**4. Commercialization of Science**

**Before you start**

1. Can science and commerce go hand in hand?

Yes, science and commerce can go hand in hand. Scientific research can lead to the development of new products and technologies that can be sold in the marketplace. Similarly, businesses can invest in scientific research to develop innovative solutions that can improve their products and services.

1. Should science only be funded if it makes money?

No, science should not only be funded if it makes money. Scientific research often leads to discoveries that are not immediately profitable but have significant long-term benefits for society. Limiting funding to only profitable research could stifle scientific progress and innovation, and lead to a focus on short-term gains rather than the greater good. Additionally, scientific research can have unexpected benefits and may lead to profitable outcomes in the future.

1. How far do you agree with the following opinion of Robert Wright? Comment on.

“Your brain may give birth to any technology, but other brains will decide whether the technology thrives. The number of possible technologies is infinite, and only a few pass this test of affinity with human nature.”

― Robert Wright, Nonzero: The Logic of Human Destiny

While it is true that other human minds play a significant role in determining the success of technology, there are also many external factors beyond human control that can impact its fate. The statement also suggests that only a few technologies pass the test of affinity with human nature, but this ignores the vast array of successful technologies that have been embraced by people. However, it is undeniable that the alignment of technology with human needs and desires is critical for its success.

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

|  |  |  |
| --- | --- | --- |
| Word | Transcription | Translation |
| encompassing | /ɪnˈkʌmpəsɪŋ/ | охватывающий |
| license | /ˈlaɪsns/ | лицензия |
| conferring | /kənˈfɜː(r)ɪŋ/ | предоставление |
| to reinstate | /tu ˌriːɪnˈsteɪt/ | восстановить |
| unjustly | /ˌʌnˈdʒʌstli/ | несправедливо |
| turnstile | /ˈtɜːnstaɪl/ | турникет |
| fulfillment | /fʊlˈfɪlmənt/ | исполнение |
| to retrieve | /tu rɪˈtriːv/ | извлекать |
| albeit | /ˌɔːlˈbiːɪt/ | хотя |
| invalid | /ɪnˈvælɪd/ | неверный |
| human labor | /ˈhjuːmən ˈleɪ.bər/ | человеческий труд |

**Ex. 2 Read the text and title its parts:**

**Commercialization of Science: Can Science Make Money?**

(a) The Importance of Patents in Rewarding Scientific Innovation

Science is the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment. Every day science creates something fundamentally new and makes a person's life better, but how is a scientist, an inventor, to receive payment for his work? The main way to earn money for such professionals is to patent their discoveries and inventions.

The patent is a government authority or licence conferring a right or title for a set period, especially the sole right to exclude others from making, using, or selling an invention. As a rule, the one who will first apply for a particular invention will receive a patent for it. For example, Apple patented the "Slide to unlock" action for unlocking a smartphone with a touch screen. Having received this patent, Apple filed a lawsuit against Samsung. After several years of fighting in court with Samsung, Apple has finally emerged victorious in a patent battle that took much longer than it should have.

(b)Supreme Court Denies Appeal in Apple vs Samsung Patent Infringement Case

The Supreme Court ruled Monday, Nov. 6, that it's not going to welcome any appeals of the patent infringement case, which originally found that Samsung had infringed on two Apple patents, requiring it to pay Apple $119,625,000 as a result. Naturally, Samsung isn’t pleased with the outcome. “Our argument was supported by many who believed that the Court should hear the case to reinstate fair standards that promote innovation and prevent abuse of the patent system,” a Samsung representative said in a statement. The company also said the ruling would let Apple “unjustly profit” from an invalid patent.

(c)Successful Russian Patent Generates Millions in Royalties

One of the most successful Russian patents can be considered a patent registered in 2001. The patent for the invention of an "automated travel payment system and control of travel documents" (ASKP) consists in the installation of three interacting devices - a validator, a turnstile and a mounting basket (a complex of metal poles, to which the validator and turnstile are attached). For the use of ASKP "Mosgortrans" had to pay royalties, the amount of which from year to year could vary. So, in 2010 it was 3% of the cost of each paid transportation; in total for 2008-2010 "Mosgortrans" paid for the use of the patent 910.4 million rubles.

(d)Business Applications of Science and Technology: Amazon's Innovations

Let's give examples of how business uses advanced scientific developments in everyday life. The largest companies from around the world invest billions of dollars in the development of science and technology, in order to get a big profit in the end. For example, the head of one of the most innovative companies Amazon - Jeffrey Bezos in 2017 became the richest man on the planet. The most famous projects of Amazon are: automated warehouse, automated store, and delivery with the help of drones.

