1. **Science and the Modern World**

**Before you start**

* Do you agree with Stephen Hawking, who said, Science is not only a disciple of reason but also, also, one of romance and passion?
* What scientific project would you like to be involved in? Why?
* What scientific breakthroughs do you think will shape our future?

**Ex. 1. Study the words and word combinations:**

|  |  |  |
| --- | --- | --- |
| Word | Transcription | Translation |
| Suspicion | /səsˈpɪʃən/ | подозрение |
| Gradually | /ˈgræʤʊəlɪ/ | постепенно |
| Embodiment | /ɪmˈbɒdɪmənt/ | воплощение, олицетворение |
| manufacturer | /mænjʊˈfækʧərə/ | производитель |
| non-profit research company | /nɒn-ˈprɒfɪt rɪˈsɜːʧ ˈkʌmpəni/ | некоммерческая исследовательская компания |
| to circumvent | /sɜːkəmˈvent/ | перехитрить |
| to estimate | /ˈɛstɪmɪt/ | оценивать |
| to embark | /ɪmˈbɑːk/ | начинать |
| household appliances | /haʊshəʊld əˈplaɪənsɪz/ | бытовая техника |
| akin to | /əˈkɪn tuː/ | сродни |
| to collide | /kəˈlaɪd/ | сталкиваться |
| accelerator | /əkˈseləreɪtə/ | ускоритель |
| superconducting | /ˈsuːpəkəndʌktɪŋ/ | сверхпроводящий |
| to blink | / blɪŋk/ | моргать |
| fundamental structure | / fʌndəˈmentl ˈstrʌkʧə/ | фундаментальная структура |
| colonization | / kɒlənaɪˈzeɪʃn/ | колонизация |

**Ex. 2. Read the text.**

**Science and the Modern World**

**Science Colonization**

There was a time when the scientist in Europe was looked upon with fear and suspicion. He was persecuted by the Church and the State. But gradually the situation changed. The importance of science in the modern world can scarcely be overestimated. This world depends on science and it now consists of the things that appeared due to science employment. Buildings we live, study and work in, means of transport we use, food we eat, clothes we wear – everything is based on the scientific theories, discoveries and inventions. We cannot imagine our lives without such things as cellular phone, a pair of sneakers, toothpaste, computer, medicine, weather forecast etc. The things we use every day are available thanks to science. It’s science that drives the economy and, more pervasively, it’s science that shapes our culture.

**Elon Musk and Popularizing Science**

Now even fictional characters are working on the popularization of science. What a boy it would not be desirable to become an iron man! And meanwhile this image from comics in the 21st century has a living embodiment - Elon Musk. He really is the one who changes the world around him. Elon Musk is the co-founder, CEO and Product Architect at Tesla, Space Exploration Technologies (SpaceX), OpenAI.

All of Tesla's developments are designed not only to help us in life, but also to prevent terrible environmental disasters. As we all know, no invention of the company needs gasoline or gas, which means that it does not pollute the earth. Such a friendly attitude to the environment was to the liking of the Government of the Netherlands and, more recently, the country has embarked on the path of total abandonment of gasoline powered cars. They are replaced by a part of the taxi to Tesla and in the near future. Also Tesla developed two energy storage products, the Powerful home battery and the Powerpack industrial-scale battery. In 2016, Tesla acquired SolarCity (the brainchild of Musk), the leading provider of solar power systems in the United States.

**Musk’s goals and ambitions**

In a non-profit research company, OpenAI Elon is working on safe artificial intelligence and its benefits are as many as possible. At present, OpenAI states that "it's hard to fathom how much human-level AI could benefit society," and that it's difficult to comprehend "how much it could damage society if built or used incorrectly". Previously, Elon co-founded and sold PayPal, the world's leading Internet payment system, and Zip2, one of the first internet maps and directions services.

Another global and ambitious goal of the Musk is the colonization of Mars. Above this, Elon and his team work in Space X. He oversees the development and manufacturing of advanced rockets and spacecraft for missions to and beyond the Earth orbit, with the goal of creating a self-sustaining city on Mars. SpaceX's achievements include the rocket to reach orbit-Falcon 1, spacecraft-Dragon, the first propulsive landing for an orbital rocket (Falcon 9 in 2015); and the first reuse of an orbital rocket (Falcon 9 in 2017).

