие

ПО АНГЛИЙСКОМУ ЯЗЫКУ

Часть 1

Для магистрантов и аспирантов

**Горки**

**БГСХА**

**2013**

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УДК 804. 0 (072)

*Рекомендовано методической комиссией*

*факультета международных связей*

*и довузовской подготовки*

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Автор:

кандидат филологических наук,

доцент кафедры английского языка *С.А. Носкова*

Рецензент:

кандидат педагогических наук,

доценткафедры английского языка *И. П. Макаренко*

**Носкова C. А.**

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Пособие предназначено для подготовки к сдаче кандидатского экзамена по английскому языку. Включают требования к кандидатскому экзамену по дисциплине «Иностранный язык», программу подготовки, грамматические и лексико-стилистические особенности научного стиля, а также материалы чисто прикладного характера, облегчающие работу с индивидуальными текстовыми материалами по специальности, а также выход в устную речь – беседу по научной работе.

Для магистрантов и аспирантов.

**УДК 804. 0 (072)**

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сельскохозяйственная академия», 2013

**ВВЕДЕНИЕ**

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Пособие рассчитано на обучающихся с разным уровнем владения английским языком и не зависит от области специализации, так как оно не содержит узкоспециальной лексики.

Методическое пособие составлено на основе программы кандидатского экзамена по иностранному языку для аспирантов и соискателей, рекомендуемой Министерством образования Республики Беларусь.

**СОДЕРЖАНИЕ И СТРУКТУРА ОБЩЕОБРАЗОВАТЕЛЬНОЙ ДИСЦИПЛИНЫ «ИНОСТРАННЫЙ ЯЗЫК»**

В соответствии с целевыми установками иноязычной подготовки обучающегося содержанием общеобразовательной дисциплины «Иностранный язык» является обучение различным видам речевой деятельности в предполагаемых сферах научного общения.

Тематическое содержание общеобразовательной дисциплины «Иностранный язык» реализуется в форме устного и письменного общения на иностранном языке.

**Тематическое содержание устного общения:**

международное сотрудничество в научной сфере;

достижения науки в странах изучаемого языка (в области научных интересов обучающегося);

содержание научного исследования обучающегося.

**Формы письменного общения:**

научный перевод;

научное реферирование и аннотирование.

Изучение общеобразовательной дисциплины «Иностранный язык» рассчитано на 420 часов (140 аудиторных часов и 280 часов самостоятельной работы).

Виды занятий:

аудиторная групповая работа (состав группы – 10–15 человек – для нелингвистических специальностей

обязательное внеаудиторное индивидуальное выполнение обучающимся заданий по письменному переводу научных текстов по исследуемой проблеме (110 000 –120 000 печатных знаков) с последующим оформлением данных заданий в виде реферата;

консультации (групповые и индивидуальные).

**ТРЕБОВАНИЯ К СОДЕРЖАНИЮ И СТРУКТУРЕ КАНДИДАТСКОГО ЭКЗАМЕНА ПО ОБЩЕОБРАЗОВАТЕЛЬНОЙ ДИСЦИПЛИНЕ**

**«ИНОСТРАННЫЙ ЯЗЫК»**

На кандидатском экзамене по общеобразовательной дисциплине «Иностранный язык» обучающийся должен продемонстрировать умение пользоваться иностранным языком как средством профессионального общения в научной сфере.

Право на сдачу кандидатского экзамена по общеобразовательной дисциплине «Иностранный язык» получает обучающийся, выполнивший в полном объеме требования, предъявляемые программой-минимумом, и представивший обзорный реферат (тематический или сводный) на иностранном языке. Реферат должен быть подготовлен на материале письменных переводов научной литературы по теме диссертационного исследования и сопровожден краткой аннотацией на русском, белорусском и иностранном языках, перечнем переведенной литературы и словарем научных терминов по специальности с русскими эквивалентами (не менее 300 лексических единиц).

Кандидатский экзамен по общеобразовательной дисциплине «Иностранный язык (английский, немецкий, французский, испанский, итальянский)» включает следующие задания:

1. Письменный перевод со словарем научного текста по специальности на русский/белорусский язык. Объем текста – 2500 печатных знаков для лингвистических специальностей и 2000 печатных знаков – для нелингвистических специальностей. Время выполнения перевода – 45 минут. Форма контроля – чтение текста на иностранном языке вслух и проверка выполненного перевода.

2. Чтение оригинального текста по специальности без словаря. Объем текста – 2000–2100 печатных знаков для лингвистических специальностей и 1500–1600 печатных знаков – для нелингвистических специальностей. Время подготовки – 5–7 минут. Форма контроля – передача общего содержания текста на иностранном языке.

3. Чтение иноязычного текста социокультурной направленности и изложение его основного содержания на иностранном языке. Объем текста – 1500–2000 печатных знаков. Время подготовки – 15 минут.

4. Беседа на иностранном языке по тематике, связанной с научной деятельностью и диссертационным исследованием обучающегося (тема исследования, актуальность и новизна, материалы и методы исследования, полученные результаты и выводы).

**Рекомендации по оформлению реферата**

**Реферат.** *Реферат* (Summary)

***Объем реферата***в среднем составляет 16-20 страниц формата А4. Набор текста обычно осуществляется шрифтом Times New Roman, кегль 14, межстрочный интервал – полуторный; поля страницы: сверху, снизу, слева – 2–2,5 см, справа – 1–1,5 см.

***Тема реферата***отражает научную тему аспиранта.

*Виды рефератов*. Реферат может быть *монографическим* (по одному источнику) и *обзорным* (составляется на одну общую тему по нескольким источникам).

***Структура реферата***по страницам:

1. **Титульный лист** с выходными данными (где выполнен реферат – Министерство, вуз, кафедра; название реферата; кем выполнен, напр.: аспирант/соискатель кафедры …. Иванов И.И.; научный руководитель, напр.: д.т.н., проф. Сидоров С.С.; кем проверен, напр. к.филол.н., доц. Петров В.В.; год выполнения).

Реферат подписывается проверяющим преподавателем иностранных языков.

2. **Аннотация и Abstract.** Три аннотации реферата (на русском, белорусском и английском языке) имеют идентичное содержание.

3. **Содержание реферата** (разделы и подразделы).

4**. Введение.** Отражает обоснование выбора проблемы или темы: актуальность, степень изученности/освещенности в литературе, практическую/теоретическую значимость и т. п. Может быть сделано как по прочитанным материалам, так и по другим источникам. Объем – 1–1,5 стр.

5. **Основная часть** – изложение темы по реферируемым материалам согласно содержанию.

6. **Заключение** – выводы по изложенным в реферате вопросам.

Может представлять собой краткие тезисы. Объем – 1–1,5 стр.

7. **References** – библиографические ссылки, по которым составлен реферат, с указанием всех выходных данных и страниц.

***Требования*,** предъявляемые к реферату:

1) объективность (отбор материала определяется значимостью исходной информации);

2) четкость, логичность и связность изложения информации;

3) недопущение прямой речи и собственных рассуждений;

4) включение иллюстративного материала (таблиц, формул, схем и др.) в случае крайней необходимости и в минимальном количестве. Иллюстративный материал можно оформить в виде нескольких страниц приложения к реферату.

**Штампы аннотаций.**

Текст аннотации на любом языке опирается на использование типичных для него штампов, служащих для оформления введения в тему, развития и смены темы, подведения итогов.

**Key-patterns**

The paper deals with… – (Данный/настоящий) реферат касается …

… is devoted to… – посвящен…

… describes… – описывает…

… presents information on ... – представляет информацию о…

Special/Much attention is paid to… – Особое/Большое внимание уделяется…

It is specially noted that… – Особо отмечается, что…

Details are given of… – Приводятся подробности…

… is described in detail. – Подробно описывается…

Mention is made of… – Упоминается о…

… is described/are described … – описывается/описываются.

In short – вкратце.

The paper concludes with... – В конце реферата приводится…

The information of the paper may be interesting for… – Информация реферата может представлять интерес для…

… …….may be useful for… - может быть полезной для…

………….may be recommended to ... – может быть рекомендована…

Текст аннотации на английском языке обычно пишется в Present Simple или в Present Perfect, причем сказуемое часто стоит в пассивном залоге (Passive Voice).

**Темы для устного обсуждения для кандидатского экзамена по английскому языку в БГСХА**

1. Мои научные интересы и научная деятельность. Моя кафедра.

2. Перспективы моей научной карьеры.

3. Университеты как научные центры. Ведущие научные школы в моей области знаний.

4. Наука в исторической перспективе (появление и развитие моей научной области).

5. Современное состояние науки в моей области знаний.

6. Роль иностранного языка в международном сотрудничестве и решении научных проблем.

7. Международные и национальные программы поддержки молодых ученых.

8. Вопросы научной этики и гражданской ответственности ученых.

**Unit 1. Planning a career in science**

1. **Why do you want to do research ? No, really. Why? You need to be very clear in your mind what the reasons are. Thankfully, there are some very good reasons why a normal, sane person would choose to do research. If any of these make sense to you, then you are on the right track. The reasons why you ‘ve joined a master/PhD course can be:**
2. I’m fascinated by a particular topic.
3. I know that I want to work in academia.
4. I want to stay at university one /three more years.
5. It is necessary for my career advancement.
6. I am taking a PhD primarily as a means of self-development.
7. Because of the recession.
8. I am good at (as a hobby) …
9. To be called Dr!

**Which are yours?**

1. **Read what some student coaches write about their Master studies at Waganingen university and answer the questions which follow.**

*Student coaches are students who know from their own experience how difficult it can be to choose a MSc programme. They can help future masters with all your questions about the possibilities after your Bachelor studies. For instance, what is the difference between a bachelor and a master study programme? What is the added value of a Master? What are the career possibilities? Or what is the difference between the Bachelor programme at my current university and Wageningen university. The student coaches will help you to answer these questions in order to make the right choice.*

A. Hello everyone! I’m Karine, 23 years old and a second year MSc student in Aquaculture and Marine Resource Management. This MSc offers a unique, multidisciplinary programme in the field of aquaculture, marine ecology and marine governance. I follow the specialisation Marine Resources and Ecology, with special interest in the Ecology part. However, this is just one of many paths you can take in this programme. Before this master I did the BSc Animal Sciences, but this MSc-programme is home to students of many different backgrounds. As a result of that I can imagine that there are a lot of different questions from future students. As a student coach I will try to help you to answer these questions, of course related to the MSc-programme, but since this is already my 5th year of living in Wageningen I can also tell a lot about that.

B. Hello! My name is Elleander and I am 23 years old. Since one year I am studying in Wageningen for the master in Applied Communication Science. After finishing my HBO education, I decided to extend my knowledge in the field of communication, combined with food. A long period of thinking followed, considering all options and in the end, the master of Applied Communication Science turned out to be a perfect match with my interests. Finding the masters study matching with your interests can be challenging and might lead to a lot of questions. These questions can be related to the study programme of Applied Communication Science, or living in Wageningen etcetera.

C. Hi! My name is Nienke and I am the student coach of the Environmental Science and Urban Environmental Management Master programmes. I started the Master Environmental sciences in September 2012, after completing a Bachelor in Maastricht. What I like about the programme is that it is highly applicable and deals with current environmental issues, while keeping an eye at the future. The university of Wageningen has a lot of practical knowledge available, which ensures a high quality programme! When I was choosing my own Masters programme, it was very helpful to ask my questions to a student who had experience with the programme, and have a chat about the university. Do you have trouble deciding if Environmental Science or Urban Environmental Management is the right programme for you? As a student coach I am here to answer all your questions about choosing the right programme, studying in Wageningen , and student life.

D. Andrew Watson, **MSc Crop Protection, a PhD research student**

Harper Adams University has by far the best reputation within the industry. Having already been there for four years I knew the lectures were of a very high standard. The MSc allowed me to study the subject I was passionate about in more detail. It gives you greater opportunities to get the job you want, and enables you to progress more easily.

The MSc works well because each module is taken in an intensive week of lectures, enabling you to stay focused on a specific subject. This makes best use of your time and allows you to organise your life around studies. Having an MSc definitely gives you an edge when applying for jobs, and certainly improves your self-confidence, time management, report writing and organisational skills.

The teaching at Harper Adams is fantastic; the lectures are very well organised and highly relevant to what I want to do. The university also has very good facilities, especially with the new library, and a great social life! I have been a member of its outdoor pursuits club and have been rock climbing, sky diving, ice skating, skiing, and kart-racing. I was also a member of Harper Adams rowing club, shooting club and off road club, so I've never been short of something to do when I'm not studying.