(e)Efficiency and Innovation in Amazon's Robotic Warehouse System

At the hearth of the warehouse is a storage space containing foursquare shelves packed with innumerable products from Amazon’s inventory list. In previous generations of its fulfillment center, Amazon’s workers would have roamed these shelves searching for the products needed to fulfill each new order. Now the shelves themselves slide quickly across the floor carried atop robots about the size and shape of footstools. In a carefully calculated dance, these robots either rearrange the shelves in neatly packed rows, or bring them over to human workers, who stack them with new products or retrieve goods for packaging. Amazon’s robotic shelves allow more products to be packed into a tighter space. They also make stacking and picking more efficient by automatically bringing empty shelves over to packers or the right goods over to pickers. The process is more efficient than having humans walk around, so it also a great example of how automation can be integrated with human labor to increase efficiency.

(f)Amazon's Just Walk Out: Automated Shopping with AI

Amazon calls it "Just Walk Out" technology and it uses computer vision, deep learning algorithms and sensor fusion — many of the same advances being used to develop autonomous driving. For customers, it's simple: Scan your Amazon Go app as you walk into the store, pick up whatever you want, and simply walk out. On the back-end, Amazon's technology detects everything you're taking or returning to shelves, and keeping track in a virtual shopping cart. When you walk out, Amazon charges your account and sends a receipt.

(g)Amazon's Prime Air completes successful drone delivery in the UK

Amazon says it has successfully trialled its Prime Air drone delivery service in Cambridge, UK, by delivering a TV streaming stick and bag of popcorn directly to the garden of a nearby customer. The breakthrough suggests that autonomous aerial delivery could become a viable business sooner than thought, albeit only for customers with huge gardens, who live close to the delivery depot, and want items weighing less than 2.6kg. Additionally, while deliveries are available seven days a week, the drones can only fly in daylight hours and clement weather. Currently, the trial is only open to two customers, but Amazon says it hopes to expand that to dozens in the coming months. For those customers, Prime Air is available for no extra cost. The company says the delivery, which took place last week, involved fully autonomous flight, with no human pilot involved in the process. The success was announced by Amazon chief executive Jeff Bezos, [who tweeted](https://twitter.com/JeffBezos/status/809034847121350657): “first ever AmazonPrimeAir customer delivery is in the books. 13 min—click to delivery.”

(h)NTechLab's FindFace project leads in face recognition technology in Russia

Speaking about Russia, one of the most successful projects related to science is the FindFace project by a small Moscow-based intelligence startup named NTechLab. “We have found a special type of internal architecture for neural networks, that perfectly fits the face recognition tasks. To search among huge datasets — up to billions of images — we use our specially developed search engine, which is extremely quick and accurate. Each face in the search index is represented by only 80 numbers (a very small amount for such algorithms), and the overall search time is only about half a second.” NTechLab CEO and founder Artem Kukharenko said. According to Kukharenko, FindFace has so far performed about one quadrillion photo comparisons using images from the Russian social network Vkontakte, which has around 200 million profiles. The dream of FindFace is quite literally to be able to do what its name suggests: to let users see someone on the street, snap a quick photo, and immediately be able to link that person to their social media profile.

(i)Commercialization of Science: Pharmacology and the Role of FDA and Patents in the US

Pharmacology in the United States is another example of the systematic commercialization of science. A commercial product with a brand name was originally discovered and developed by a pharmaceutical company. In order for a company to sell its product, they must first obtain the approval of the Food and Drug Administration (FDA) by submitting a new drug. In this documentation, the company provides data for determining the clinical safety and efficacy of the drug. Other studies determine the characteristics of the dosage form of the drug, including the manufacturing process, the stability of the drug, the purity, strength, and how it dissolves. After the drug is approved by the FDA, the innovator company can then exclusively sell and sell this product "brand name" as long as the company has patent protection. In a 2000 study published in the journal Health Economics, it was estimated that bringing a new drug to the market costs the innovator an average of 802 million for 10-15 years. A patent allows an innovator to sell his product solely in order to recoup the money spent during development and make a profit.

Generic medicines are biologically exactly the same as original, innovative products. They have the same active ingredient, they have equal strength, they are used identically, they have the same effect on the patient, and the dose is also exactly the same. The only difference is in their form, packaging, color and some inactive ingredients, such as preservatives or flavorings.

But as soon as the patent and exclusive possession of the market expire, the legislation encourages competition in the interests of consumers. Any pharmaceutical company will be able to produce non-branded versions of the same drug, the so-called "generics".