**Japanese robotics**

Speaking about the development of science and its application to the sphere of human life, it is difficult to circumvent the Japanese robotics. The robotics industry is more important in Japan than any other country in the world. Japan employs over a quarter of a million industrial robot workers. In the next 15 years, Japan estimates that the number may jump to over one million and they expect the revenue for robotics to be near $ 70 billion by 2035.

So, each of us knows such Japanese companies as: Sony Corporation, Honda, Toyota, Toshiba, Mitsubishi Electric Automation - Robotics. And in our view, these companies are engaged in the development and sale of household appliances, mobile phones, cars. But not everyone knows that this is one of the leading companies in the development of robots. Advanced development helps these companies stay on the leading positions.

Robots belong to the following categories: Human Robots, Androids, Guard, Mobility, Rescue, Industrial humanoid robotics, Astronaut, Industrial robotics. The characteristics of robots are progressive, their abilities are enlarged as the technology has progressed. There are humanoid capable to blink, smile or express emotions, akin to anger and surprise, robots designed for games with children, for the comfort of people who do not have enough communication.

For example, CB² is the robot taught how to move around the room by using its 51 "muscles". Developments of Japanese scientists surprise, amaze and make it clear that there is no limit to the human mind.

**CERN and fundamental breakthroughs**

At CERN, the European Organization for Nuclear Research, physicists and engineers are probing the fundamental structure of the universe.

They use the world's largest and most complex scientific instruments to study the basic constituents of matter – the fundamental particles. The particles are made to collide together at a rate close to the speed of light. The process gives the physicists clues about how the particles interact, and provides insights into the fundamental laws of nature.

The instruments used at CERN are purpose-built particle accelerators and detectors. Accelerators boost beams of particles to high energies before the beams are made to collide with each other or with stationary targets. Detectors observe and record the results of these collisions.

The most famous of them are the Large Hadron Collider (LHC), the world’s largest and most powerful particle accelerator. The LHC consists of a 27-kilometer ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.

The discoveries made at CERN include the discovery of neutral currents using a bubble chamber Gargamel (1973), creation of the first antimatter atoms - antihydrogen atoms in the experiment PS210 (1995), the discovery of elementary tetraquark and pentaquark particles (2014 and 2015, respectively). The most famous discovery of recent years, with certainty, can be called the discovery of a new elementary particle of the Higgs boson in 2012.

Главная идея, логические части

This text is about importance of science and its impact on our life. So, this text contains 4 logical parts.

The first is introduction, which marks that science gradually become more and more important in our life.

Next part is about Elon Mask and his involvement in Tesla, SpaceX and OpenAI. Elon really is the one who changes the world around him, author says

The third part of this text contains information about Japanese robotics. Author says that this is important sphere of development of science.

The last part is about CERN. Author marks facts about Large Hadron Collider and discoveries made at CERN.

**Ex. 3. Answer the questions:**

1. What things the author mentions are available thanks to science? Give a few examples.

The author says that many things become available due to the science. In example, buildings we live, study and work in, means of transport we use, food we eat, clothes we wear and many other.

1. What is the primary mission of Elon Musk’s developments?

The primary missions of Elon Musk’s developments are popularization of science, saving environment and help us in live.

1. What is the recent initiative taken in Holland?

The Netherlands government embarked on the path of total abandonment of gasoline powered cars due to the Mask’s ideas. In example, they replaced a part of taxi to Tesla.

1. What project did Tesla launch in 2016?

In 2016 Tesla acquired SolarCity (the brainchild of Musk), the leading provider of solar power systems in the United States.

1. What is Elon Musk currently working on?

Today Elon Musk is the co-founder, CEO and Product Architect at Tesla, Space Exploration Technologies (SpaceX), OpenAI and he work with these projects.

1. What is Tesla’s ambitious goal for the future?

It’s a goal of creating a self-sustaining city on Mars **????**

1. How can you prove the significant role of robotics in Japan?

Japan employs over a quarter of a million industrial robot workers. In the next 15 years, Japan estimates that the number may jump to over one million and they expect the revenue for robotics to be near $ 70 billion by 2035.

1. What are the main categories of robots?

Robots belong to the following categories: Human Robots, Androids, Guard, Mobility, Rescue, Industrial humanoid robotics, Astronaut, Industrial robotics

1. What does CERN do? What do their scientists focus on?

CERN and their scientists focus on probing the fundamental structure of the universe.