**What questions would you like to ask these students?**

**Can you speak about reasons why you’ve taken a master course? And your first impressions?**

**3. After reading the information about PhD students in Great Britain and their employment possibilities, answer the question: Where would you like to work after your master course and why?**

**More postgraduates than ever before**

In the last ten years the number of postgraduate students in the UK has increased to almost 400,000, an increase of 400% over the last 20 years and continuing to rise. Reasons for this rise include:

* Increasing opportunities for postgraduate study, full-time, part-time and by distance learning (it is worth noting that over 60% of all postgraduates are part-time students)
* The perception that a postgraduate qualification is an asset when developing your career or competing with others for jobs

**What do postgraduates do**? The work which postgraduates enter will depend not only upon the subject studied but also upon the individual graduate - their interests, employability skills, abilities and personal circumstances. These will be especially important for those graduates who are seeking employment not directly related to their studies. The reasons why you have chosen to follow postgraduate study are also significant. According to the survey done by a British university PhDs work in the following spheres:

* 50% in education
* 10% finance, IT and business
* 15% health and social work
* 15% manufacturing
* 5% public administration
* 5% other

**4. Now you are going to read the interview with a young scientist. Be ready to comment on his answers.**

|  |  |
| --- | --- |
| Question | **Why did you decide to become an ecologist specializing in birds?** |
| Answer | I like solving problems, and science provides a logical way of solving real-life problems. So becoming a scientist was no great surprise, I guess. Becoming a bird ecologist was just luck! I had the chance to be a field assistant for a scientist working in the Galapagos Islands, and while I was there, I saw a particular problem in behavioral biology that I wanted to solve and, in the process, made myself into a bird ecologist. |
| Question | **What educational background do you need to become an ecologist?** |
| Answer | You need at least a bachelor's degree in biology, with the chemistry, physics and mathematics training that goes along with that. Many ecologists have master’s and Ph.D. degrees also, and those degrees are necessary for some kinds of ecologist positions, like university professorships. |
| Question | **What do you do during a typical day at work?** |
| Answer | I work in two places. When I am in the field at my group's Galapagos study site, I have a long day. We study seabirds called masked boobies there, and we have put numbered leg bands on several thousand birds so that we can recognize them from year to year. Every year, I keep track of which of our boobies are still alive by doing a census at night, when most birds are sleeping at their nests in a big colony. I walk around with a head lamp and read the band numbers while the birds sleep, and I write the band numbers in notebooks. This can take all night, every night, for about two weeks. During the day, I work with the other people in the research group, students and such, helping out with their own projects. I don't get a lot of sleep in the field! I don't mind, though, because the research is exciting to me and I like my job.  When I am back in my office, I spend time teaching biology classes at Wake Forest University in North Carolina, writing grant proposals to support all of this field research, analyzing data and writing papers to make our results public. I also try to make sure that schoolkids hear about science and how scientists do their jobs, like with something called The Albatross Project (<http://www.wfu.edu/albatross>), which lets classes participate in our research on seabirds. |
| Question | **What do you enjoy most about your work? Is there anything about it you don't like?** |
| Answer | There are two things I enjoy most about my work. First, I get to work with interesting and enthusiastic people who are also fired up about science. Second, every once in a while I have moments in which I suddenly understand the solution to a problem that I've been working on -- those are great moments. |
| Question | **If I'm a student thinking about becoming an ecologist, what can I do now to prepare?** |
| Answer | Read a lot, and not just about science. Successful ecologists are successful in part because they have prepared their minds to attack scientific problems using a variety of intellectual tools. Take mathematics courses seriously. Ask questions about why nature is like it is, and try to get the answer yourself before asking someone else for an answer. When deciding on which college to attend, ask about opportunities to participate in research while you're a college student. See if you can arrange to have a short visit with an ecologist at a college or university near your home. Ecologists are among the friendliest people anywhere, and they would be glad to talk with someone interested in their field. |
| Question | **Is there anything else you'd like to let Frontiers viewers know about yourself or your career?** |
| Answer | I'd like to emphasize that science isn't about guys in white lab coats with big vocabularies. It's about curious people asking questions about nature and finding the answers by collecting data. |

**Which of the questions did you like most and why?**

1. **Complete Helga’s computer story using the correct form of the verbs in the box.**

|  |
| --- |
| Check click open plug press shut switch (x3) unplug |

I had a really frustrating day yesterday. I needed to do some research, but I couldn’t get online. I tried ……. **1** the computer off and on again, but that didn’t help. I even ……. **2** hinge down, ……. **3** all the different bits of equipment and ….. **4** it all into another socket, but that didn’t solve the problem, either. I tried to …… **5** the Internet connection, but after I’d …**6** on ‘Control panel’ and …….**7** ‘Network connections’, I didn’t understand the message it gave me! So I had to ring the helpline, and of course when I ……**8** the number to speak to a technician, I had to wait for ages listening to really irritating music. I finally spoke to someone who was actually really helpful, and we found the problem. There’s a little switch for the Internet connection on the side of my laptop, and it had somehow got ……**9** off. I didn’t even know it was there! I …….**10** it on again and everything was fine. I felt so stupid – and I’d wasted a whole morning.

1. **Change the word in capital letters to fit the sentence. Read through the text carefully before you do the exercise.**

Agricultural Engineers use their plethora of (KNOW) to solve the problems of both farmers as well as (AGRICULTURE) industry. They are responsible for (MANUFACTURE) machinery for irrigation, drainage systems, floods and water control systems, perform (ENVIRONMENT) impact assessments, agricultural product processing and interpret research results and implement relevant practices.

Agricultural engineers utilize engineering technology and science for agricultural use by (MANAGE) biological resources (EFFICIENT). Apart from creating new techniques in farming and agriculture, they also apply engineering design and analysis to protect animals and (NATURE) resources.

As an agricultural engineer, he accepts the challenge to improve agricultural (PRODUCE) by means of better engineering methods, (INVENT), technology and equipment. This requires a good intellect and a desire to make a (DIFFER) to future of farming. The agricultural engineers invent new techniques to conserve soil and water and to improve the (PROCESS) of agricultural products into value added agriculture products.

1. **Read the following extract from a website, then, in pairs, decide if the statements below are true or false.**

**Applying for research position/funding.**

**Structural Engineering Research Centre**

**Profile**: Structural [Engineering](http://entrance-exam.net/engineering-entrance-examinations/) Research Centre (SERC) was established under the Government of India. The research centre actually comes under the Council of Scientific & Industrial Research (CSIR). The research centre is considered among one of the National Laboratories as well. The major objective behind the establishment of Structural Engineering Research Centre was to provide design consultancy services for the development of a variety of structural designs in the country.

**Job Profile**: Candidates are invited to apply for the posts of Scientist Grade-IV in Structural Engineering Research Centre depending on their educational qualification and experience in the research field. Candidates would have to work in R&D areas.

**Eligibility**:

Candidates should not be more than 35 years of age. There is relaxation in age for the reserved category candidates as per rules.

**Educational Qualification**:

M.Tech or equivalent from any recognized institute or university with at least 2 years experience in required as the minimum educational qualification for the post of Scientist in Structural Engineering Research Centre.

**No. of posts**: There are total 12 posts available for the position of Scientist.

**Pay Scale**: Selected candidates will be the prescribed salary of Rs. 15600-39100 + Grade Pay of Rs. 6600.

**Selection process**:

The final selection of the candidates for the above specified post of Scientist in Structural Engineering Research Centre will be made strictly on the basis of their performance in the personal interview test with the selection committee.

**How to apply**: Application forms complete in all respect should be mailed along with a self addressed and duly stamped envelope of Rs. 10 of size 22cm\*10cm and a crossed demand draft of Rs. 100 (No fee for SC/ST candidates) drawn in favour of I.R.F., SERC payable at Chennai, in an envelope superscribed with the Advertisement Number, name of the post applied for and full address in Block Letters to the prescribed address:

Structural Engineering Research Centre

**8**. **True/False**

1. This research center is in private ownership.
2. Scientists’ jobs will be connected with research and development.
3. Eligibility criteria is limited by the age.
4. There is no information on the salary.
5. All candidates who applied will be accepted.
6. It is not clear from this advertisement how to apply.
7. What do you think : What requirement is a discrimination?

**9. Remember the words used in the text «The truth of the academic job hunt – even one with a happy ending».**

apply – обращаться

avoid – избегать

inevitably – неизбежно

refer to – ссылаться на

claim – обратиться за

experience – опыт

encourage – поощрять

argue – возражать

clear purpose – ясная цель

jobseeker – ищущий работу, безработный

performance – выполнение

match – подходить

sacrifice – жертва.

undertake – предпринять

find out – выяснять.

strictly – строго

explanation – объяснение

search – поиск

share – делить(ся)

оtherwise – иначе

predominantly – главным образом

**10. Check these words in your dictionary and see which of the following negative prefixes are used with them: *dis~, in~, un~, ir~, ab~, il~, im~*.**

1. *certainty – uncertainty*

2. satisfactory –

3. efficient –

4. likely –

5. appearance –

6. principled –

7. normal –

8. relevant –

9. legal –

10. moral –

11. published –

12. employed –

13. possible –

**Note:** In some cases, the prefixes *dis~, in~, un~, ir~, ab~, il~, im~* might create an opposite rather than a negative meaning. There are also some words beginning with these prefixes that do not have a negative *or* opposite meaning. For example: an *inbound* flight; to *implant* an artificial heart.

The prefix *in*~ is not normally used with words beginning with *b, l, m, p* or *r*.

**11. Read the article below and say what the main topic is?**

**a.** Better relationships with colleagues

**b.** Disappointment in the career of a scientist

**c.** Encouragement to the scientific career

**The truth of the academic job hunt – even one with a happy ending**

*A science career is about sacrifice, says one post-doc after a decade's journey from PhD to permanent research post*

The search for that elusive permanent research post can be as long and painstaking as the work itself.

I've recently been offered the first full-time permanent position of my science career. It only took 11 years. This is my story but it could belong to many others.

After completing my [PhD](http://www.guardian.co.uk/higher-education-network/phd) in 2001 I worked as a post-doc researcher in biological sciences in two different labs until 2006. Despite best efforts, the second post-doc didn't work out [research](http://www.guardian.co.uk/higher-education-network/research) wise and after two years of negative results my funding ran out. Even though I applied for other positions, by the time my contract ended I was officially unemployed. To save money I decided to move back in with my parents and claim jobseekers allowance, a galling process when you are 33 and have three higher degrees.

The job centre staff were nice. [Contrary to some experiences](http://www.guardian.co.uk/higher-education-network/blog/2012/aug/03/academic-job-seeking-and-post-doc-unemployment), they understood my qualifications, that I was trying hard to find another job and that they couldn't really help me. My jobseeker priorities were simple: monitor university and science websites for vacanсies. I registered with some science-focused recruitment agencies but any positions that came up were out of my area – subject-wise or geographic – and poorly paid.

The department for work and pensions have a professional register for specialist careers, but the only job it found in six months that even vaguely matched my qualifications was lab technician in a secondary school. The chances of getting it were slim so I declined an interview to many frowns from my advisor, who understood but clearly didn't approve.

In the meantime I applied for posts. Every day. Sometimes between six to 10 in an afternoon. I was willing to move anywhere and tailored my CV and application for every position I found. Despite some good publications on my CV and a lot of science experience, I couldn't get an interview. Eventually I took on some bar work, permissible part-time while claiming jobseekers allowance. What they don't tell you is that any wages for up to 16 hours work are taken out of your dole. I might as well have sat at home and watched Bargain Hunt. I was out of work, out of money and quickly running out of hope.

But after four months things picked up. I got two interviews in as many days, one with a company in Cambridge and another in Aberdeen. Desperate for any job by then, I travelled hundreds of miles for the appointments and got to the last two for the Cambridge job, only losing out to a more experienced research candidate from UCL. That's the thing about negative results – you can't publish them. I was offered the position in Aberdeen but they wanted to job-share the post between two people, a fact they conveniently forgot to mention during the interview and that made relocation to Scotland financially impossible.

The job centre did pay for my interview expenses, however, and my outlook improved – maybe I wasn't so rubbish after all. I soon got another interview for a one year post at Manchester University and when I was given the position it was renewed for three years. I've since switched to another university and after two and a half years there and 11 years in total as a post-doc, I've been offered that permanent full-time post.