**Ex. 3** **Read the text carefully. Answer the questions:**

1. What is a patent?

A patent is a government license that gives the inventor the exclusive right to make, use, and sell their invention for a set period of time.

1. Who is the head of the Amazon?

the head of Amazon is Jeff Bezos

1. How did Amazon automate its warehouses?

At the hearth of the warehouse is a storage space containing foursquare shelves packed with innumerable products from Amazon’s inventory list. The shelves themselves slide quickly across the floor carried atop robots about the size and shape of footstools. In a carefully calculated dance, these robots either rearrange the shelves in neatly packed rows, or bring them over to human workers, who stack them with new products or retrieve goods for packaging.

1. What restrictions are imposed on the delivery of drones?

Now available only for customers with huge gardens, who live close to the delivery depot, and want items weighing less than 2.6kg and the trial is only open to two customers.

1. What is Just Walk out Technology all about?

Just Walk Out is a technology developed by Amazon that enables customers to shop in stores without having to go through a traditional checkout process. Customers need to download the Amazon Go app, scan it upon entering the store, and the technology automatically detects which products they take from the shelves and charges their Amazon account. It eliminates the need for cashiers, checkout lines, and scanning of items, making shopping faster and more convenient.

1. What can FindFace actually do?

FindFace is a facial recognition technology developed by a Russian company called NTechLab. It can match faces in photos and videos to images in its database with a high degree of accuracy, making it useful for various applications such as security, marketing, and law enforcement. However, it has raised concerns about privacy and potential misuse.

1. How much does bringing a new product to the market cost?

bringing a new drug to the market costs the innovator an average of 802 million for 10-15 years

1. What is the difference between branded medicines and generics?

Branded medicines are medications that are developed and sold by a specific pharmaceutical company and are protected by patents. Generics are drugs that contain the same active ingredients as the branded medicines, but are sold under their chemical names and are usually less expensive as they are not protected by patents.

1. What problems does the pharmacological system face?

It faces with problem of the systematic commercialization of science

1. What is included in the patent for the invention of ASKP?

The patent for the invention of an "automated travel payment system and control of travel documents" (ASKP) consists in the installation of three interacting devices - a validator, a turnstile and a mounting basket (a complex of metal poles, to which the validator and turnstile are attached).

**Ex. 4 Are these sentences true or false?**

1. Patents protect intellectual property. T
2. Amazon started delivery by drones all over US. F
3. Amazon automated store does not have a cash register. T
4. Generics are no different from branded drugs in everything. F
5. The Supreme Court ruled that Samsung must pay Apple $ 119,625,000. T
6. Pharmaceutical companies use petitions to delay the release of generics. F
7. ”Mosgortrans” doesn’t pay for the use of the Russian patent for the invention of the ASKP. F
8. Packers and pickers don't work in an Amazon warehouse with robotic shelves. T
9. The FindFace system will be able to find a person's profile in a social network very quickly and accurately from a photo. T
10. In order for a company to sell its product, they must first obtain the approval of the FDA. F

**Ex. 5 Give Russian equivalents for the following word combinations:**

the systematic study, the structure and behavior, a government authority, The Supreme Court, to pay royalties, fulfillment center, retrieve goods, computer vision, deep learning algorithms, on the back-end, sooner than thought, Moscow-based, the face recognition, search engine, a pharmaceutical company, obtain the approval, determining the clinical safety and efficacy of the drug, bringing a new drug to the market, little competition, problems with the quality of medicines, inactive ingredients, such as preservatives or flavorings, licence conferring a right, to send a receipt, in neatly packed rows, to get a big profit, autonomous aerial delivery, to snap a quick photo, the dosage form of the drug, exclusive possession of the market

систематическое изучение, структура и поведение, государственный орган, Верховный суд, выплачивать авторские отчисления, центр выполнения заказов, извлекать товары, компьютерное зрение, алгоритмы глубокого обучения, на стороне сервера, раньше, чем предполагалось, основанный в Москве, распознавание лиц, поисковая система, фармацевтическая компания, получение одобрения, определение клинической безопасности и эффективности препарата, выведение нового препарата на рынок, мало конкуренции, проблемы с качеством медикаментов, неактивные ингредиенты, такие как консерванты или ароматизаторы, лицензия, предоставляющая право, отправлять чек, аккуратно упакованные ряды, получать большую прибыль, автономная воздушная доставка, сделать быстрый снимок, лекарственная форма препарата, исключительное владение рынком.