1. What are the instruments used at CERN? What are the main discoveries made at CERN?

The instruments used at CERN are purpose-built particle accelerators and detectors. The most famous example is the Large Hadron Collider. The discoveries made at CERN include the discovery of neutral currents using a bubble chamber Gargamel (1973), creation of the first antimatter atoms - antihydrogen atoms in the experiment PS210 (1995), the discovery of elementary tetraquark and pentaquark particles (2014 and 2015, respectively). The most famous discovery of recent years, with certainty, can be called the discovery of a new elementary particle of the Higgs boson in 2012.

**Ex. 4. Mark these statements as true or false:**

1. In the modern world, culture shapes science. F
2. The idea of popularization of science is extremely popular nowadays. T
3. AI can either benefit or damage today’s society. T
4. Elon Musk has co-founded and owns PayPal. T
5. SpaceX aims to build self-sustainable cities on different planets.F
6. The robotics industry may soar in the following fifteen years.T
7. Leading Japanese companies stay in the leading positions because they produce highly-qualified household appliances. F
8. CB² is the robot used to express emotions.F
9. Both accelerators and detectors are used at CERN. All the discoveries made at CERN recently are of equal importance. **???** May be T
10. The most famous and powerful particle accelerator consists of magnets with the property of superconductivity. T

**Ex. 5. Give Russian equivalents for:**

To be looked upon with fear and suspicion – рассматриваться с опаской и подозрением

to be overestimated – являться переоцененным

due to science employment – благодаря научной деятельности

to drive the economy - развивать экономику

a living embodiment – живой пример

to prevent terrible environmental disasters – предотвращать ужасные экологические катастрофы

a friendly attitude to the environment – бережное отношение к окружающей среде

missions to and beyond the Earth orbit – миссии на орбиту земли и за ее пределы

to embarked on the path of total abandonment of gasoline powered cars – взять курс на полный отказ от автомобилей на бензине

a brainchild -

a non-profit research company – некоммерческая исследовательская компания

to be engaged in the development and sale of household appliances – заниматься разработкой и продажей бытовой техники

to create a self-sustaining city – создать самодостаточный город

to stay on the leading positions – оставаться на передовых позициях

to probe the fundamental structure of the universe – изучать фундаментальное устройство вселенной

at a rate close to the speed of light – со скоростью близкой к скорости света

to provide insights into the fundamental laws of nature – обеспечивать сведения о фундаментальных законах природы

purpose-built particle accelerators and detectors – специально-созданные ускорители и детекторы частиц

stationery targets – стационарные мишени

superconducting magnets - сверхпроводящие магниты

to boost the energy of the particles along the way – увеличить энергию частиц на всем пути

the discovery of elementary tetraquark and pentaquark particles – открытие элементарных частиц тетракварка и пентакварка

**Ex.6.** **Match the parts of the sentence:**

|  |  |
| --- | --- |
| **1.** Speaking about the development of science and its application to the sphere of human life **F** | **a.** …to study the basic constituents of matter. |
| **2.** All of Tesla's developments are designed not only to help us in life **D** | **b.** …it’s science that shapes our culture. |
| **3.** At CERN, the European Organization for Nuclear Research **H** | **c.** …their abilities are enlarged as the technology has progressed. |
| **4.** The characteristics of robots are progressive **C** | **d.** …but also to prevent terrible environmental disasters. |
| **5.** It’s science that drives the economy and, more pervasively **B** | **e.** …how the particles interact, and provides insights into the fundamental laws of nature. |
| **6.** Such a friendly attitude to the environment was to the liking of the Government of the Netherlands **G** | **f.** …it is difficult to circumvent the Japanese robotics. |
| **7.** The process gives the physicists clues about **E** | **g.** …and, more recently, the country has embarked on the path of total abandonment of gasoline powered cars. |
| **8.** They use the world's largest and most complex scientific instruments **A** | **h.** …physicists and engineers are probing the fundamental structure of the universe. |