Finally, I can forget about that sinking feeling that comes with knowing your contract is up. Is there funding? Will my grant application go through? Will I have to apply for another job? For the first time, I can look ahead and plan for my future. I can buy a house and build some foundations in a city without worrying if I have to move on in three years.

What people sometimes don't realise is that a career in science is about sacrifice. You are overqualified and underpaid. You work late evenings and weekends when the experiments demand it. You're never permanently employed. No grant then no job. No HEFCE funding then no job. No exciting results then – guess what? – no job.

You have to be a dynamic researcher with contacts and grants and results and publications. And you have to do it quickly. The gun sounds as soon as they shake your hand after the viva – and you're off. You have five to 10 years to get your own funding. Otherwise you become too expensive – I have twice taken a pay-cut to get a contract. After eight to 10 years you don't even qualify for research council starter fellowships.

I know of many friends who have given up on a science career after completing their PhDs. No wonder, when it can take up to 15 years to get a lectureship. My own situation has improved. But I am one of the lucky ones to get a permanent position.

Anyone entering the research field should be under no illusion that it takes blood, sweat and tears to get anywhere unless you hit a magical bulls eye: that truly novel find and that first Nature/Science paper from your first research project. To those lucky few, fellowships and PI grants and lectureships follow. The rest of us simply help them along the way, the faceless science post-docs trying to grind out a career and hit lucky on a project, idea or grant application before we become either too expensive or unemployed.

*Anonymous is a postdoctoral research associate in biological sciences at a UK university*

**12. Insert the prepositions. Consult the text if necessary.**

The search …

My funding ran …

I applied ….other positions.

[Contrary … some experiences](http://www.guardian.co.uk/higher-education-network/blog/2012/aug/03/academic-job-seeking-and-post-doc-unemployment).

Monitor university and science websites … vacancies.

Positions were … … my area.

I took … some bar work.

Things picked …

Desperate … any job.

Many friends have given … on a science career.

**13. Say in other words**

A job hunt, a decade's journeyfrom PhD to permanent research post, the second post-doc didn't work out [research](http://www.guardian.co.uk/higher-education-network/research) wise, any positions that came up were out of my area, I declined an interview to many frowns from my advisor, any wages for up to 16 hours work are taken out of your dole, after four months things picked up, only losing out to a more experienced research candidate, they wanted to job-share the post between two people, I've since switched to another university, anyone entering the research field should be under no illusion that it takes blood, sweat and tears to get anywhere.

**14. In what situations were the following word combinations used? Try to reproduce them.**

a post-doc researcher, a job center, science-focused recruitment agencies, the department for work and pensions, permissible part-time, two interviews, Manchester University.

**15. Translate into Russian word combinations with adverbs**

Vaguely matched

really help

poorly paid

conveniently forgot

never permanently employed

**16.** **Answer the questions.**

1. Why do women leave PhD course? Name reasons.
2. What does the scientist say about the career in science?
3. How to survive in a scientific career?
4. Why is a career in science about sacrifice?
5. Is the article optimistic or pessimistic?
6. After all: Is it worth taking up a research career ?

**17. The sentences are in the wrong order. Number the sentences to create a logical sequence so as to follow the career path of this post doc?**

1. … took on some bar work.
2. … completed a PhD course in 2001.
3. … was given the position at Manchester university
4. A post-doc researcher in biological sciences until 2006.
5. Officially unemployed and claimed jobseekers allowance.
6. … was offered the permanent full-time post.
7. … tailored his CV and application for every position he found.

**18. Describe this PhD’s path to a scientific career using** ***at first/first of all, after/afterwards, then, in the end/finally.***

**Mind!**

At first – вначале; first of all – в первую очередь (как последовательность действий)

After - после, afterwards – затем, In the end – (в конце концов) something that happened after a long time, finally – (наконец) is used to describe the finish of an event

**Unit 2. Science and scientists**

1. **Discussion** Is the name Vavilov familiar to you?

In what field of science did he do research ?

1. **Choose the right answer**

Russian geneticist Nikolai Vavilov is best known for his studies of

1. of germplasm and plant propagation.
2. of cytogenics and crop plants.
3. relating cultivated plants with their wild ancestors.
4. all of the above
5. **Learn the following words and word-combinations; they will help you speak on scientific problems and your research:**

a master / a holder of a master’s degree / an undergraduate – магистр / магистрант;

degree of master of sciences; master’s degree (less formal) — степень магистра наук;

to take / have an undergraduate course — учиться в магистратуре;

thesis — диссертация (иногда употребляется «dissertation», хотя в Великобритании это работа меньшей значимости);

master’s thesis – магистерская диссертация;

to write a master’s thesis – писать магистерскую диссертацию;

to do academic work / research — / выполнять научную работу / исследование;

to devote oneself to academic / research work — посвятить себя науке;

a branch of knowledge — отрасль науки;

an academic work — научный труд;

an academic approach — научный подход;

a learned journal — научный журнал;

a learned article — научная статья;

a learned paper — научный доклад;

a research worker / a researcher — научный работник;

a research associate — научный сотрудник;

a scientific supervisor — научный руководитель;

to analyze statistic data / information — анализировать статистические данные / информацию;

to carry out – совершать, выполнять; производить; осуществлять, доводить до конца.

**4. Read text A carefully and answer the questions:** What is the essence of Vavilov’s theory of plant populations?

**Text A. World of Genetics on Nikolai Ivanovitch Vavilov**

Nicolai Ivanovich Vavilov made significant contributions to the field of modern **plant genetics**. His identification of plant centers of origin, and the relationship between cultivated plants and their wild cousins, revolutionized the means by which scientists evaluate plant populations. Devoting a great deal of his career to the cause of agricultural improvement, he was a consummate traveler, fervent researcher, and a passionate advocate of the practical application of genetic research.

Nikolay Vavilov was born into the family of a businessman in Moscow. There were two sons and two daughters in the family. Nikolay was the eldest. He didn’t follow in his father’s footsteps, and instead he devoted his life to natural sciences. After graduating from the Moscow Commercial College in 1906, Vavilov entered the Moscow Agricultural Institute (now the Timiryazev Agricultural Academy in Moscow), from which he graduated in 1910. Even in his early student years, Vavilov showed scientific interests that determined his future lines of research: in 1908 he took part in the student expedition to the Caucasus. In 1909 he made a report on Darwin's Theory, and in 1910 he completed and published his diploma work devoted to protecting agricultural plants from pests. In 1912, he outlined a program which implied the application of genetics to improve the cultivation of plants in his pioneering paper “Genetics and Agronomy”. Thus, from his very first steps in science, Vavilov established himself as a geographer, an evolutionist and a specialist in plant protection. It is noteworthy that all his scientific interests were interrelated. He was the first to see the possibility and the vital necessity of investigating cultivated plants from the viewpoints of genetics, evolution, and geography

He studied **genetics** at Cambridge and the John Innes Horticultural Institution in London under the direction of **William Bateson** (1861-1926). In 1913-1914, Vavilov worked in the best laboratories of Great Britain, France, and Germany. In 1916 he went to Iran to study local cultivated plants. .He returned to Russia and took a position as a professor of botany at the University of Saratov. In 1921, he left the university to work for the government and became director of the Bureau of Applied Botany in St. Petersburg. His next position was as director of the All--Union V.I. Lenin Academy of Agricultural Sciences. During his tenure at the Academy of Agricultural Sciences, the government began programs to advance the scientific research. Vavilov aided in the establishment of nearly 400 research institutes throughout the Soviet Union.

Nikolay Ivanovich Vavilov was a person of many and varied interests. He was a person of inexhaustible energy and unbelievable efficiency. He was an avid traveler and during his many trips across the world he put together a unique collection of plants and seeds. During three decades of tireless scientific work, Vavilov travelled over five continents, amassed the largest species and strains collection of cultivated plants in the world, and developed theories on how to utilize them for breeding new strains. The activities of Vavilov were extraordinarily varied, but they were all designed to increase agricultural production and to provide humanity with more food. By 1933, he had completed numerous research expeditions, visiting over 40 countries and collecting some 80, 000 plant specimen, a third of which were various types of wheat. An especially difficult expedition to Afghanistan in 1924 earned him a gold medal from the Russian Geographic Society. On these voyages, Vavilov began to formulate his theories on plant populations based upon his observations in the field. He published the results of his study in *The Origin, Variation, Immunity and Breeding of Cultivated Plants*. Vavilov concluded that the place of origin for any cultivated plant could be found in the region where varieties of the plant's non--cultivated relatives were most prolific and best adapted. He later expanded his theory. Postulating that a plant's center of origin is where the genetic diversity of a plant **species** is greatest, he identified over a dozen such global points of origin. When published, Vavilov's conclusions became known respectively as the law of homologous series in variation (1920) and the theory of the centers of origin of cultivated plants (1926). The theories provided a structure for charting movement, adaptation, and change within plant populations.

Vavilov's theories of plant populations, and their origins, remain important today. As natural habitats of wild plant species are increasingly threatened on a global scale, conservation--geneticists are concerned with its impact on the genetic pools of both wild and cultivated plants. Despite his frequent research expeditions, Vavilov remained committed to using plant--genetics to improve Soviet agriculture. Vavilov used his prominence to further promote the establishment of agricultural research institutes. To facilitate better communication among scientists who were studying the breeding and raising of plant--crops, Vavilov organized conferences, societies, and institutes. He was a foreign member of six national academies of science, and served as the director of the Soviet Genetics Institute.

Trofim Lysenko and his followers started to attack Vavilov's leadership and support of modern genetics. In 1936 the Congress on Genetics and Agriculture was convened in Moscow with the obvious purpose of discrediting Vavilov and genetics. In 1940 Vavilov was arrested, placed in a concentration camp at Saratov, and then transferred to a Siberian forced-labor camp located in Magadan. He died on Jan. 26, 1943, a broken man, a victim of quackery and Stalinist tyranny. In 1956 the Soviet Academy of Sciences ordered the republication of Vavilov's works, apparently in an effort to rehabilitate him.

**5. Look through the text and prove that Vavilov’s theories of plant populations are important even today using the information of the text.**

**6. Which adjectives from the list below would you use to characterize him 1) as a researcher, 2) as a personality?**

|  |
| --- |
| Consummate, fervent, passionate, inexhaustible energy and unbelievable efficiency, avid, committed, evolutionist, varied interests |

**7. Arrange the sentences in their logical order**

1. N.Vavilov collected 80 000 plant specimen from all over the world.
2. He did his best to use plant--genetics to improve agriculture.
3. Vavilov contributed greatly to plant genetics.
4. In 1936 the Congress on Genetics and Agriculture in Moscow discredited Vavilov and genetics as science.
5. He studied genetics at Cambridge.
6. He helped to establish many research institutes throughout Russia.
7. He died on Jan. 26, 1943 in a Siberian camp in Magadan.
8. Vavilov worked as a professor of botany at the University of Saratov.
9. Nikolai Vavilov was born in Moscow.
10. He was also the director of the Academy of Agricultural Sciences.

**8. What are these dates connected with?**

1861-1926, 1921, 400, 1933, 1924, 80, 000, 1920, 1940.

9. **Speak about N.I. Vavilov or another scientist you want to using the following patterns. Describe his/her education and position.**

X was born ……

X studied at …..

X made a great contribution to …

X is Chair or Director of …

X is Professor of/ a lecturer/ assistant professor/ a researcher … at the University of X

Since 2002 etc., she or he has taught … at …

She has taught at various universities, including …

He received his doctorate in … at …

After graduating in … at …, X or he or she …

She is currently …

He was, until recently, Professor of …

**10. Read the article about Norman Borlaug and say what for he was awarded Nobel Peace Prize**.

Norman Borlaug, the U.S. agricultural scientist received the 1970 Nobel Peace Prize for developing high-yielding crops to prevent famine in the developing world.

Borlaug hailed as a central figure in the "green revolution" that made more food available for the world's hungry.

The "green revolution" -- the development of crops such as wheat that delivered better yields than traditional strains -- is credited with helping avert massive famines that had been predicted in the developing world in the last half of the 20th century.

Borlaug served as a distinguished professor of international agriculture at Texas A&M University, located in College Station, Texas.

Experts have said his crusade to develop high-yielding, disease-resistant crops saved the lives of millions of people worldwide who otherwise may have been doomed to starvation. His efforts to develop new crop varieties helped alleviate food shortages in places such as India and Pakistan, helping make developing countries self-sufficient in food production.