**Ex. 6 Match the 2 parts of the sentence:**

|  |  |
| --- | --- |
| 1. The patent is a government authority or licence conferring a right or title for a set period, A | 1. …the innovator company can then exclusively sell and sell this product "brand name" as long as the company has patent protection. |
| 1. Science is the intellectual and practical activity encompassing the systematic study of the structure and E | 1. …automatically bringing empty shelves over to packers or the right goods over to pickers. |
| 1. After the drug is approved by the FDA, C | 1. …the legislation encourages competition in the interests of consumers. |
| 1. Amazon’s robotic shelves make stacking and picking more efficient by B | 1. …the installation of three interacting devices - a validator, a turnstile and a mounting basket. |
| 1. In order for a company to sell its product, H | 1. …behavior of the physical and natural world through observation and experiment. |
| 1. The patent for the invention of an "automated travel payment system and control of travel documents" consists in D | 1. …to let users see someone on the street, snap a quick photo, and immediately be able to link that person to their social media profile. |
| 1. The dream of FindFace is quite literally to be able to do what its name suggests F | 1. …especially the sole right to exclude others from making, using, or selling an invention. |
| 1. But as soon as the patent and exclusive possession of the market expire, G | 1. …they must first obtain the approval of the Food and Drug Administration (FDA) by submitting a new drug. |

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

1. Роботы либо переставляют полки в аккуратно упакованных рядах, либо передают их работникам.
2. Для клиентов все просто: сканируйте приложение Amazon Go при входе в магазин, берите все, что хотите, и просто выходите.
3. Кроме того, в то время как доставка доступна семь дней в неделю, беспилотники могут летать только в дневное время и в спокойную погоду.
4. Мечта FindFace - позволить пользователям увидев кого-то на улице и быстро сделав фотографию, сразу же связать этого человека с профилем в социальных сетях.
5. Дженерики биологически точно такие же, как оригинальные, инновационные продукты.
6. Патент позволяет продавать продукт эксклюзивно, чтобы вернуть потраченные деньги и заработать прибыль.
7. Роботизированные полки Amazon – это отличный пример того, как автоматизация может быть интегрирована с человеческим трудом для повышения эффективности.
8. После того, как препарат одобрен FDA, компания-новатор может эксклюзивно продавать этот продукт "под торговой маркой".
9. За пользование автоматизированной система оплаты проезда и контроля проездных документов "Мосгортранс" должен был выплачивать авторские гонорары, размер которых из года в год мог меняться.
10. Любая фармацевтическая компания сможет выпускать небрендовые версии одного и того же препарата, так называемые "дженерики".
11. Robots either rearrange shelves in neatly packed rows or hand them over to workers.
12. For customers, it's simple: scan the Amazon Go app upon entering the store, take whatever you want, and simply walk out.
13. Additionally, while delivery is available seven days a week, drones can only fly during daylight hours and in calm weather.
14. The FindFace app's goal is to allow users to quickly take a photo of someone they see on the street and immediately link that person to a social media profile.
15. Generics are biologically identical to original, innovative products.
16. A patent allows a product to be sold exclusively in order to recoup investment costs and generate profit.
17. Amazon's robotic shelves are an excellent example of how automation can be integrated with human labor to increase efficiency.
18. After a drug is FDA-approved, the innovative company can sell the product exclusively under a trademark.
19. "Mosgortrans" had to pay royalties for using an automated payment and ticket control system, the amount of which could vary from year to year.
20. Any pharmaceutical company can produce non-branded versions of the same drug, known as "generics."

**Before you start**

Do you agree with Thomas Edison, who said, “Most inventors who have an idea never stop to think whether their invention will be saleable when they get it made. Unless a man has plenty of money to throw away, he will find that making inventions is about the costliest amusement he can find.”? Why or why not?

I agree that many inventors fail to consider the commercial viability of their inventions before investing significant time and resources into them. Without a clear understanding of market demand, an invention may not be profitable and could result in wasted resources. Invention can be an expensive pursuit, and it is important for inventors to carefully evaluate the potential for success before embarking on the invention process.