**Ex.7.** **Translate into English.**

1. Мы не можем представить нашу жизнь без таких вещей, как сотовый телефон, зубная паста, компьютер, медицина, прогноз погоды и т.д. То, что мы используем каждый день, доступно благодаря науке.
2. Все открытия Tesla разработаны не только для того, чтобы помочь нам в жизни, но и для предотвращения ужасных экологических катастроф.
3. Колонизацией Марса занимается команда Space X. Их основной задачей является разработка и изготовление передовых ракет и космических аппаратов для поездок на орбиту и за ее пределы.
4. В настоящее время OpenAI заявляет, что «трудно понять, насколько искусственный интеллект может принести пользу или нанести вред обществу при неправильном использовании».
5. Есть гуманоиды, способные моргать, улыбаться или выражать эмоции, сродни гневу и удивлению, роботы, предназначенные для игр с детьми, помогающие людям, которым не хватает общения.
6. Разработки японских ученых удивляют и заставляют понять, что человеческому разуму нет предела.
7. Процесс, при котором частицы сталкивают друг с другом, помогает понять, как они взаимодействуют, и дает представление о фундаментальных законах природы.
8. Большой адронный коллайдер - самый мощный в мире ускоритель частиц.
9. Именно наука движет экономикой, и, что более важно, именно наука формирует нашу культуру.
10. Правительство Нидерландов в ближайшем будущем планирует заменить часть такси на Tesla.

1. We can't imagine our lives without things like cell phones, toothpaste, computers, medicine, weather forecasts, etc. The things we use every day are available because of science.

2. All of Tesla's discoveries are designed not only to help us in life, but also to prevent terrible environmental disasters.

3. The colonization of Mars is handled by the Space X team. Their main task is to design and build advanced rockets and spacecraft to travel to orbit and beyond.

4. OpenAI currently states that "it is difficult to know how much artificial intelligence can benefit or harm society if used improperly."

5. There are humanoids capable of blinking, smiling or expressing emotions akin to anger and surprise, robots designed to play with children, helping people who lack communication.

6. Developments of Japanese scientists amaze and make us realize that there is no limit to human intelligence.

7. The process by which particles collide with each other helps to understand how they interact and gives insight into the fundamental laws of nature.

8. The Large Hadron Collider is the world's most powerful particle gas pedal.

9. It is science that drives the economy and, more importantly, it is science that shapes our culture.

10. The Dutch government plans to replace some cabs with Tesla in the near future.

**Ex. 8 Glossary.** **Give the definitions of the following words and word combinations:**

Accomplishment - достижение

to revolutionize – совершить революцию

contribution - вклад

accompanied by – в сопровождении

counterpart - аналог

evolving - развивающийся

blood-brain barrier – гематоэнцефалический барьер

tumor - опухоль

scourge - бич

teardrop - каплевидный

in its infancy – в начальной стадии

efficacious - эффективный

to come up - подниматься

**Ex. 9. Read the text divided into parts. Suggest a title for each part:**

**Scientific Achievements We Are Waiting For**

Science has grown exponentially over the past few centuries, making things possible that were once absolutely considered completely impossible. Science has done a lot to cure many of our worldly troubles, but one thing about science is that it isn’t perfect, and never will be. The reason for this is that science is always getting better. There is always more to discover. These several scientific accomplishments haven’t been achieved… yet.

Imagine having an iPod capable of holding thousands of years of high definition video. A DNA computer would make such a device very possible. DNA is the substance that living organisms use to store genetic information. What makes DNA special is that it is extremely efficient when it comes to storing information in a limited space. Just one milligram of DNA is capable of holding all the printed material in the world.

DNA computers will be the next-generation computers made of genes' building blocks. Because of their speed, miniaturization and data storage potential DNA computers are being considered as a replacement for silicon-based computers. Current DNA computer research has already proven that DNA computers are capable of solving complex mathematical equations and storing enormous amounts of data. DNA computing is currently in its infancy, with prototypes such as MAYA-II only capable of showing the concept. If DNA computing is perfected, computers will become capable of holding amounts of information that are hard to imagine by today’s standard. With the use of DNA logic gates, a DNA computer the size of a teardrop will be more efficacious than today's most powerful supercomputer.

The second scientific challenge on the list is the development of a cure for cancer. Oncological tumors are the scourge of the 21st century. Cancer is similar to the common cold in that although there are many ways to treat it, modern medicine is still yet to come up with a cure. This is partially because like the common cold, there are many different types of cancer, and they are all slightly different. Unfortunately, with over seven million deaths per year, cancer is much more serious than the common cold. Sad statistics confirm this: the World Health Organization (WHO) note that, worldwide, nearly 1 in 6 deaths are down to cancer.