He was awarded the 1970 Nobel Peace Prize. In 2007, Borlaug also received the Congressional Gold Medal, the highest civilian honor of the United States.

"We all eat at least three times a day in privileged nations, and yet we take food for granted," Borlaug said in a recent interview. "There has been great progress, and food is more equitably distributed. But hunger is commonplace, and famine appears all too often."

In 1944, he was appointed as geneticist and plant pathologist assigned the job of organizing and directing the Cooperative Wheat Research and Production Program in Mexico.

This joint undertaking of the Mexican government and the Rockefeller Foundation philanthropic organization focused upon scientific research in genetics, plant breeding and related fields. Within two decades, he succeeded in finding a high-yielding disease-resistant wheat.

The Iowa-born scientist then worked to put newly developed cereal strains into extensive production. He died at age 95 in Texas in 2013.

**11. Make up English-Russian pairs of words equivalent in meaning:**

1. to publish, sphere, research, to include, importance, to develop, to collaborate, enterprise, scientific adviser, scientific degree, to be awarded, department, to encounter, branch, research team, data, to participate, to take post-graduate courses, to defend a thesis (dissertation);
2. защищать диссертацию, обучаться в аспирантуре, опубликовать, область, быть награжденным, включать, (научное) исследование, важность, кафедра, встречать(ся), исследовательская группа, данные (информация), разрабатывать, сотрудничать, участвовать, ученая степень, научный руководитель, предприятие, отрасль.

**12. Form nouns by adding suffixes. Read and translate them**

1) V + -er / - or → N

Example: to research → researcher

to invent → inventor

to publish, to use, to make, to investigate, to experiment, to compute, to collect, to advise, to supervise, to report, to work, to collaborate, to write; to travel

2) – ist N

Example: physics → physicist

economy, evolution, technology, science, biology, collective, journal.

**13. DEFINITIONS**

When we present new concepts, or explain new technology, or describe a new way of looking at an old idea, we need to define these things so that it is perfectly clear what we mean. The kind of definitions we are usually concerned with in academic writing is a formal definition.

[Post](http://www.thefreedictionary.com/post+doc) doc, [postdoc](http://www.thefreedictionary.com/postdoc) - a scholar or researcher who is involved in academic study beyond the level of a doctoral degree  
“A scientist is a person whose job is to do theoretical or applied research”.

Another example of a formal definition is a definition of ‘*an encyclopaedia*’: “An encyclopaedia is a book which gives information on subjects in alphabetical order”.

|  |
| --- |
| Note: *Who* is used for persons, *which* is used for inanimate objects and animals, *that* is used for both persons and objects, *where* is used for places. |

**Use *who, which, that or where***

1. [Exploratory research](http://en.wikipedia.org/wiki/Exploratory_research) is the research ……. helps to identify and define a problem or question.
2. An agricultural scientist is someone ……. works to ensure agricultural productivity and food safety.
3. A laboratory is the place …..
4. A generator is a machine ….. transforms mechanical energy to electrical energy.

**14. Find synonyms in the list below, arrange them in pairs:**

1) device, research, technology, branch, obtain, importance, collaborator, team, scientific adviser, to enable, thesis, journal, to prove a thesis, to collect, data, to encounter, to be engaged in, to be through with, scientific papers, rapidly;

2) quickly, publications, instrument, technique, to finish, to be busy with, field, to get, significance, to come across, information, to gather, coworker, group, supervisor, to defend a dissertation, scientific magazine, dissertation, to allow, investigation.

**15. Find antonyms in the list below, arrange them in pairs:**

1) theory, to obtain, rapidly, experimentator, to finish, to increase, new, experienced, unknown, wide, passive, to enable, high, complicated;

2) simple, low, practice, to give, to disable, active, slowly, theoretician, narrow, famous, to start, to decrease, old, inexperienced.

**15. Text B.** **Read the article written by a British professor.**

**A) Decide whether the statements below are true or false, according to what you’ve read in the passage.**

**B) After you’ve read the article, choose the name for it.**

**Text B.**

1. There was, apparently, a brief moment in history when almost everyone who entered a Ph.D. program ended up in a faculty position shortly after graduation. That moment is long past: Today it takes years of postdoctoral experience before most Ph.D.s can compete for a faculty job, and those jobs are now so scarce that the majority of recently graduated scientists end up in careers off the faculty track. Thousands of companies are now outsourcing some of their problem solving and innovation needs.
2. This realization has spurred several national, institutional, and grassroots efforts to help young scientists develop careers, both inside and outside academia. One approach to the problem is online tools to help scientists assess their skills and career goals and develop an individual professional development plan. For example, in 2009 the U.S. National Postdoctoral Association released the [NPA Postdoctoral Core Competencies Toolkit](http://www.nationalpostdoc.org/competencies) "as: (1) a basis for self-evaluation by postdoctoral scholars and (2) a basis for developing training opportunities that can be evaluated by mentors, institutions, and other advisors," says the NPA Web site.
3. Then in 2011 the U.K. organization Vitae launched [The Vitae Researcher Development Framework](http://www.vitae.ac.uk/researchers/428241/Researcher-Development-Framework.html)(RDF), which "articulates the knowledge, behaviors and attributes of successful researchers and encourages all researchers to realize their potential," Vitae says. The organization, which receives support from Research Councils UK (RCUK), [works](http://blogs.sciencemag.org/sciencecareers/2011/04/vitaes-professi.html) towards promoting the personal, professional, and career development of research students and staff members at research institutions. Last week, at the [Vitae Researcher Development International Conference 2012](http://www.vitae.ac.uk/policy-practice/916-494271/Vitae-Researcher-Development-International-Conference-2012-Realising-the-Potential-of-Researchers.html) in Manchester, Vitae entered a new era by releasing a Web application called the [RDF Professional Development Planner](http://www.vitae.ac.uk/researchers/291411/RDF-Professional-Development-Planner.html), which, Vitae announced in a [press release](http://www.vitae.ac.uk/policy-practice/375-569801/Vitae-launches-new-Researcher-Development-Framework-Planner.html), is aimed at helping researchers use the RDF as a basis "to identify their expertise and capabilities, plan their professional development, set personal targets, and demonstrate evidence of success." The online planner, which replaces Vitae's free but less user-friendly [Excel RDF Planner Prototype](http://www.vitae.ac.uk/CMS/files/upload/Vitae-Excel-RDF-Planner-Prototype-2010.xls.383631.download), will also signpost training and development resources offered to researchers in U.K. institutions. The RDF planner will be available by institutional subscription; Vitae plans to offer individual subscriptions later this year. Meanwhile, Vitae is inviting everyone interested to [take part in their pilot phase](http://www.vitae.ac.uk/researchers/291411/RDF-Professional-Development-Planner.html).

**16.** **Agree or disagree with the following.**

1. Every PhD students is sure to get a faculty position after graduation.
2. Faculty jobs are now very scarce in the UK.
3. Online tools are developed to help young scientists to assess their skills and career goals.
4. The U.K. organization Vitae is a commercial organization for scientists.

**17. WHAT SKILLS DO SCIENTISTS NEED?** Make a list and compare it with a list made by your partner.

**Now read the abstract below and make a list of the most important points for a person to be qualified as a scientist in an English-speaking country**

**Five qualities required to be a Scientist…**

What does it take to become a professional scientist? To get into graduate school, persevere, collect a PhD and land a job in the field? A lot of things.

First, it takes brain power. Intelligence. Talent. The ability to do the hard work.

This is probably obvious to most, but is sometimes ignored when people want to put down a scientist reporting results they don’t like. Every scientist has some native intelligence above and beyond that of the general population. Perhaps not a lot more, but above average.

Now, I will admit that there are plenty of gradations of intelligence above average, and that there are some stupid smart people and some smart stupid people, but that’s the subject of another, future post. PhD-level scientists are all smart, but plenty fall way short of genius level and fail to apply their brains to every problem before them.

OK, second: stick-to-itivness. You don’t get a PhD for pointing out small things. You have to show that you can produce a significant step in our understanding of the universe, and that requires many months to years of sustained effort to complete. Usually at least three years. If you can’t start, sustain, and finish a project that takes longer than a year, forget about being a scientist. There are plenty of smart people, including geniuses, who can’t be scientists because they’re flighty, lazy dilettantes. We all know them, and most of them make me shake my head. I’ve had a couple of promising, smart students who will never make it for this weakness. They make good points, have good criticisms, but never produce anything of their own all that worthwhile.

Third item: communication skills. Maybe it’s possible to be a scientist without good communication skills, but how will the career suffer. Scientists must write papers, proposals, and give talks. Referee papers. Review proposals and papers. The ones who can’t communicate clearly and effectively will not get their work considered seriously and will have poor careers, assuming they can even get through writing a thesis and defending it successfully. Staying in science without being able to secure funding is tough. Very tough.

That was my original list, but I finally decided that I had to add two other items.

Curiosity and attention to detail.

Curiosity is what drives any decent scientist. Having a PhD and securing a permanent position means having independence to pursue a line of research. That requires curiosity. Grad students who need to be told what to do every step do not make good scientists. They’re technicians at best, which is fine, but a different career. Scientists are curious and need that to do research. There is a scientific method, but there’s no algorithm to how to develop and test the next hypothesis. It does require that spark.

Finally, attention to detail. This was something I was never great about growing up and had to learn myself. It’s amazing how many details must be addressed in bringing a research project to publication. Ideally every journal article describes every project in enough detail to duplicate it. That’s a big responsibility, and anyone who can’t be bothered to get those details right nearly all the time or better can’t be a good scientist. Mistakes are always going to happen, but they shouldn’t be too common. And sometimes in science, the results and their interpretation turn on those details as they do in few other fields.

There’s no crime in not becoming a scientist. Not every smart person has these qualities. And there are plenty of smart people who aren’t geniuses who make great scientists. As a professor mentoring students, I see some of the brightest fail on some of these points every year, and others less gifted succeed on their other strengths.

**What do you think: why this article was written by a professor?**

**18. Do you possess these qualities? Speak about yourself using the following phrases:**

1. On the whole …., however…
2. As regards choosing my course …
3. It not only will prepare me for work …, but it also means that …
4. In addition master degree is getting more and more attention …
5. As far as my choice of the course is concerned, ….

**19. Word building.**

The researcher should be a (CREATE) and highly motivated individual, a good problem (SOLVE) who sees problems as challenges to be overcome rather than (AVOID). They need to have a good appearance, since they will be (REPRESENT) the company with many outside agencies. They should be able to work as a member of a team and to take (DIRECT). They should also possess excellent oral and (WRITE) skills, being able to communicate (EASY), (EFFECT), persuasively on the phone and in writing. Postgraduate research experience, a multidisciplinary academic background, good visual sense, interest in (INTERACT) multimedia and basic word-processing skills are advantageous.

**20. Graduate Students Skills Translate to Non-Academic Careers.**

Most graduate students, especially doctoral students, aspire to a career in academics. But an academic career isn't right for everyone. More importantly, academic jobs are hard to come by. But what else is there? Most students don't realize that a graduate degree offers preparation for careers well beyond academia. Why?

It's the skills. Graduate study imparts students with a host of skills that are transferrable to a variety of positions and fields. What can you offer employers? Below are just some of the skills that most graduate students develop (some vary by field).