**Ex. 8 Glossary. Math the words and word combinations with their Russian equivalents.**

|  |  |
| --- | --- |
| 1. convergence g | 1. объединиться, слиться |
| 1. rapprochement j | 1. посвящающий, посвятивший |
| 1. internal combustion engine n | 1. первоклассный |
| 1. first-rate c | 1. пренебрегать |
| 1. litigation l | 1. ракета-носитель |
| 1. entrepreneur k | 1. потомок |
| 1. to coalesce a | 1. конвергенция |
| 1. to neglect d | 1. банкрот |
| 1. devoting b | 1. железнодорожный магнат |
| 1. synchronized m | 1. сближение |
| 1. bankrupt h | 1. предприниматель |
| 1. descendant f | 1. судебный процесс |
| 1. railroad tycoon i | 1. синхронизированный |
| 1. launch vehicle e | 1. двигатель внутреннего сгорания |

**Ex. 9 Read the text.**

**Enthusiasm is the basis of any progress**

There is a scientific term called convergence. As a rule, it is used in the natural Sciences and Humanities and refers to the process of rapprochement. The convergence of science and business occurs when the achievements of scientists are put on an economic track and serve for the benefit of people, and their creators receive a good income for this. You don't need to go far for examples: a car, a computer, or a phone. This is in a global sense. Unfortunately, there are not many successful examples of the convergence of science and small business. Especially in Russia. The question "how to become a scientist and invent something new" probably cannot be answered. But how to become a successful scientist-businessman - you can. And this can be helped by illustrative examples from the past and our present.

"A car for everyone" was the slogan of the **Henry Ford** company, which produced the first truly mass-produced car. He built his first car in his spare time as an engineer, with the help of like-minded people. At the age of 12, Henry set up a small workshop where he spent all his free time enthusiastically. It was there a few years later that he constructed his first steam engine. In 1879, Henry Ford moved to Detroit, where he took a job as a machinist's assistant. Ford assembled the first internal combustion engine in the kitchen of his home. Soon he decided to put the engine on a frame with four Bicycle wheels. So in 1896 there was a quadricycle - a vehicle that became the first Ford car. After retiring from Edison Illuminating in 1899, Henry Ford founded his own company, Detroit Automobile. Despite the fact that the company went bankrupt a year later, Ford managed to assemble several race cars. Ford himself took part in auto racing and in October 1901 managed to defeat the American champion Alexander Winton.

After several failures with racing cars, Henry Ford found investors who supported his idea to switch to mass-production cars. There is a common belief that Henry Ford invented the conveyor. In fact, he perfected the invention of another American entrepreneur — Ransom Olds-and was the first to establish a production line. Later, his system of organizing work was called "Fordism". Ford was one of the first to suggest that workers should be paid well, and then their skills would improve. The first mass-produced models A and N sold well, but the truly legendary model T- a reliable, high-quality and inexpensive car that became one of the most popular and widespread cars of its time. It was the appearance of the "T" model that marked the beginning of a new era in the development of personal transport. Ford's car was easy to drive, it did not require complex maintenance and could even drive on rural roads. It came out in 1908, and since then Ford Motor, controlled by descendants of Henry Ford, remains one of the most budget car manufacturers.

**Thomas Edison** was an American inventor who is considered one of America's leading businessmen and innovators. He is credited today for helping to build America's economy during the Industrial Revolution.

In 1869, at 22 years old, Edison moved to New York City and developed his first invention, an improved stock ticker called the Universal Stock Printer, which synchronized several stock tickers' transactions. The Gold and Stock Telegraph Company was so impressed, they paid him $40,000 for the rights. By the early 1870s, Edison had acquired a reputation as a first-rate inventor. In 1870, he set up his first small laboratory and manufacturing facility in New Jersey, and employed several machinists. As an independent entrepreneur, Edison formed numerous partnerships and developed products for the highest bidder. Often that was Western Union Telegraph Company, the industry leader, but just as often, it was one of Western Union's rivals.

In one such instance, Edison devised for Western Union the quadruplex telegraph, capable of transmitting two signals in two different directions on the same wire, but railroad tycoon Jay Gould snatched the invention from Western Union, paying Edison more than $100,000 in cash, bonds and stock, and generating years of litigation. In 1876, Edison built an independent industrial research facility incorporating machine shops and laboratories.

While Edison was not the inventor of the first light bulb, he came up with the technology that helped bring it to the masses. Edison was driven to perfect a commercially practical, efficient incandescent light bulb following English inventor Humphry Davy’s invention of the first early electric arc lamp in the early 1800s.  Over the decades following Davy’s creation, scientists such as Warren de la Rue, Joseph Wilson Swan, Heinrich Goebel and Mathew Evans had worked to perfect electric light bulbs or tubes using a vacuum but were unsuccessful in their attempts.  After buying Goebels’ and Evans' patent and making improvements in his design, Edison was granted a patent for his own improved light bulb in 1879. He began to manufacture and market it for widespread use. In 1880, Edison founded the Edison Illuminating Company — the first investor-owned electric utility, which later became [General Electric](https://www.ge.com/).