For years now, researchers have led meticulous studies focused on how to stop this deadly disease in its tracks. Ever since the days of Hippocrates people have been searching for a cure. Currently, the most common types of cancer treatment are chemotherapy, radiotherapy, tumor surgery, and — in the case prostate cancer and breast cancer — hormonal therapy. However, other types of treatment are beginning to pick up steam: therapies that — on their own or in combination with other treatments — are meant to help defeat cancer more efficiently and, ideally, have fewer side effects.

Innovations in cancer treatment aim to address a set of issues that will typically face healthcare providers and patients, including aggressive treatment accompanied by unwanted side effects, tumor recurrence after treatment, surgery, or both, and aggressive cancers that are resilient to widely utilized treatments. However, number two on this list has quite a bit of promise.

The third scientific challenge is essentially a possible solution to the problem described above. Speaking of specially developed tools for delivering drugs straight to the tumor and hunting down micro tumors with accuracy and efficiency, the past couple of years have seen a “boom” in nanotechnology and nanoparticle developments for cancer treatments. Nanoparticles could be ‘a game-changer’ in cancer treatment.

Nanoparticles are microscopic particles that have garnered so much attention in clinical research, among other fields, because they bring us the chance to develop precise, less invasive methods of tackling disease. Vitally, they can target cancer cells or cancer tumors without harming healthy cells in the surrounding environment.

Nanoparticles are the subject of nanotechnology research. Nanoscience and nanotechnology are the study and application of extremely small things: the so-called nanoscale deals with dimensions between approximately 1 and 100 nanometers. Although modern nanoscience and nanotechnology are quite new, nanoscale materials were used for centuries. Alternate-sized gold and silver particles created colors in the stained glass windows of medieval churches hundreds of years ago. The artists back then just didn’t know that the process they used to create these beautiful works of art actually led to changes in the composition of the materials they were working with.

Today's scientists and engineers are finding a wide variety of ways to deliberately make materials at the nanoscale to take advantage of their enhanced properties such as higher strength, lighter weight, increased control of light spectrum, and greater chemical reactivity than their larger-scale counterparts.

Nanotechnology has the potential to revolutionize several fields, but its greatest contribution may very well be in medicine. The applications of nanotechnology in medicine are literally endless. The idea of advanced drug delivery techniques used to deliver drugs to specific parts of the body and eliminate side effects has already be announced. In addition, molecules could be built to stick to and destroy cancer cells, and only cancer cells. Microscopic robots could be used to perform ultra delicate surgeries, to repair damaged tissues, or to hunt down and destroy certain cells, like cancer cells or bacteria. Nanomedicine is currently in its infancy, but it may prove to be the biggest breakthrough in modern medicine since the first vaccine.

As already mentioned, nanotechnology is a very evolving science and people still learning about how quantum mechanics impact substances at the nanoscale. Because elements at the nanoscale behave differently than they do in their bulk form, there's a concern that some nanoparticles could be toxic. Some doctors worry that the nanoparticles are so small, that they could easily cross the blood-brain barrier, a membrane that protects the brain from harmful chemicals in the bloodstream. If we plan to use nanoparticles, we need to be sure that they will not poison us.

Closely related to the knowledge barrier is the technical barrier. In order for the incredible predictions regarding nanotechnology to come true, we have to find ways to mass-produce nano-size products like transistors and nanowires. While we can use nanoparticles to build things like tennis rackets and make wrinkle-free fabrics, we can't make really complex microprocessor chips with nanowires yet.

There are some hefty social concerns about nanotechnology too. Nanotechnology may also allow us to create more powerful weapons, both lethal and non-lethal. Some organizations are concerned that we'll only get around to examining the ethical implications of nanotechnology in weaponry after these devices are built. They urge scientists and politicians to examine carefully all the possibilities of nanotechnology before designing increasingly powerful weapons.

Even so, nanotechnology will definitely continue to impact us as we learn more about the enormous potential of the nanoscale.