Your graduate degree is useful in academia, but it is also useful outside of academia. Stop and consider what you have learned and what you bring an employer and you'll find that you have many more career options than you imagined.

|  |  |
| --- | --- |
| **The Ten Core Competencies are based on an employer survey conducted by the Careers Education and Placement Centre at the University of Hong Kong. Draw a line from the word on the left to the definition that best matches.** | |
| Adaptability | The ability to adjust yourself easily and willingly to different conditions, and to see change as a challenge and an opportunity. |
| Analytical Reasoning | A promise that one will stay with a particular company for a long time and to be a reliable and responsible person. |
| Commitment | The ability to look at things in different ways. It begins with taking an objective look at a problem or obstacle, and combining imagination and reason to discover a solution. |
| Communication Skills | The intention to achieve career success within the organisation. The motivation to seek success in specific projects. A positive attitude towards changing systems, methods and in particular, approaches to the development of the business. |
| Creativity | The ability of analysing present conditions carefully, along with a realistic projection of future trends. For instance, one can think of expanding markets, creating new applications for established products or finding variations of services now provided. |
| Emotional Stability | The ability to work on your own, to take a project and get it done without having to be told what to do every step of the way. |
| Foresight | The ability to move others towards a stated goal or objective. The ability to define goals and to support/motivate others in reaching them. A related facet is the ability to influence others through argument and persuasion without having to rely on assertive direction. |
| Independence | The ability to cope with difficulty and frustration without an excessive display of emotion. The inclination to take a positive view under adverse conditions. Not being subject to continuous anxiety and tension. |
| Leadership | The ability to generate solutions to problems. |
| Motivation | The ability to communicate confidently, clearly and succinctly in oral /written communication. The ability to establish rapport quickly with those from diverse cultures. |

**21. Read the following ad offering a fellowship in Singapore and explain the requirements to the candidates.**

[**Singapore NRF Fellowships**](http://blogs.sciencemag.org/sciencecareers/2012/05/singapore-nrf-f.html)

The [National Research Foundation](https://rita.nrf.gov.sg/AboutUs/NRF_Initiatives/nrff2013/default.aspx) (NRF) in Singapore is inviting scientists under 40 years of age to apply for a generous fellowship to carry out independent research in the country.  
The Singapore NRF Fellowships offer tenure-track faculty positions that come with a salary package equivalent to that of a local assistant professor and a research grant of up to $2.4 million over 5 years. These are individual fellowships, so researchers get to choose the host institution; NRF Fellows will be able to lead their own teams at the institution of their choice, as long as it's in Singapore. Shortlisted candidates will be invited in January to visit local research organizations for a week, before the final interview, so they may discuss support for their research and choose potential host institutions.  
Now in its sixth round, the Fellowship scheme welcomes research proposals in computer science, all branches of engineering, medicine, life sciences, and natural/physical sciences. To apply you must have a Ph.D. and postdoctoral experience. Scientists of all nationalities are eligible.  
More information about the scheme and how to apply can be found on the [NRF Web site](https://rita.nrf.gov.sg/AboutUs/NRF_Initiatives/nrff2013/default.aspx). Deadline for application: 15 August 2012. The announcement of short-listed candidates will be no later than 30 November 20.

1) **Would you be interested in applying? Why/why not? What could attract you in this advertisement?**

**2) What information might you need to include in application?**

**3) What are the advantages of attracting scientists with future potential for leadership in their field to a foreign country?**

**4) Do you see any discrimination in this ad?**

**22. Explain in your own words:** generous fellowship, tenure-track faculty positions, host institution, shortlisted candidates.

**23. Complete the project summary below using the correct phrase or word from the box**

|  |
| --- |
| Aims to however the initial stage the proposed research  the study will indicate |

Consumer interest in wines produced in organic vineyards has increased significantly in the last few years. (1) ------, to date it is unclear whether these production methods actually improve soil or grape quality. (2) ------- will be the first phase of a long-term study on a New Zealand vineyard. These results (3) ------ whether methods of viticulture improve grape quality.

The research (4)---- investigate the effect of organic agriculture on soil and grape quality. (5) ---- will consist of two treatments: organic and conventional each replicated four times in a randomized complete block design. All organic practices will follow the standards set out by Food Standards Australia.

(5) ---- will asses soil quality using physical, chemical and analytical indicators over 6 years. The next phase will then assess the physiology of the grape.

**24. Write about the following topic: “*You must be born a scientist”***

To what extent do you think this is true?

Should anything be done to change the situation?

Give reasons for your answer and include any relevant examples from your own knowledge or experience.

### UNIT 3. Women in Science

Although the proportion of female researchers in Europe is increasing, the under-representation of women in scientific disciplines and careers still persists. This is the message of the latest edition of the "She Figures", published today by the European Commission. Women represent only 33% of European researchers, 20% of full professors and 15.5 % of heads of institutions in the Higher Education sector.

# How far do you agree or disagree with the following statement?

# *Men and women have different kinds of brain, so it follows naturally that men and women have different inherent skills and abilities.*

# What are your own views on the subject?

# Read the article and decide which of the opinions best sums up the point the writer is making.

# Women’s brains work in a different way from men’s.

# Women failed to become scientists because of male prejudice.

# Women feel resentful at the way they have been treated by men.

# Men are afraid to accept the limitations of their own intellect.

# Text A. MEN’S CLUB

# Modern science was born in the 16th and 17th centuries, and its enemy was witchcraft (колдовство). Witchcraft was a force of darkness that could not be understood by experiment, theory and observation. Science was a new way of knowing that seemed to be sweeping away such old darkness. And it was a masculine way of knowing. Religious terror and male conviction resulted in the death of an estimated three million women in Europe during the 250 years of the systematic persecution of witches.

# “The view was that the mind was masculine and nature feminine”, says Dr.Jan Harding, who works with the Fawsett Society to promote women in science. “It was not thought that women were equipped to do science, but they appeared to have access to some other forms of knowledge. So it was thought they must get that knowledge from the devil..”

# The Royal Society in London was where modern science was institutinalised and codified. Dominated for years by the titanic figure of Isaac Newton, it was the exclusive club in which the scientific dream was first dreamt. And it was utterly, rigorously and unarguably a men’s club.

# Margaret Cavendish, a Duchess of Newcastle, was allowed entry in 1667 to see a demonstration of Boyle’s celebrated air pump., but that was about it, and nobody had any doubts that neither she nor any other woman was capable of grasping the arcane of this new and staggeringly effective form of knowledge. It is worth knowing that Newton himself, having changed the universe, is thought to have died celibate.

# Science has remained a men’s club ever since, even though the fear of witchcraft may appear to have subsided. In the 19th century, Caroline Herschel was almost as great an astronomer as her kinsmen William and John. She discovered a phenomenal comets. The name Herschel is now immortalized in the textbooks, but only as the surname of two men.

# By then, however, the reasons for women’s inadequacy in science were no longer seen as their associations with the devil. More kindly, yet equally disastrously, they were now believed to be constitutional. Augustus de Morgan wrote to the mother of his gifted pupil, Ada Lovelace. She was proving an alarmingly capable mathematician and de Morgan feared that mathematics demanded a “very great tension of mind” which would be “beyond the strength of a woman’s physical power of application”. Lovelace went on to work with Charles Babbage on the development of his difference engine, the precursor of the computer.

# These adverbs all appear in the article. Match them with an equivalent meaning on the right, according to how they are used.

# utterly a evenly

# rigorously b astoundingly

# unarguably c catastrophically

# staggeringly d completely

# kindly e rigidly

# equally f disturbingly

# disastrously g generously

# alarmingly h indisputably

# Match one of the headings to each of the six paragraphs.

# Exclusion of the ”opposite sex”.

# Fear of the unknown.

# The “weaker sex”.

# The male/female divide.

# Defining terms of reference.

# A scientific family.

# In support of his argument the writer mentions the following women:

# Margaret Cavendish Caroline Herschel Ada Lovelace

# Which of the above:

# Caused her tutor much concern?

# Basked only in reflected glory?

# Was the first female to gain access to one particular all-made domain?

# Seemed unnaturally scientifically minded?

# Was a woman of aristocratic birth?

# Was a worthy member of a scientifically-minded family?

# Linking sentences. Study these examples paying attention to the linking words in bold.

# Mary was never able to achieve the success she craved despite the fact that she studied very hard.

# Mary was able to achieve the success she craved on account of the fact that she studied so hard.

# Write one sentence about each of the women in the text using the information in previous exercise. Use either despite the fact that or on account of the fact that.

# After you’ve read the article answer the question: What does the author of the article mean? “Science research is not a tap you can turn on and off at will”

**Text B**. Sir Peter Knight, president of the Institute of Physics talks to **Eliza Anyangwe** about the quality of UK research output and the search for a female Brian Cox

**It was revealed that UK physics**[**research**](http://www.guardian.co.uk/higher-education-network/research)**surpassed the US in the average quality rank, coming only second to Canada yet in terms of its output, UK physics is ranked much lower down - seventh.**

**Have you always been passionate about physics and research?**

Having gifted teachers at school made a real difference - to be turned on to science at an early age and to be at a school with good labs so we could do stuff. I was determined to get to university but not to do physics. I went to Sussex to do chemistry but in the middle of the 1960s, it was a multi-disciplinary sort of place, so I quickly realised that physics excited me more instead. I stayed on and did my doctorate then had three lovely years in the States which were really important because in the UK you graduate with your doctorate and you're just 24. You've not got a lot of experience. That three year post-doctoral period I had in the States allowed me to work with some incredibly gifted people, and form my own ideas.

**How has higher education and the working lives of researchers changed during your career?**

The first main difference between when I started and now is that not that many people went to university then. Now there's much wider participation in higher education. But the biggest change is that research is now being done in a more constrained environment where you a under more pressure to get things done quickly - "just in case". If you don't finish before the funding runs out, you are then preoccupied with getting the next bit of resource.

**You've said earlier that for a decade there was much investment in UK science, what's the funding climate like now?**

We've hit a substantial financial crunch and scientists have to ensure they demonstrate that science is part of the solution not the problem. We have to make the case that science can help rebalance the economy so that there is less dependence on casino financing and more on actually doing and making things. I think that the science budget isn't perfect, it could have been much worse. In the next budget, we need to demonstrate to the Treasury that its faith in us is well-placed, that we are actually delivering.

And even if we can't, ministers have to be wary of thinking of science research as a tap you can turn on and off at will. It is very easy to thinking: "Oh, it'll only be a year or two of cuts." When there is a pause in research support - even for a few years - the team of people you've assembled and the levels of enthusiasm you've built up dissipate very quickly. You need a good funding environment to keep the team together; allow people to do their PhDs and continue working with the team on a postdoc. We have to keep on saying that science is important, it's creating new knowledge, new knowledge is in turn creating new economies

**What do you think the knock-on effects will be of HE teaching funding on postgrad research, specifically in science?**

If you look at the way universities are funded (we get research and teaching income), in looking at the way fees structures are built up, there are potential deterrents for people staying on to do PhDs and there is also a vulnerability in all of the master's programmes.

At the moment, a lot of universities are predicting the collapse of master's degrees because of this uncertainty as well as people worrying about whether UK students will be able to afford to do a PhD. Many things have changed all at once in the funding landscape. None of the changes on their own are enormously challenging, but coming together means we're going to have to be fairly fleet of foot.

In spite of all this, there are trends you wouldn't expect to observe; physics applications to university have gone up a lot. Many universities are now finding it really easy to get brilliant students to fill course places, and the physics A level is the fourth most popular A level among boys. Isn't that great?

**Yes, that's great for boys! What about the girls?**

Well, physics comes in 22nd. This means huge numbers of very talented young women are saying "physics isn't for me". This gender mismatch is scary and this is one of the greatest challenges the Institute of Physics faces - to get girls engaged in science. We have great role models for them, women such as [Joceyln Bell](http://www.guardian.co.uk/science/2011/mar/08/jocelyn-bell-burnell-100-women), my predecessor at IoP, and my successor as head of physics at Imperial, [Jo Haigh](http://www3.imperial.ac.uk/people/j.haigh). It shouldn't have been difficult but it has been. What we need is a woman Brian Cox. There are a few very charismatic female scientists in the rising generation, such as [Lucy Green](http://www.mssl.ucl.ac.uk/careers/lmg.html) a young space physicist, we just need to encourage them.

1. **Try to answer the questions put to Sir Peter Knight in as few words as you can.**
2. **What do these words and word combinations mean?:** gifted teachers, excellent labs, excited more, form my own ideas, research is done, constrained environment, preoccupied, knock-on effects, a vulnerability, challenging, fleet of foot, gender mismatch, encourage

# One of the paragraphs discusses efforts of getting the funding for research in Great Britain. In the following sentences discuss whether it is possible to use the verbs: *have to, need, could*

# Scientists ….. ensure they demonstrate that science is part of the solution not the problem.

# Scientists ……. prove that science can help the economy.

# The science budget isn't perfect, it ……. have been much worse.

# Scientists ……. to demonstrate to the Treasury that they do their research effectively.

# You ……. a good funding environment to keep the team of scientists together.

# We ……. to keep on saying that science is important.

# True or false?

1. School education influenced greatly the author’s career.
2. The working lives of researchers have changed for the better.
3. Scientists get more and more money for research.
4. Many UK universities do not have enough brilliant students.
5. Many women take up research in physics.
6. **Read the title of Text C.** What do you expect to read in it?

What characteristics of academic careers seem unattractive to you?