Edison's career was the quintessential rags-to-riches success story that made him a folk hero in America.  An uninhibited egoist, he could be a tyrant to employees and ruthless to competitors. Though he was a publicity seeker, he didn’t socialize well and often neglected his family.  But by the time he died, Edison was one of the most well-known and respected Americans in the world. He had been at the forefront of America’s first technological revolution

There are probably no people left today who haven't heard of **Elon Musk**. He is a Canadian-American engineer, entrepreneur, inventor, and investor. Elon Musk is the founder of Paypal, SpaceX, and Tesla, and a member of the Board of Directors of SolarCity, a company founded by his cousins.

Zip2 was the first company co-founded by the Musk brothers in 1996. They were engaged in the production of software. The startup did not develop as quickly as Elon wanted, but hard work allowed him to bring it to such a level that investors were interested in it. Soon Compac acquired Zip2 for $ 307 million, 22 million went to Elon Musk personally and he became a millionaire at the age of 27. In March 1999 Elon Musk became one of the founders X.com (by investing 12 million of their own savings), intending to revolutionize Bank payments. Already in 2000 the companies X.com and Confinity merged, and the systems X.com and PayPal coalesced. In October 2002, PayPal was bought by eBay for $ 1.5 billion, and Elon received $175 million for his 11.7% stake.

In June 2002, Musk founded his third company, SpaceX. This company of Elon is associated with space development. The purpose of its creation was to reduce the cost of flights to space, promote its development, and in particular, the future colonization of Mars. Elon Musk became the chief engineer and CEO of SpaceX. On March 24, 2006, the company launched its first Falcon 1 launch vehicle, but it ended in an accident. However, in the same year, SpaceX became one of the winners in the NASA Commercial Orbital Transportation Services (COTS) competition, receiving total funding of $ 396 million, for the development and demonstration of the Falcon 9 launch vehicle and the Dragon ship. On September 28, 2008, the first successful launch of the Falcon 1 took place. Thanks to the energetic actions of Elon Musk, the company has developed two types of potentially multiple launch vehicles: the Falcon 1 and Falcon 9, as well as the reusable Dragon spacecraft. In 2003, Elon organized a company that he named after Nikola Tesla "Tesla Motors". The company's field of activity is the creation of environmentally friendly electric vehicles and solutions for electric energy storage.

“I like to participate in projects that change the world. The Internet did it, and space will probably change the world more than anything else. If humanity can go beyond the Earth, it is obvious that its future lies there.” Said Elon Musk. His success rules don't change. He continues to work on the colonization of Mars, devoting most of his time to SpaceX. However, he also does not forget about Tesla, and is actively engaged in charity.

A brief biography of Edison, Ford, and Musk is an inexhaustible source of inspiration. They proved by their example that nothing is impossible, you just need to continue to implement your ideas.

**Ex. 10 Read the text carefully again. Answer the questions:**

1. What are the three entrepreneur are cited as an example as scientists-businessmen? Give other examples.
2. How did Henry Ford start his career?
3. What are the main inventions of Henry Ford?
4. What was the name of the most popular and mass-produced car produced by Ford?
5. What invention made Edison famous?
6. What fields of science does Elon Musk develop? What other projects has he founded besides those mentioned in the text? (hint: unit 1)
7. What are the main developments of SpaceX?
8. What does Tesla do?
9. What contribution did Thomas Edison make to development of the electric world?
10. What do you know about Elon Musk's goals related to space exploration?
11. The three entrepreneurs cited as examples of scientists-businessmen are Thomas Edison, Henry Ford, and Elon Musk. Other examples of scientist-businessmen include Steve Jobs, Bill Gates, and Jeff Bezos.
12. Henry Ford started his career as a machinist's apprentice and later became an engineer at the Edison Illuminating Company. He then went on to build his own automobile company, the Ford Motor Company.
13. Henry Ford's main inventions include the Model T automobile, the assembly line production method, and the Ford V-8 engine.
14. The name of the most popular and mass-produced car produced by Ford was the Model T.
15. The invention that made Edison famous was the practical incandescent electric light bulb.
16. Elon Musk develops fields such as space exploration, renewable energy, and transportation. Other projects he has founded include PayPal, Neuralink, and The Boring Company.
17. The main developments of SpaceX include the development of reusable rockets, the launch of the Falcon Heavy rocket, and the successful launch and return of the Crew Dragon spacecraft with astronauts on board.
18. Tesla designs and produces electric vehicles, energy storage systems, and solar products.
19. Thomas Edison made significant contributions to the development of the electric world, including the invention of the incandescent light bulb, the phonograph, and the motion picture camera.
20. Elon Musk's goals related to space exploration include establishing a permanent human settlement on Mars and making space travel more accessible and affordable for everyone.