**Ex. 10. Read the text again carefully. Mark these statements as true or false:**

1. Currently, humanity is approaching full knowledge of the world through scientific discoveries F
2. DNA is a molecule carrying genetic instructions for the development, functioning, growth and reproduction of all known organisms and many viruses. F
3. DNA computers show promise because they do not have the limitations of silicon-based chips.T
4. Silicon-based computer chips allow us to store volumes of information comparable to all the printed mattes in the world. F
5. DNA computers are still in its infancy. F
6. Scientists in the field of nanoscience have already developed a production technology of complex microprocessor chips with nanowires. F
7. According to the World Health Organization, one in six deaths on the planet occurs as a result of cancer. T
8. Nanotechnology is the manipulation of matter with at least one dimension sized from 1 to 100 nanometers. T
9. Nanoparticles exhibit a number of special properties relative to bulk material. T
10. The choice of cancer therapy depends upon the type, location and grade of the tumor and the stage of the disease. T

**Ex. 11.** **Give an example of how modern science is changing our world. In pairs, prepare a short story (for 5 minutes) about the most interesting recent invention or scientific fact. Discuss in the group the positive and negative aspects of a scientific fact or invention. To express your own opinion, learn the following Useful Language:**

*In my opinion, ...*

*To my mind, ...*

*From my point of view, ...*

*As far as I am concerned, ...*

*My view / opinion / belief / impression / conviction is that...*

*I think / consider / find / feel / believe / suppose / presume / assume that ...*

*I hold the view that…*

*It goes without saying that...*

*I have no doubt that...*

*It seems to me that...*

*I am under the impression that…*

*I dare say that…*

*My own feeling on the subject is that…*

*I am sure / I am certain that...*

In my opinion, release of Go or Golang in 2009 is important scientific invention of recent time. **Go** is a [statically typed](https://en.wikipedia.org/wiki/Static_typing), [compiled](https://en.wikipedia.org/wiki/Compiled_language) [high-level](https://en.wikipedia.org/wiki/High-level_programming_language) [programming language](https://en.wikipedia.org/wiki/Programming_language) designed at [Google](https://en.wikipedia.org/wiki/Google). This is a fantastic language to write easy to read, clear and nice code. It also provide very good performance. The language is ideal for creating programs designed for multicore processors. The multithreading implemented through the so-called go routines, which communicate through channels, allows several functions to be called at in parallel. This possibility is very urgent when creating large and complex programs. The means of parallel programming save developer's time and help distribute processor resources evenly. This language doesn’t deal with some popular and common for devs features and structures. In example, here you haven’t got classes, inheritance, constructors, annotations, generics and exceptions. The above changes distinguish Go from other languages and it makes programming in Go different from programming in other languages. You may not like some of the points above. But that doesn't mean you can't write your own application without these features. All you have to do is write 2 or 3 lines more. But, on the other hand, it will make your code cleaner and clearer. It seems to me that today more and more job offers require this language in technologies stack. Go is developed and maintained by Google. Google has the largest cloud infrastructure in the world and it's still expanding. Google created Go to solve their own scalability and efficiency problems. These are the same problems you'll have to face when building your own server. I’m sure that Go gives you the same high performance as C/C++, highly efficient multitasking as Java, and the same ease of coding as Python

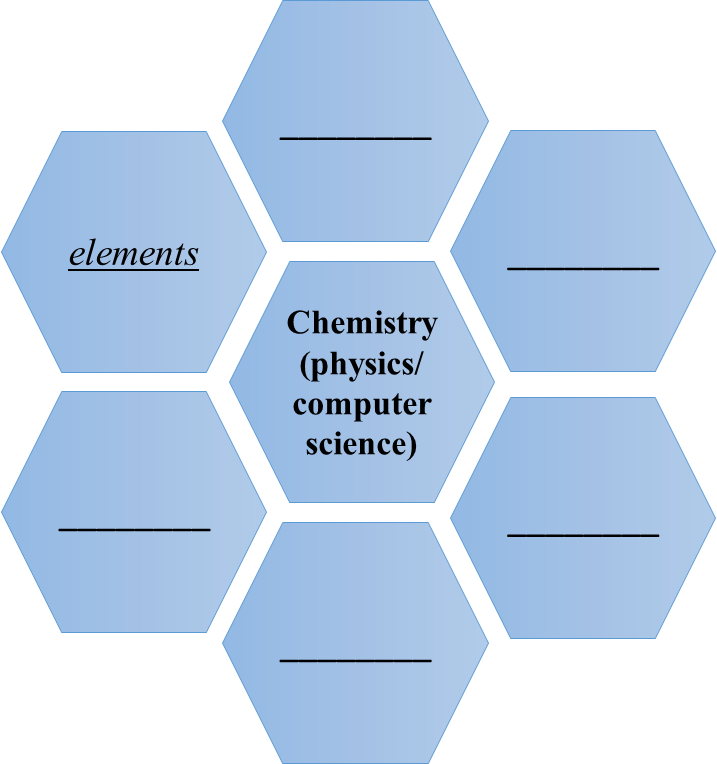
**Ex. 12 Read the quotes and translate. Answer the questions:**

