**2. Science and Crime**

**Before you start. Answer the questions:**

* What kinds of crime do you know?
* Can you give any examples of crimes in the field of science?
* How can crime be prevented? How can crime be eradicated?

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

|  |  |  |
| --- | --- | --- |
| Word | Transcription | Translation |
| historically distinguished | /hɪˈstɒrɪkli dɪsˈtɪŋgwɪʃt/ | исторически отличающийся |
| violation | /vaɪəˈleɪʃn/ | нарушение |
| considerable scale | /kənˈsɪd(ə)rəb(ə)l skeɪl/ | значительный масштаб |
| deliberate distortion of the truth | /dɪˈlɪbərɪt dɪsˈtɔːʃn ɒv ðə truːθ/ | преднамеренное искажение истины |
| severe condemnation | /sɪˈvɪə ˌkɒndɛmˈneɪʃən/ | жестокое осуждение |
| to be subjected to harsh measures | /tuː biː səbˈʤɛktɪd tuː hɑːʃ ˈmɛʒəz/ | подвергается жестким мерам |
| the theft of intellectual property | /ðə θɛft ɒv ˌɪntɪˈlɛktjʊəl ˈprɒpəti/ | кража интеллектуальной собственности |
| a trademark | /ˈtreɪdmɑːk/ | торговая марка |
| timeliness | /ˈtaɪmlɪnɪs/ | своевременность |
| simultaneously | /sɪmlˈteɪnɪəslɪ/ | одновременно |
| unscrupulous | /ʌnˈskruːpjʊləs/ | недобросовестный |
| unauthorized access to information | /ʌnˈɔːθəraɪzd ˈæksɛs tuː ˌɪnfəˈmeɪʃən/ | несанкционированный доступ к информации |
| forgery of output information | /ˈfɔːʤəri ɒv ˈaʊtpʊt ˌɪnfəˈmeɪʃən/ | подделка выходящей информации |
| unauthorized copying of confidential information | /ʌnˈɔːθəraɪzd ˈkɒpiɪŋ ɒv ˌkɒnfɪˈdɛnʃəl ˌɪnfəˈmeɪʃən/ | несанкционированное копирование конфиденциальной информации |
| fraudulent | /ˈfrɔːdjʊlənt/ | мошеннический |
| embezzlement of various types of goods | /ɪmˈbezlmənt əv ˈveəriəs taɪps əv ɡʊdz/ | растрата различных видов товаров |

**Ex. 2 Read the text and title the paragraphs**

1. **Diverse crime**

At present, crime covers all spheres of society: political, social, economic, including the sphere of science. Though science is a separate, historically distinguished social institution which function is to develop, store and systematize knowledge, criminality in this sphere is especially dangerous. Science is aimed at describing, explaining and even predicting real processes and phenomena based on the laws it discovers,any violation of the latter can have a considerable scale of destruction and negative consequences.

1. Fake results and deliberate distortion of truth

One of the most frequent violations in the scientific sphere is deliberate distortion of the truth. A researcher can make a mistake, this is normal in human nature. But you can not distort the truth on purpose. Falsifications of results made by scientists in order to get sensational results are regular and, being revealed, come across severe condemnation. So, the well-known South Korean expert in the field of stem cells cloning Hwan U Suk forged a report on one of his studies. The results of this study were published in 2005 by the journal Science. It sensationally reported that it was possible to get colonies, derived from stem cells from different donors and create a genotype identical to the donor one. Specially assembled at the Seoul National University to investigate Hwang’s laboratory activities, the commission concluded that these results, which attracted the attention of scientists around the world, were falsified. Hwang was immediately subjected to harsh measures – he received a two-year suspended sentence.

One more example is Jan Hendrik Shen. He was a German physicist who worked in the United States. For some time, his scientific work in the field of microelectronics brought Shen great fame, but in 2002, Shen was caught in multiple falsifications. Until then, Shen had received prestigious awards in Germany and the United States. His works, including those containing scientific falsifications, were published in many world-wide scientific journals. Many of them were recalled after the scandal. The scandal surrounding Shen's work has led to discussions in the scientific community about the degree of responsibility that should be borne by co-authors and reviewers of scientific journals when publishing works, especially regarding their review, ideally designed to identify all errors, clearly determine the value and originality of the work and filter out the work of fraudsters. Shen's infringement has shown that this system is far from perfect.

(c) Intellectual property as a victim of a crime

In addition, one of the frequent violations in the scientific sphere is the theft of intellectual property. The property in this case is nonmaterial (intangible) - for example, scientific ideas, trademarks (brands) or musical products. In this regard, the timeliness of innovations registration is very important for authors, since there are often disputes about the priority of an invention or a work created. If, for any reason, a thief of an idea or a piece of music had been able to publish or register it before the author did, then it would be extremely difficult to prove the priority of the latter even in case of direct borrowing or insignificant compilation. If the stolen intellectual property has been put through clever processing and extensive interpretation, it is practically impossible to prove the theft, due to the fact that some people call "to hang in the air", and it can be nominated by two or more people.