What needs improvement to attract the best and the brightest to research?

Do women often leave a PhD course in your country? Why?

**13. You will come across these words and word combinations while reading text C.**

Unappealing - непривлекательный

Encounter impediments – ощущать препятствия

To make sacrifices - приносить жертвы

Retention –- сохранение

Constant hunt for funding – постоянный поиск финансирования

To be fuelled by-разжигаться

Lack of self-confidence – отсутствие самоуверенности

Encounter problems – ощущать проблемы

To pursue a career – выбрать карьеру

Credibility – надежность, убедительность

Cutting edge – передовой, современный

**Text C.**

**Why women leave academia and why universities should be worried**

*A recent report reveals that only 12% of third year female PhD students want a career in academia.****Curt Rice****looks at the reasons why and warns that universities' survival is at risk.*

Young women scientists leave academia in far greater numbers than men for three reasons. During their time as [PhD](http://www.guardian.co.uk/higher-education-network/phd) candidates, large numbers of women conclude that (1) the characteristics of academic careers are unappealing, (2) the impediments they will encounter are disproportionate, and (3) the sacrifices they will have to make are great.

This is the conclusion of [**The chemistry PhD: the impact on women's retention**](http://www.biochemistry.org/Portals/0/SciencePolicy/Docs/Chemistry%20Report%20For%20Web.pdf)**,** a report for the [UK Resource Centre for Women in SET](http://www.raeng.org.uk/about/diversity/ukrc.htm) and the [Royal Society of Chemistry](http://www.rsc.org/). In this report, the results of a longitudinal study with PhD students in chemistry in the UK are presented.

Men and women show radically different developments regarding their intended future careers. At the beginning of their studies, 72% of women express an intention to pursue careers as researchers, either in industry or academia. Among men, 61% express the same intention.

By the third year, the proportion of men planning careers in [research](http://www.guardian.co.uk/higher-education-network/research) had dropped from 61% to 59%. But for the women, the number had plummeted from 72% in the first year to 37% as they finish their studies.

If we take apart those who want to work as researchers in industry from those who want to work as researchers in academia, the third year numbers are alarming: 12% of the women and 21% of the men see academia as their preferred choice.

This is not the number of PhD students who in fact do go to academia; it's the number who want to. 88% of the women don't even want academic careers, nor do 79% of the men! How can it be this bad? Why are universities such unattractive workplaces?

Part of **The chemistry PhD** discusses problems that arise while young researchers are PhD candidates, including too little supervision, too much supervision, focus on achieving experimental results rather than mastery of methodologies, and much more. The long-term effects, though, are reflected in the attitudes and beliefs about academia that emerge during this period.

The participants in the study identify many characteristics of academic careers that they find unappealing: the constant hunt for funding for research projects is a significant impediment for both men and women. But women in greater numbers than men see academic careers as all-consuming, solitary and as unnecessarily competitive.

Both men and women PhD candidates come to realise that a string of post-docs is part of a career path, and they see that this can require frequent moves and a lack of security about future employment. Women are more negatively affected than men by the competitiveness in this stage of an academic career and their concerns about competitiveness are fuelled, they say, by a relative lack of self-confidence.

Women more than men see great sacrifice as a prerequisite for success in academia. This comes in part from their perception of women who have succeeded, from the [**nature of the available role models**](http://curt-rice.com/2012/01/13/why-not-just-any-old-role-model-will-do-what-early-career-men-and-women-need/)**.** Successful female professors are perceived by female PhD candidates as displaying masculine characteristics, such as aggression and competitiveness, and [they were often childless](http://curt-rice.com/2011/12/08/the-motherhood-penalty-its-not-children-that-slow-mothers-down/).

As if all this were not enough, women PhD candidates had one experience that men never have. They were told that they would encounter problems along the way simply because they are women. They are told, in other words, that their [gender](http://www.guardian.co.uk/world/gender) will work against them.

By following PhD candidates throughout their study and asking probing questions, we learn not only that the number of women in chemistry PhD programs who intend to pursue a career in academia falls dramatically, but we learn why.

This research and the new knowledge it produces should be required reading for everyone leading a university or a research group. The stories surely apply far beyond chemistry. Remember that it's not just women who find academia unappealing. Only 21% of the men wanted to head our way, too.

Universities will not survive as research institutions unless university [leadership](http://www.guardian.co.uk/higher-education-network/leadership) realises that the working conditions they offer dramatically reduce the size of the pool from which they recruit. We will not survive because we have no reason to believe we are attracting the best and the brightest. When industry is the more attractive employer, our credibility as the home of long-term, cutting edge, high-risk, profoundly creative research, is diminished.

The answers here lie in leadership and in changing our current culture to build a new one for new challenges. The job is significant and it will require cutting edge, high-risk leadership teamwork to succeed. Is your university ready?

*This content is brought to you by*[*Guardian Professional*](http://www.guardian.co.uk/guardian-professional)*.*

**14. Answer the questions**

1. Who is more attracted by the academic career **a**t the beginning of their studies – men or women?
2. What happens by the third year? Why do you think?
3. What aren’t they satisfied with?
4. Are impediments the same for men and women?
5. What characteristics of the academic career attract you?
6. What needs improvement to attract the best and the brightest to research?
7. What was the author’s purpose? How much do you agree with his points?

**15. Find in the text all word combinations with “research” and translate them into Russian.**

**16. What do these numbers refer to?**

72%, 61%, 59%, 37%, 12%, 21%, 79%, 88%.

**17. Find synonyms for the following words**:

1. Drop, greater numbers, fall, unappealing, impediment, regarding, tease apart, emerge, encounter.
2. Large numbers, plummet, unattractive, appear, obstacle ,meet, concerning, separate.

**18. Put the verbs in the passive.**

1.In this report, the results of a study with PhD students in chemistry in the UK ( present).

2. The long-term effects (reflect) in the attitudes and beliefs about academia that emerge during a PhD course.

3. Women more negatively (affect) than men by the competitiveness.

4. Their concerns about competitiveness (fuel) by a relative lack of self-confidence.

5. They (tell) that they would encounter problems along the way simply because they are women.

**19. What is not mentioned in the text as impediments?**

a) Supervision b) too little mastery of methodologies

c) constant hunt for funding for research d) few academic positions

e) lack of interest in the research.

**20. Choose the correct word.**

***Despite/Although*** there are encouraging signs, women are still under-represented in science ***whether*/*if*** in basic scientific research or at higher decision-making levels. Science ***mustn’t*/*cannot*** continue to deprive itself of the full scientific potential of over half the world’s population. Science is a key***to/for*** knowledge; for women to gain access to knowledge and achieve gender equality, they must have ***access/except*** to science. It/**noted/** **has been noted** that women are responsible **for/to** half of the human knowledge and technical expertise ***as/like*** informal agriculturalists, gardeners, animal-breeders, managers of their community resources **as/as well as** technological innovators and agents of change. But unfortunately, **f*ail*/*failure*** to recognize women’s scientific know how and inputs, even in daily life situations, has led to a noticeable lack of confidence in their academic capacities and career choices.

**UNIT 4. Research and Society**

1. **Do you agree? In countless ways, developments based on scientific research have made our world healthier, more prosperous and opened up new opportunities.  But the power of science to transform lives and societies also comes with great responsibilities**. **What are these responsibilities?**
2. **Read text A and try to answer the question: What is the main idea of the text?**

**Text A.**

Actually, measuring the value of science is a lot more complicated than that. Not only do economic factors have to be considered but the non-market impacts of research, such as social and environmental impacts, are also important and should be measured in some way.

The Australian university is conducting fundamental research into how best to put an economic value on science. The problem is a pressing one. While the positive impacts on society from research and development are well understood, it is becoming increasingly important for those investing in research to be able to identify whether their investment has been successful or worthwhile.

The value of science has been measured in several ways: some approaches ascribe a dollar value to the benefits flowing from research, some calculate a ratio of costs to benefit; and others focus on research outputs, such as publications and patents, and use these as a measure of performance. All these conventional approaches have their drawbacks. It takes time to produce research; time to implement changes or produce a product; time before the new processes/products are taken up; and time before changes in productivity are observed. Non-economic impacts such as social and environmental impacts are hard to measure and hard to accommodate.

The university has conducted a number of research projects over several years to estimate the economic impacts of scientific research. Teaming with the Bio-Protection Research Center at Lincoln university, it is identifying and developing methods or techniques that can be used to value bio-protection research. The methods and protocols developed for the Bio-Protection Research Center may, with modifications, be applied to other disciplines.

**Answer the questions.**

1. Why is it important to measure an economic value of research?
2. What conventional approaches to the problem exist?
3. What are the drawbacks of conventional approaches in measuring the value of scientific research?
4. What are non-market impacts of research?

**3. Match the Russian equivalents to the English ones used in the text.**

**A**. Стоимость науки, воздействие научных исследований, измерять воздействие научных исследований, инвестировать научные исследования, сконцентрироваться на результатах исследований, мера эффективности, традиционные подходы, иметь недостатки, требуется время для проведения научных исследований, внести изменения, социальные и экологические воздействия трудно измерить, проводить исследования, оценить экономическое воздействие научных исследований, применять по отношению к другим дисциплинам, разработать методы.

**B.** impacts of research, invest in research, the value of science, to measure the value of science, conventional approaches, to implement changes, focus on research outputs, it takes time to produce research, a measure of performance, to have drawbacks, to apply to other disciplines, to measure the economic impact of research, to produce research, to develop methods, social and environmental impacts are hard to measure

**4. Read Text B and note phases in the development of agricultural research.**

**Beginnings of formal agricultural research**

Most people place the beginnings of formal agricultural research in the late eighteenth century to the mid-nineteenth century. This relatively long initial phase was caused by several factors. First, many of the other basic sciences were in an early developmental stage. In fact the early agricultural scientists were trained chemists applying their skills to food production. Secondly, governments were reluctant to provide funding for agricultural research. In the United States both George Washington and Thomas Jefferson advocated formal agricultural research as a fundamental component of the newly developed country. However, Congress did not share either president's feeling and did not support a formal agriculture department until 1862. The U.S. Department of Agriculture did not achieve cabinet status until 1889.

Third, many of the world's great universities had not yet been founded or were also in early stages of development. The first colleges involved in agricultural research in the United States were Harvard, Yale, and Princeton. Several of the early endowed chairs in universities were in chemistry, agriculture, or a combination of the two. Fourth, agricultural principles developed were often not applicable to farms or crops in other parts of a country or continent. Thus an initial credibility problem existed with much of the early agricultural research. In the mid-1800s the concept of an experiment station developed in Europe. Some authors credit the Germans with development of the experiment station, while others credit the British. Regardless of the location of the first stations, the concept was to develop agricultural research sites near areas of agricultural production so results would be applicable to the local areas. This concept became common in all areas of agricultural production.

Justus von Liebig is often credited with writing the first book on agricultural research, Organic Chemistry and Its Applications to Agriculture and Physiology, published in both Germany and England in 1840. Liebig was an agricultural chemist in Giessen, Germany, one of the first experiment station sites. Liebig also established courses in agricultural chemistry and provided a site for foreign students to study under his tutelage. Numerous students from across Europe and the United States studied under him. The model Liebig developed for research sites near production areas, student training, and course offerings remained the standard for agricultural research around the world in the early twenty-first century.

**Developments in the United States**

The U.S. government did not establish a formal agricultural research agency until the middle part of the nineteenth century. Early agricultural research, from 1836 to 1862, was conducted by the U.S. Patent Office, which received, on an irregular basis, funds from Congress for specific purposes. Scientists trained in Europe were hired as faculty members by many of the universities and by other nongovernmental groups, such as the Smithsonian Institution. Thus it seems clear that universities in Europe, particularly in Germany and England, were the first to establish formal agricultural research programs.

As the scientific disciplines of chemistry and biology developed, those principles were increasingly applied to food production. In many cases chemical assays and principles were established in direct response to needs in the food and agriculture industries. In the second half of the nineteenth century agricultural research became a recognized discipline in institutes of higher education. The Hatch Experiment Station Act of 1887 established a formal linkage between the U.S. Department of Agriculture, which would supply funding, and state colleges of agriculture, where the research would be conducted. This collaboration between states and the federal government was an important model in governmental relations.