**Ex. 11 Translate into English:**

1. Одной из глобальных целей Илона Маска является раздача бесплатного интернета, и для решения этой задачи он уже запустил 60 спутников на орбиту Земли.
2. Производство практичных и недорогих автомобилей, которое организовал Генри Форд, позволило улучшить жизнь множества людей во всем мире.
3. Томас Эдисон был американским изобретателем, который получил мировой рекорд в 1093 патента. Кроме того, он создал первую в мире промышленную исследовательскую лабораторию.
4. Внедрив конвейерную сборку, Форд не только наладил массовый выпуск автомобилей, но и направил развитие промышленности по новому пути.
5. Конвергенция науки и бизнеса происходит тогда, когда достижения ученых ставятся на экономические рельсы и служат на благо людей.
6. Тесла — одна из тех компаний, которые заботятся о сохранении окружающей среды, предлагая экологически чистый вид транспорта, не уступающий автомобилям с двигателями внутреннего сгорания.
7. Эдисон был вынужден усовершенствовать коммерчески практичную, эффективную лампу накаливания после изобретения английским изобретателем Хамфри Дэви первой ранней электродуговой лампы в начале 1800-х годов.
8. Цель компании SpaceX уменьшить в несколько десятков раз затраты на полеты в космос.
9. Перед разработчиками Falcon 9 стояла непростая задача, им предстояло создать максимально простой, легкий, технологичный и при этом пригодный в дальнейшем для многоразового использования носитель, а самое главное, сделать его дешевым.
10. После нескольких неудач с гоночными автомобилями Генри Форд нашел инвесторов, которые поддержали его идею перейти на автомобили массового производства.

**Ex. 12 Learn the information about topical sentences. Then, create a plan of a text in Ex. 9 using topical sentences from each paragraph.**

A topic sentence usually makes some kind of claim, which will be supported with facts in the rest of the paragraph. Moreover, such a sentence hooks your reader and makes them want to keep reading. It's helpful to think of a topic sentence as a mini-thesis statement for your paragraph.

Topic sentences are also similar to short sentences in form, due to how it expresses a complete and understandable thought. A topic sentence has several functions in writing: it supports a thesis statement; it summarizes the content of a paragraph; and it gives the reader a glimpse of the subject to be tackled and how it would be discussed in the given paragraph. In most cases, readers look into the first few sentences of a paragraph to find out what it is about.

**Ex. 13** **Choose a commercial company, which is actively engaged in the promotion of science. Describe what the company does and how the company has managed to turn scientific research into a source of income (example: Boston Dynamics, Pfizer, Medtronic etc.). Prepare a short speech/presentation.**

Intel Corporation.

Intel invests significant resources in scientific research and has a long history of developing new technologies based on their research findings.

One way that Intel has turned scientific research into a source of income is by applying their research findings to develop new computer chips and other electronic components. For example, Intel's research on materials science has led to the development of new semiconductor materials, which have enabled the development of faster and more energy-efficient computer chips.

In addition to developing new products and technologies, Intel also collaborates with universities and research institutions to conduct joint research projects. These partnerships help to advance scientific knowledge and also provide Intel with access to new ideas and talent.

Overall, Intel's commitment to scientific research has been a key driver of their success as a company. By investing in research and turning scientific findings into practical applications, Intel has been able to remain competitive in the semiconductor industry and maintain its position as a leader in the field.

**WATCHING THE VIDEO**

Meet the inventor of the electronic spreadsheet

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

**Part 1 0.00-5.46**

**Before you watch**

**Ex. 1** Answer the questions:

1. What programs do you use for calculation on your computer?

I use a calculator, pivot tables, and scripts written in programming languages

1. Are you familiar with Microsoft Excel?

Yes, but I hate it

1. What tasks can Microsoft Excel be used for?

"It is used for a wide range of tasks, including performing various calculations, building models, or keeping track of reports. However, for understandable reasons, it is not as effective as more specialized software

**Ex. 2** **Match the words and word combinations and their Russian equivalents**

|  |  |
| --- | --- |
| 1. Perseverance   i | 1. набор текста |
| 1. trailblazing   j | 1. переписывать |
| 1. typesetting   a | 1. по запросу |
| 1. exhibit   f | 1. вычисление |
| 1. to transcribe   b | 1. система начисления заработной платы |
| 1. spreadsheet   h | 1. дополнение, приложение |
| 1. payroll system e | 1. оборудование |
| 1. on-demand   c | 1. электронная таблица |
| 1. computation   d | 1. настойчивость |
| 1. hardware   g | 1. новаторский |

**While you watch.** Answer the questions:

1. What are electronic spreadsheets?

electronic spreadsheets are computer programs that allow users to perform calculations, organize data, and create graphs and charts in a tabular format. They were invented by Bricklin and Bob Frankston in the late 1970s and revolutionized the world of business and finance by replacing paper-based manual calculations with automated, digital ones. Electronic spreadsheets are now used in a wide range of industries and professions, from accounting and finance to scientific research and project management.