(d) Criminal competition

This situation is often encountered in the scientific sphere, where identical ideas are put forward by several scientists, sometimes simultaneously, independently of each other. Then the law discovery or the derived formula is named after these scientists - for example, the Bio-Savar-Laplace law or the Newton-Leibniz formula. Thus, the first side of the problem of unfair competition in the field of intellectual property is the relative difficulty in determining the priority of know-how creation.

Alexander Graham Bell is often credited with being the inventor of the telephone since he was awarded the first successful patent. However, there were many other inventors such as Elisha Gray and Antonio Meucci who also developed a talking telegraph. On June 11, 2002, the US Congress recognized that the primacy in this invention still belongs to the Italian Antonio Meucci, who filed for the corresponding patent in 1871, and also that Bell could potentially have access to Meucci's materials. However, Alexander Graham Bell made the inventions in other various fields.

(e) Computer crime

To date, computer crime has been widely spread around the world, science is no exception. The main types of crimes are:

• Сomputer virus infiltration

• Unauthorized access to information

• Forgery of output information

• Unauthorized copying of confidential information

The examples are fraudulent election results or embezzlement of various types of goods, by entering fake data into the program; falsification, manufacture or sale of forged documents, stamps, seals and forms; manufacture or sale of counterfeit credit or payment cards and other payment documents.

The significant development of electronic media expands the possibilities of the mass public opinion manipulating, false stereotypes imposing. There are new forms of crime associated with penetration into computer networks and their hacking by so-called hackers. Needless to say, like all others, scientist struggle to not to lose valuable data they have been collecting through decades.

(f) How to defend?

On the other hand, science itself may act as a remedy for modern criminals. So, cyber-crime science is an emerging area of study aiming to prevent cyber-crime by combining security protection techniques from Information Security with empirical research methods used in Crime Science. Information security research has developed techniques for protecting the confidentiality, integrity, and availability of information assets but is less strong on the empirical study of the effectiveness of these techniques. Crime Science studies the effect of crime prevention techniques empirically in the real world, and proposes improvements to these techniques based on this. Combining both approaches, Cyber-crime Science transfers and further develops Information Security techniques to prevent cyber-crime, and empirically studies the effectiveness of these techniques in the real world.

(g) There is positive hope

In fact, society develops in all spheres, and so does crime. However, the methods of crime combating are also developing, and there is a hope that technology and science will rather become helpers not for criminals, but for people who struggle against violation of laws.

**Ex. 3 Answer the questions:**

1. Why is crime in science so dangerous?

Science is aimed at describing, explaining and even predicting real processes and phenomena based on the laws it discovers,any violation of the latter can have a considerable scale of destruction and negative consequences.

1. What are the most important offenses in science? Give examples.

It’s may deliberate distortion of the truth - Hwan U Suk forged a report on one of his studies, theft of intellectual property – theft of trademark or idea, computer crimes - Сomputer virus infiltration

• Unauthorized access to information

• Forgery of output information

• Unauthorized copying of confidential information

1. In what cases is timeliness most important?

the timeliness of innovations registration is very important for authors, since there are often disputes about the priority of an invention or a work created

1. What are the most common types of computer crime?

Сomputer virus infiltration

Unauthorized access to information

Forgery of output information

Unauthorized copying of confidential information

1. Give examples of computer crimes.

The examples are fraudulent election results or embezzlement of various types of goods, by entering fake data into the program; falsification, manufacture or sale of forged documents, stamps, seals and forms; manufacture or sale of counterfeit credit or payment cards and other payment documents.

1. How can science protect itself against computer criminals?

There are 2 ways of science that aimed on crime defense – cyber-crime science and crime science

1. Is it always possible to prove the theft of intellectual property?

If the stolen intellectual property has been put through clever processing and extensive interpretation, it is practically impossible to prove the theft, due to the fact that some people call "to hang in the air", and it can be nominated by two or more people.

1. Give examples of when an invention was created by several scientists simultaneously and independently of each other.

for example, the Bio-Savar-Laplace law or the Newton-Leibniz formula.

1. What has the development of electronic media led to?

The significant development of electronic media expands the possibilities of the mass public opinion manipulating, false stereotypes imposing. There are new forms of crime associated with penetration into computer networks and their hacking by so-called hackers

1. What can you say about the scandal surrounding Jan Shen's work?

He was a German physicist who worked in the United States. For some time, his scientific work in the field of microelectronics brought Shen great fame, but in 2002, Shen was caught in multiple falsifications. Until then, Shen had received prestigious awards in Germany and the United States.