1. Do you agree with George Sarton, who said: “Scientific achievements seem evanescent, because the very progress of science causes their supersedure; yet some of them are of so fundamental a nature that they are immortal in a deeper way”? Why? If you don't agree, why? What are some examples of such inventions?
2. “I have always believed that scientific research is another domain where a form of optimism is essential to success: I have yet to meet a successful scientist who lacks the ability to exaggerate the importance of what he or she is doing, and I believe that someone who lacks a delusional sense of significance will wilt in the face of repeated experiences of multiple small failures and rare successes, the fate of most researchers.” ― Daniel Kahneman, Thinking, Fast and Slow

What do you think about this quote? How important is it for a scientist to understand the significance of what he is doing?

1. Steven Spielberg said that “Technology can be our best friend, and technology can also be the biggest party pooper of our lives. It interrupts our own story, interrupts our ability to have a thought or a daydream, to imagine something wonderful, because we’re too busy bridging the walk from the cafeteria back to the office on the cell phone.” Do you agree with him? What technologies used in your life are considered by you as «friends», and which ones are your «enemies»?

**Ex. 13** **Provide examples of chemistry/physics/computer science (optionally) in your everyday life. Complete the chart with your associations (for example, chemistry - elements, etc) and share with your fellow students.**

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**WATCHING THE VIDEO**

<https://www.ted.com/talks/elon_musk_the_mind_behind_tesla_spacex_solarcity>

**Part 1- 0.00-07.10**

**Before you watch**

1. Rank the following characteristics of a full-electric car (1- most desirable, 7-least desirable)
2. Sustainability
3. Responsiveness
4. Beautiful design
5. Light body (+heavy battery)
6. Charging stations available
7. Good highway range (driving the most out of a single charge)
8. Being a compelling mass-market product
9. Do you know what the words **in bold** mean? Look them up if necessary
10. I was **pulled over** by the police yesterday.
11. You need **mind meld** with your car.
12. If you use electricity to charge cars, you are **better off**.
13. We are facing the era of the **advent of** alternative transport.
14. The **natural cadence** of a trip means people stop every three hours for twenty minutes.

**While you watch –**

**Tick the items Elon Musk mentions in his interview**

1. What brought about the idea of building an electric car.
2. The improves design of the model.
3. An electric car as the most efficient mode of transport.
4. Building ultra-light rockets.
5. The three mains versions of Tesla.
6. Making an electric car a publicly available product.
7. The highway range (making the most out of a single charge).
8. Speed limits of electric cars.
9. The profound difference between a conventional car and all-electric cars in terms of responsiveness.
10. The new charging technologies offered.

**Part 2 07.10-11.54**

**Before you watch**

1. **Discuss with your partner:**
2. Is solar energy used where you live?
3. Who pays the utility bills for the place you live in?
4. Do you know any examples of distributed utilities?
5. **Match the words and word combinations (numbers) and their Russian equivalents (letters). There are four extra options**
6. To tap a little
7. Feed stock
8. Operational costs
9. To allude to
10. To raise a chunk of capital
11. An expected return on capital
12. To empower
13. A plurality of power
14. Немного взять
15. Ссылаться на
16. Давать права, полномочия
17. Запас еды
18. Ехать аллюром
19. Привлекать немного инвестиций
20. Расходы по эксплуатации
21. Включать в сеть
22. Плюрализм правительства
23. Исходный материал
24. Большая часть мощности
25. Ожидаемый возврат инвестиций

**While you watch**

**Why do the speakers say the following? Give your comments**

1. The whole ecosystem is solar-powered.
2. …solar will beat everything hands down.
3. It works for decades, it’ll work for probably a century.
4. Don’t pay so much upfront.
5. No risk, you’ll pay less than you are paying now.
6. What it amounts to is a giant distributed utility.
7. Solar will be at least a plurality of power.

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