Through the first sixty to seventy years of the twentieth century, Hatch funds were sufficient to conduct research and to train students at universities. However, late in the century Hatch funding received no increases, and the funds diminished in real terms. In the twenty-first century, university scientists working in agriculture must compete for funds from a variety of funding sources, mostly federal government programs, by writing competitive proposals. Congress in collaboration with the president provides funds for the various federal research programs. Thus at times funding for research topics is influenced by political motivations instead of by the common good. Even with staffs and consultants well versed in current topics, this approach diminishes the dialogue on the most important topics that require research support. This change in research funding has positive and negative attributes. On the positive side, only the best research, on topics that have far-reaching implications and those that will have the largest impact on agriculture and society, is conducted. On the negative side, minor agricultural industries rarely receive any of this funding, and development of new opportunities in agriculture is difficult.

E. John Russell (1966) described five phases of agricultural research in Great Britain. While the years may differ, the concepts and general timing are similar to other parts of the world. Phase one began in the late sixteenth century with Francis Bacon and was characterized by numerous individuals conducting research in ancillary areas to agriculture without communication among themselves. This period lasted until the end of the eighteenth century.

The second phase coincided with the emergence of chemistry and lasted until the mid-nineteenth century. Numerous nongovernmental groups were established during the period to promote agriculture, and several universities established formal programs in agricultural sciences. The third phase lasted until the early twentieth century and included establishment of extension activities in university programs as well as expansion of teaching. The fourth stage was a short but important period because of the expansion of experiment stations, research funding from governments, and recognition of the role of agricultural development as an economic development tool. This phase lasted from 1920 to 1930. The fifth phase has lasted into the twenty-first century. Russell described this phase as the time of governmental laboratories and dissociation from farmers and their needs. While Russell's view is rather cynical, many farmers share his point.

As large, multinational companies became involved in agricultural research, much of the generated research results became proprietary and focused on generation of revenue. However, the range of products developed during the twentieth century was extraordinary, ranging from corn syrup to lecithin and resulting in products that literally changed lives. Breakfast cereals, sliced white bread, hot dog buns, soybean meal, and more changed the way people lived in developed countries and offered the promise of alleviating hunger and malnutrition in the remainder of the world. Agricultural research in universities focused on production of crops, both plant and animal, and on improving efficiency of production. Agricultural engineers led the Industrial Revolution and are rapidly applying space-age technology to tractors. Advanced biological lines of research, including microbiology, biochemistry, molecular biology, and developmental biology, are routine in agricultural research laboratories in the twenty-first century. Practical agricultural research funding, however, is diminishing.

Agricultural research was one of the early areas of formal scientific investigation and remained the foundation for many forms of research in the twenty-first century. Results from this research led to high-quality foods that are moderately priced, significant improvements in health, elimination of various diseases, far-reaching increases in cognitive function, and many other benefits to society.

**5. What are these names connected with?** George Washington and Thomas Jefferson, Harvard, Yale, and Princeton, Justus von Liebig, E. John Russell.

**6. Answer the questions**

1. Name reasons why the initial stage of agricultural research was so long.
2. What was the idea of experimental stations?
3. Where from were agricultural scientists hired to US universities?
4. What changes in research funding took place in the 21-st century?
5. What are positive and negative sides of the new policy of research funding?
6. Describe each of the four phases of agricultural research in Great Britain.
7. What is the importance of agricultural research for the society?

7.  **Read Text B and speak about the problems existing in Belarusian science.**

**Text B.**

**Young talented people are expected to pursue a career in science in Belarus.**

It is impossible to solve economic issues, we face today, without science, technology, education and new knowledge. The country needs researchers able to generate unconventional and out-of-the-box solutions. Today the alternation of scientific generations is a relevant issue. The average age of doctors of science at Belarus universities is 61 years; candidates of science are 10 years younger. Fewer young people choose to pursue postgraduate studies. What is the number one problem? Is it all about small grants and small salaries for fledgling scientists and other material factors? Or is it about inadequate work to encourage young talented people to pursue a career in science?

Belarus earmarks about 1% of gross domestic product for science, while abroad the figure makes 2%, 3% or 4%. However, the bulk of resources provided for research in foreign countries is invested by commercial companies that pay for results. Belarusian scientists only create intellectual products that sometimes cannot be commercialized. More than that, researchers and manufacturers cannot even fully use resources of the innovation fund.   
In 2012 a doctor's degree was granted to 46 seekers, a professor’s degree was bestowed upon 33 people.

Enhancement of science, keeping research schools’ traditions alive, enhancing ties between scientists and manufacturers are the priorities of the state policy. Thanks to the state support Belarusian researchers have succeeded in outer space exploration, development of information and other sophisticated technologies, creation of unique nanomaterials, working out state-of-the-art treatment methods, finding solutions to many urgent problems.

**What do you think: what are the solutions to the mentioned above problems? You can use some of the linking words given in ex.8.**

**8. Complete the table with linking words**

|  |  |
| --- | --- |
| Function | Linking words |
| Addition | besides, mo----, in ad-----, fur------- |
| Conclusion | Lastly, in c-------, f------- |
| Consequence | So, there-----, c---- |
| Contrast | But, in---, e--- s---- |
| Equivalence | That is to say, n----, , in o------- w------- |
| Example | For instance, s------ as, f----- e------ |
| Generalization | In most cases, as a ------, on the w----- |
| Highlighting | Mainly, chiefly, in p------, es------ |
| Stating the obvious | Of course, n------, ob------,cir-------- |
| Summary | To sum up, o------, in b--------- |

**9. Collocations. Finish these extracts by completing each one with verbs from the box that collocate with the words in bold**.

|  |
| --- |
| giving offer putting promotes cutting-edge launched |

Germany is Europe’s number one research location. In 2006, Germany ……. a comprehensive national **strategy**, known as the [High-Tech Strategy](http://www.research-in-germany.de/main/research-landscape/r-d-policy-framework/2960/high-tech-strategy-for-germany.html) (HTS), with the aim of ……. Germany at the **forefront** of tomorrow’s important markets. Today, the German government is investing more than ever in research and development. Targeted funding for the 17 selected ……. **fields** has the aim of …..new **impetus** to the transfer of ideas into practice.

Every eighteen months, the Federal Ministry of Education and Research (BMBF) **selec**t one of the 17 …… research sectors as the core campaign of the High-Tech Strategy’s internationalisation initiative. The campaign ……. these selected **research areas** internationally and enhances the visibility of Germany as an outstanding research location. Various trade shows, conferences and workshops ……. **an opportunity** to establish strategic partnerships among research institutes, companies and scientists.

**10. Read the text and answer the question** ”What is the aim ofAaron Leopold’s research on biofuels?”

**Conducting Energy Research on Fuel Policy**

*Aaron Leopold is currently completing his PhD at the University of Kassel and the Helmholtz Centre for Environmental Research (UFZ). His work in political economics focuses on first-generation biofuel programmes in Brazil, the European Union and the United States in the wake of the “food versus fuel” controversy.*

“Countless scientists are conducting research on biofuels, trying to determine whether they are a blessing or a curse. As a result, there is a plethora of peer-reviewed scientific information available that comes to various conclusions, making it possible to “prove” either view. Similar to the issue of climate change, there is an excess of objectivity, so to speak. I want to investigate how national and international corporations, NGOs, science and politics are affecting our perception of biofuels as either something good or bad. My work focuses on how and why proponents have been able to establish political mandates for biofuel production despite the long list of highly controversial social, ecological and economic issues involved.

**- What makes Germany the right place to study and conduct research?**I wanted to move to Germany even before I had to choose a university. I then learned that the University of Kassel offers an English-language master’s programme in Global Political Economy, which really interested me. Coming to Kassel turned out to be a life-changing decision, because it shaped who I am today both personally and academically. I arrived curious about political economics and left university convinced that I had to become a political economist. My studies in Kassel also laid the foundation for my PhD.

**- In your field, a global approach to research is very important. Did Germany provide you with opportunities to conduct research internationally?**For my doctoral studies, I received a scholarship through the Helmholtz Interdisciplinary Graduate School for Environmental Research (HIGRADE). Part of the funding went toward a research stay in Brazil to study how the biofuel economy there really functions. This field research turned out to be integral to my PhD project.

**11.** Explain how you understand “***in the wake of the “food versus fuel” controversy”*** inthe sentence “His work in political economics focuses on first-generation biofuel programmes in Brazil, the European Union and the United States **in the wake of the “food versus fuel” controversy”.**

**12. Find equivalents**

1. Unimaginable A необратимый
2. Countless B невообразимый
3. Incontrovertible С бесконечный

**13. Discuss how strongly you agree or disagree with the following**

1. Climate change is the main problem being discussed nowadays.
2. Agriculture is mainly responsible for global greenhouse gas emissions.
3. Many scientists believe that climate change threatens agricultural production.
4. I would never believe that it is possible to increase food production by 70% by 2050.
5. I am highly skeptical of claims that biotechnology can be a solution to the problem of climate change.
6. It is unwise to think that climate change will affect only developing countries.

**14. You will come across these words in the text:**

profound interest in - глубокий интерес к

to endow a fund – основать фонд

to engage in – участвовать в

to make a contribution – вносить вклад

to meet the demand - удовлетворять спрос

to promote modern and sustainable agriculture – развивать современное и устойчивое сельское хозяйство

to enjoy research grants – пользоваться научными грантами

to advance the power of science – продвигать силу науки

to translate scientific discovery into affordable technologies – претворять научные открытия в доступные технологии

to challenge - делать вызов

to cause – вызывать что-то

to foster international co-operation - укреплять международное сотрудничество

a fair intellectual property rights regime – справедливый режим прав интеллектуальной собственности

to share the R&D – делиться исследованиями и разработками

**15. Read the speech of an American professor and try to understand the main facts dealing with the positive and negative aspects of scientific research.**

Thank you for that warm welcome.

I am honoured to have been invited to give this lecture and to receive the second Richard Ernst Gold Medal.

Let me thank the Swiss Federal Institute of Technology and the Club of Rome who are co-sponsoring this year’s lecture.

Your University can count some of the greatest scientists of modern times among its students, researchers and faculty members .For never has science played a greater role in our everyday lives. In countless ways, developments based on scientific research have made our world healthier, more prosperous and opened up new opportunities.

But the power of science to transform lives and societies also comes with great responsibilities.

Alfred Nobel was an extraordinary chemist and engineer but also someone with profound interest in wider social issues. He hoped his invention of dynamite, with its terrible power, would deter war. Instead, it led to destruction on a previously unimaginable scale.

His response was to use his fortune to endow a fund to encourage efforts to make the world a better and more peaceful place.

It was a similar journey followed by perhaps your greatest alumni, Albert Einstein who brought scientists together to reduce the threat of nuclear weapons his research had helped make possible.

He too urged scientists to look beyond their own narrow fields, to engage in society and help find solutions.

There are many areas where you can make a contribution .But let me focus on two priorities: food and nutrition security and climate change.

Today, more than 1 billion people suffer from hunger. By the time the students in this room have grandchildren; there will be another two billion mouths to feed. To meet that extra demand, global food production need to increase by 70%.

The science-based agricultural development, based on the ideas of another Nobel Laureate, Dr. Norman Borlaug, transformed food production in Asia.

The science-based agricultural development is based on promoting modern and sustainable agriculture with emphasis on improved seeds, and integrated soil fertility and water management practices for the benefit primarily of small-holder farmers who account for 80% of Africa’s agricultural production.

In the fight against hunger, the scientific community has a critical role to play through research and technology development. We need you to step up co-operation with the continent’s own scientists and research institutions to help launch Africa’s own green revolution.

There is huge potential. African scientists may not have the luxury of the excellent laboratory and research grants enjoyed here in Europe.

We need scientists to improve conventional plant breeding in order to create new varieties of crops, more resistant to local conditions.

Second, scientific research can help develop new fertilizer and methods of biological nitrogen fixation that will have significant benefits for environmental sustainability.

Third, farmers need new efficient water management techniques that will get “more crop per drop of water” with the minimum use of chemical inputs.

Ultimately, it is only through strategic partnerships and networks between scientists here and those in Africa that we will be able to advance the power of science for development and greater food and nutrition security.

History shows that by translating scientific discovery into accessible and affordable technologies, the scientific community can help feed our world in a way that is environmentally sustainable.

The challenge of feeding the world is, of course, being made more difficult by the impact of climate change. Increases in temperature and changing rainfall patterns are already turning vast tracts of once productive land into semi-desert. More frequent storms and flooding are damaging crops on which people depend. For global warming is not an academic exercise but a manmade reality for which the scientific evidence is incontrovertible. Far from being limited to the environment, it is an all-encompassing threat – a threat to our security, our health, our food supplies and our social stability.