1. What program is Dan Bricklin talking about?

Dan Bricklin is talking about the first electronic spreadsheet program he co-created with Bob Frankston called "VisiCalc". It was released in 1979 and was the first killer application for personal computers, allowing users to easily manipulate and analyze data in a tabular format. VisiCalc became wildly popular and helped to propel the adoption of personal computers in businesses and homes.

1. What prompted the software engineer to create it?

Dan Bricklin was inspired to create VisiCalc after he realized that the traditional process of doing financial calculations on paper was slow and prone to errors. As a Harvard Business School student in the mid-1970s, he found himself spending hours working on a case study that required him to create a five-year financial projection. Every time he made a change to the projection, he had to redo all the calculations by hand, which was time-consuming and error-prone.

1. What was the idea of Dan Bricklin to simplify calculations?

Dan Bricklin's idea to simplify calculations was to create a computer program that would automate the process of financial calculations and allow users to easily manipulate and analyze data in a tabular format. He saw the potential for personal computers to make this possible, and envisioned a program that would allow users to enter data into a grid-like structure and perform calculations on that data.

1. Which operating system predates all known Linux and Unix?

The operating system that predates all known Linux and Unix systems is called "Multics" (Multiplexed Information and Computing Service). It was developed in the mid-1960s by a collaboration of researchers from MIT, Bell Labs, and GE, with the goal of creating a powerful and reliable time-sharing operating system for mainframe computers.

**Part 2 5.46-11.45**

**Before you watch**

**Ex. 1** Discuss with your partner the following statements:

1. VisiCalc itself had a major impact on Apple and the acceptance of personal computers.

VisiCalc revolutionized the way people worked with financial data by automating the process of financial calculations and allowing users to easily manipulate and analyze data in a tabular format. This helped to pave the way for the widespread adoption of personal computers in business.

1. What we now think of as an "electronic spreadsheet", among other things, is highly interactive on a screen with pointing and scrolling, text and numbers are mixed, cells are named with letters and numbers, and there is no strict "table" with column headings.

In my opinion, the evolution of electronic spreadsheets to what we have today has been a significant development in the world of computing. The highly interactive nature of modern electronic spreadsheets allows users to easily manipulate and analyze data in real-time, which has made them an indispensable tool for businesses and individuals alike.

1. Many people use electronic spreadsheets for data storage and presentation (lists, planning, etc.) and don't use their calculation abilities.

In my opinion, it is a testament to the versatility and usability of electronic spreadsheets that they can be used for a wide range of purposes beyond just calculations. While their calculation abilities are undoubtedly powerful, the ability to store and present data in a structured, organized way is also incredibly useful for tasks such as planning, list management, and more.

**Ex. 2** Do you know what the words **in bold** mean? Look them up if necessary.

1. He showed me **mock-ups** that he'd make to figure out the placement on the page for the things for brochures that he was printing.
2. I wrote a **reference card** to act as documentation.
3. And then he would download test versions to a borrowed Apple II over a phone line using an **acoustic coupler**, and then we would test.
4. In June of 1979, our publisher announced VisiCalc to the world, in a small **booth** at the giant National Computer Conference in New York City.
5. It became pretty clear pretty fast that that was going to be too **tedious**.

**While you watch.**

What do you think is the main message of the author? Do you agree with the statement that you should take your unique backgrounds, skills and needs and build prototypes to discover and work out the key problems, and through that, change the world?

In my opinion, the main message of Dan Bricklin's TED Talk "Meet the Inventor of the Electronic Spreadsheet" is that innovation and progress can come from everyday people who identify problems and work to solve them using the tools and resources available to them. He highlights how the creation of the electronic spreadsheet was a product of his unique background, skills, and needs, and how it ultimately transformed the way people work with data.

I agree with the statement that people should take their unique backgrounds, skills, and needs and build prototypes to discover and work out key problems. This approach to problem-solving allows for creative thinking and innovation, as well as the potential to identify solutions that may not have been apparent before. By working to solve problems through prototyping and iteration, individuals can make meaningful contributions to their fields and even change the world, as Bricklin did with the invention of the electronic spreadsheet.

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