Scientific advances and technological innovations must be mobilized today if we are to develop the tools needed to confront this challenge in time. The approach must be threefold.

First, we must use less energy which means more “energy savings, energy conservation and improved energy efficiency” .From the green light bulb to high efficiency diesel engines, scientific research must provide suitable and affordable alternatives for responsible energy consumption. But for the impact of those technologies to be significant, governments must develop policies that reward sustainable production and consumption patterns and which encourage the public to demand them.

Second, we must start replacing current fossil fuels with non-fossil sources of energy. The scientific challenge is to make the transition towards clean energy alternatives that are cost-efficient, viable and potentially available to all. Wind, solar and biomass are the energy sources that your community needs to develop.

Third, we also have to accept the fact that “fossil fuels provide 81% of the world’s commercial energy supply”. This is not going to change overnight. The challenge is how we can keep burning fossil fuels while reducing their impact on climate. One solution would be to absorb CO2 from the atmosphere.

For while it is true that the impact of climate change can be felt everywhere, the tragic irony is that those who feel the worst effects are those who have done least to cause it.

The world’s 50 poorest countries have contributed less than 2% of the warming gases in our atmosphere. Yet it is the least developed countries and small island nations which are most at threat.

Again, scientific research can help the most vulnerable to adapt to climate change.

This will require a major transfer of additional resources, knowledge and technology, as well as increased collaboration between scientists and research policy institutes across the world.

Science, of course, has always been global in its outlook and collaboration has long been the norm. This University’s Alliance for Global Sustainability being just the latest example.

But such cooperation has, for far too long, been reserved to developed countries.

Half a century ago, India’s first Prime Minister Jawaharlal Nehru declared his country was too poor not to invest in scientific research. He knew it was science which would unlock the potential of his nation.

For science to be truly global, we need to foster international co-operation and ensure that research is focused on the public good. It requires scientists in the developing world to be fully involved not just in fieldwork or low-level research but also in establishing the research agenda. It also requires a fair intellectual property rights regime to ensure that the benefits of research are shared across the globe.

Finally, we must provide both universities and corporations with more incentives to increase their collaboration and share their R&D without denying those in the developing world access to technological advances at prices they can afford.

**16. Answer the questions.**

Where are consequences of climate change mostly felt?

Can you say where the impact of climate change can be felt?

What are the two priorities in the world the professor focused in his speech?

What did India’s first Prime Minister Jawaharlal Nehru mean saying that India was too poor not to invest in scientific research?

What are challenges for scientists nowadays?

**17. Language to express *cause* and *effect***

Here are some useful expressions commonly used when expressing cause and effect.

A Using **cause** as a noun

The direct/likely/ major/ main **cause** of the global climate change is human activity.

The **cause** of the experiment failure was not known.

B Using **reason** as a noun

The first/second/third **reason** for closing a university is its academic reputation.

One key **reason** for entering higher education is to improve employment prospects.

C Using **cause** as a verb

Student cars **may/can**/**will cause** some problems.

Fails in the Asian stock market may **cause** significant damage to markets in the United States and Europe.

D Using result as a verb

Global emissions may/can/**will result in** temperature rise.

**18. Translate the words in brackets.**

1. Scientific collaboration will (приведет к) technological advances.
2. The scientific community can eliminate (причины) of poverty and hunger.
3. Global warming (вызывает). many problems for agriculture.
4. The world’s 50 poorest countries have done least to (быть причиной) global warming.
5. The (причина) for the professor’s speech was to draw students’ attention to global problems.

**19. Read the article about the Hi-Tech Park in Belarus and retell it giving the main points which can be interesting to your listeners. Let the other students ask you as many questions as they can.**

During the last years the ICT sector in Belarus receives strong governmental support and is one of the top-priority economic sectors to develop. Thus, by the special Law, issued in 2005 Belarus Hi-Tech Park was established with the main goal to support software industry. HTP Belarus provides special business environment for IT business with incentives unprecedented for European countries. Any company operating in the sphere of computer-based technologies can apply for residency within the HTP and benefit from tax-incentives and other advantages it provides.

First residents were registered in 2006. Currently 118 companies are registered as the Park's residents. Half of Belarus HTP resident-companies are foreign companies and joint ventures. By the origin of investments attracted to the sphere of new and high technologies:

53% HTP residents were set up by Belarusian investors,

47% HTP resident was set up with foreign investors participation:

20% – joint ventures

27% – enterprises with 100% foreign investments.

The export share in the total production volume is 80 per cent. The resident companies are successful on North American and European hi-tech markets. Today they have customers in more than 55 countries around the globe. Today world leading corporations, such as Peugeot, Mitsubishi, British Petroleum, Gazprom, Reuters, British Telecom, London Stock Exchange, World Bank, Coca-Cola, etc. are among major consumers of Belarusian software developed in Belarus Hi-Tech Park.

EPAM Systems and the HTP Belarus from HTP Belarus on Vimeo.

The first building was put into operation in June 2009. The building hosts the Administration of Belarus Hi-Tech Park, offices of HTP resident-companies, IT-Academy and business-incubator.

**20. Read the article and try to find different opinions on the problem of nuclear power.**

**Nuclear power in Germany**

In a decade, one of the world's biggest economies will have switched off the power stations that currently supply just under a quarter of its needs.

What will take up the slack? Those who applaud the move as bold and principled say renewable energy, much of it will come from wind farms.

And, they add, the gap will be smaller as more efficient buildings and machines become available. The official commission reckons that Germany could cut its electricity use by 10% through this increased efficiency.

More skeptical voices say some of that might happen - but some of it won't, and that will mean renewed life for coal-fired power stations.

France has shown no sign of falling out of love with nuclear, and Poland is just falling in love with it, intending to build two atomic power stations.

Sweden has decided to phase out its nuclear stations, leaving them run to the end of their planned lives rather than abruptly shutting them.

According to Swedish Environment Minister Andreas Carlgren, Germany's decision meant an "uneven energy policy" in Europe, so Germany will "most probably need to increase the import of nuclear energy from France".

The German official commission set up to study the nuclear issue after the crisis at Japan's Fukushima plant called for pragmatism.

Chancellor Angela Merkel said the intention was to devise a system that was "safe, reliable and economically viable".

**21. Say in other words:**

1. France has shown no sign of falling out of love with nuclear.
2. Sweden has decided to phase out its nuclear stations.
3. Poland is just falling in love with nuclear.

**22. All the verbs in the table below can be followed by different wh-words + clause. Check the verbs in your dictionary and complete the table by writing in the appropriate wh-word followed by a phrase completion.**

|  |  |  |
| --- | --- | --- |
| **verb** | **Wh- word** | **Sentence completion** |
| doubt | whether | It is possible |
| Consider |  | It is worth |
| Determine |  | It is reasonable |
| Explain |  | It is economically viable |
| Decide |  | It is efficient |
| Describe |  |  |
| realize |  |  |
| discuss |  |  |

Помните, что порядок слов в вопросе, начинающемся с wh- слов, отличается от порядка слов в косвенном вопросе. Сравните:

Question:

Why is Germany shutting down its atomic power stations?

Wh-word+auxiliary verb+subject+verb

Indirect question:

Complement+verb\_wh-word+subject=verb

We need to discuss why Germany is shutting down its atomic power stations.

**23. Rearrange these words to complete sentences with verb +**

**wh- words + clause**

**Example**: will explain/ the secretary/ the forms/ you have to/ fill in/how

*The secretary will explain how you have to fill in the forms.*

1. The article/in a decade/ discusses/ what kind of energy/Germany/ will have
2. considers/Sweden/abruptly/ whether/ to shut down atomic power stations/it will have to
3. People/ / it is impossible/ why/ / realize /nuclear energy/ to do without
4. doubts / its atomic power stations/ whether/France /it should close
5. explained / /it is necessary to study/ Officials / why/ the nuclear issue

**24. Read the passage and choose the right answers to the questions.**

1. Research completed in 1982 found that in the United States soil erosion

A reduced the productivity of farmland by 20 per cent.

B was almost as severe as in India and China.

C was causing significant damage to 20 per cent of farmland.

D could be reduced by converting cultivated land to meadow or forest.

2. By the mid-1980s, farmers in Denmark

A used 50 per cent less fertiliser than Dutch farmers.

B used twice as much fertiliser as they had in 1960.

C applied fertiliser much more frequently than in 1960.

D more than doubled the amount of pesticide they used in just 3 years.

3. Which one of the following increased in New Zealand after 1984?

A farm incomes

B use of fertiliser

C over-stocking

D farm diversification

**Text**

All these activities may have damaging environmental impacts. For example, land clearing for agriculture is the largest single cause of deforestation; chemical fertilisers and pesticides may contaminate water supplies; more intensive farming and the abandonment of fallow periods tend to exacerbate soil erosion; and the spread of monoculture and use of high-yielding varieties of crops have been accompanied by the disappearance of old varieties of food plants which might have provided some insurance against pests or diseases in future. Soil erosion threatens the productivity of land in both rich and poor countries. The United States, where the most careful measurements have been done, discovered in 1982 that about one-fifth of its farmland was losing topsoil at a rate likely to diminish the soil's productivity. The country subsequently embarked upon a program to convert 11 per cent of its cropped land to meadow or forest. Topsoil in India and China is vanishing much faster than in America.

Government policies have frequently compounded the environmental damage that farming can cause. In the rich countries, subsidies for growing crops and price supports for farm output drive up the price of land. The annual value of these subsidies is immense: about $250 billion, or more than all World Bank lending in the 1980s. To increase the output of crops per acre, a farmer's easiest option is to use more of the most readily available inputs: fertilisers and pesticides. Fertiliser use doubled in Denmark in the period 1960-1985 and increased in The Netherlands by 150 per cent. The quantity of pesticides applied has risen too: by 69 per cent in 1975-1984 in Denmark, for example, with a rise of 115 per cent in the frequency of application in the three years from 1981.

In the late 1980s and early 1990s some efforts were made to reduce farm subsidies. The most dramatic example was that of New Zealand, which scrapped most farm support in 1984. A study of the environmental effects, conducted in 1993, found that the end of fertiliser subsidies had been followed by a fall in fertiliser use (a fall compounded by the decline in world commodity prices, which cut farm incomes). The removal of subsidies also stopped land-clearing and over-stocking, which in the past had been the principal causes of erosion. Farms began to diversify. The one kind of subsidy whose removal appeared to have been bad for the environment was the subsidy to manage soil erosion.

In less enlightened countries, and in the European Union, the trend has been to reduce rather than eliminate subsidies, and to introduce new payments to encourage farmers to treat their land in environmentally friendlier ways, or to leave it fallow. It may sound strange but such payments need to be higher than the existing incentives for farmers to grow food crops. Farmers, however, dislike being paid to do nothing. In several countries they have become interested in the possibility of using fuel produced from crop residues either as a replacement for petrol (as ethanol) or as fuel for power stations (as biomass). Such fuels produce far less carbon dioxide than coal or oil, and absorb carbon dioxide as they grow. They are therefore less likely to contribute to the greenhouse effect. But they are rarely competitive with fossil fuels unless subsidised - and growing them does no less environmental harm than other crops.

**25. With a partner, use expressions for introducing a point and seeing both sides to explain the advantages and disadvantages of the following:**

**Example**: Living in your parents’ home or moving away and sharing flat with friends. – **Firstly,** living with your parents is not always easy. **On the whole**, it is cheaper to stay at home, but the experience of living away from home is richer. **As regards** sharing with friends, it’s true that sometimes there will be personality clashes, **but, on the other hand**, it’s good to know that there’s always a friend around when you need help.

1. Some scientists believe that biofuels is something which will help solve energy problem, Others feel that it will worsen the food problem. What is your opinion? Use specific reasons and examples to support your answer.
2. Some people think that human needs for farmland, housing, and industry are more important than saving land for endangered animals. Do you agree or disagree with this point of view? Why or why not? Use specific reasons and examples to support your answer
3. Science is an inspiring process of discovery that helps satisfy the natural curiosity with which we are all born. Unfortunately, traditional instruction that misrepresents science as a body of facts to be memorized, and the process of science as a rigid 5-step procedure can deaden students' spirit of inquiry. Do you agree with this statement? Use specific reasons and examples to support your answer

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Носкова Светлана Андреевна

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