**Ex. 4 Mark these statements as True or False:**

1. Science is a social institution whose function is to disseminate knowledge. F
2. Scientific crimes cannot greatly affect society. F
3. People can be seriously punished for crimes in science. T
4. Deliberate distortion of the truth is one of the most common crimes in science. T
5. Computer crime has not penetrated into science yet. F
6. In the history of science there are known cases of data forgery. T
7. It is practically impossible to prove the theft of intellectual property. T
8. The US Congress recognized that the primacy in the invention of the telephone still belongs to Alexander Graham Bell. F
9. Hwang received a two-year suspended sentence after forging a report on one of his studies. T
10. The system of reviewing scientific publications is far from perfect. T

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

scientific falsifications – научные фальсификации

is credited - начисляется

the most frequent violations – наиболее частые нарушения

a remedy for modern criminals – спасение от современных преступников

protecting the confidentiality – обеспечивающий конфиденциальность

integrity and availability of information assets – целостность и доступность информации

filed for the corresponding patent – подача заявки на патент

the timeliness of innovations registration – своевременная регистрация инноваций

empirical research methods – эмпирические методы исследования

to propose improvements to crime prevention techniques – предложить методы улучшения борьбы с преступностью

combining both approaches – сочетание двух подходов

counterfeit credit or payment cards – поддельные кредитные карты

clearly determine the value and originality of the work – четкое определение ценности и оригинальности работы

fraudulent election results – подделка результатов выборов

put forward by several scientists – выдвинутые разными учеными

unfair competition in the field of intellectual property – недобросовестная конкуренция в сфере интеллектуальной собственности

come across severe condemnation – сталкиваться с осуждением

new forms of crime associated with penetration into computer networks – новые формы преступлений связанных с проникновением в компьютерные сети

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

|  |  |
| --- | --- |
| **1.** Computer crime D | **a.** …is one of the types of computer crime. |
| **2.** Deliberate distortion F | **b.** …the theft of the idea of an invention or model. |
| **3.** An example of theft of intellectual property may be B | **c.** …is an offense involving automated processing of data or data transfer. |
| **4.** Unauthorized copying of confidential information C | **d.** …is the process of introducing a malicious program to disrupt a PC. |
| **5.** The introduction of a computer virus A | **e.** …transfers and further develops Information Security techniques to prevent cyber-crime |
| **6.** Cyber-crime Science E | **f.** …of the truth is punishable. |
| **7.** The property H | **g**. …expands the possibilities of the mass public opinion manipulating, false stereotypes imposing. |
| **8.** The significant development of electronic media G | **h.** …is intangible - for example, scientific ideas, brands or musical products. |

**Ex. 7 Fill the gaps**

|  |
| --- |
| *Computer crime the theft of intellectual property cyber-crime confidentiality falsification hacker economic global confidential*  *authorized crime prevention* |

1. At present, crime covers all spheres of society: political, social, **ECONOMIC**, including the sphere of science.
2. **Computer crime** is an offense involving automated processing of data or data transfer.
3. Laws and theorems can be signed by two names, when it is impossible to know who first came to the result. It is an example of **the theft of intellectual property**
4. A high level of crime is one of the main **global** problems.
5. A **hacker** is someone who seeks to breach defenses and exploit weaknesses in a computer system or network.
6. **Crime prevention** is the attempt to reduce and determine crime and criminals.
7. **Falsification** of food products is most often carried out by giving them some of the most typical features.
8. Internet **confidentiality** costs organizations, companies and governments billions of dollars each year.
9. Data is **authorized** when only those people who are **confidential** to access it can do so.
10. Passwords, encryption, authentication, and defense against penetration attacks are all techniques designed to ensure **cyber-crime**

**Ex. 8 Translate into English:**

1. Термин "компьютерная преступность" впервые появился в американской, а затем другой зарубежной печати в начале 60-х годов. The term "computer crime" first appeared in the American and then other foreign press in the early 1960s.
2. Существуют определенные отрасли науки, направленные на борьбу с преступностью.

There are certain branches of science aimed at combating crime.

1. Очень важно проверять научные достижения, чтобы избежать умышленного искажения истины. it is very important to verify scientific advances to avoid intentional distortion of the truth.
2. Ученые до сих пор работают над улучшением методов борьбы с преступностью.

Scientists are still working to improve methods of fighting crime.

1. Преступники все больше пользуются новыми достижениями науки и техники. Criminals are increasingly taking advantage of new advances in science and technology.
2. В истории науки нередко бывали случаи, когда независимо друг от друга ученые приходили к одному и тому же результату. In the history of science, there have often been cases in which scientists independently of one another have arrived at the same result
3. Общество до сих пор не может договориться о том, кто из великих ученых положил начало радиовещанию. Society still cannot agree on which of the great scientists started radio broadcasting.
4. Понятие «интеллектуальная собственность» до конца ХХ века четко не формулировалось и использовалось юристами и экономистами только в качестве теоретических рассуждений. The concept of "intellectual property" until the end of the twentieth century was not clearly formulated and was used by lawyers and economists only as theoretical reasoning.
5. С активным развитием интернета и социальных сетей сталкиваться с нарушениями права собственности на текстовый, фото и видео контент приходится все чаще. With the active development of the Internet and social networks, violations of property rights to text, photo and video content are becoming more and more frequent.
6. Авторские права возникают автоматически при создании объекта. Copyrights arise automatically when an object is created.

**Before you start**

“Standing on the shoulders of giants” is a metaphor that means, "Using the understanding gained by major thinkers who have gone before in order to make intellectual progress".

It is a metaphor of dwarfs standing on the shoulders of giants (Latin: nanos gigantum humeris insidentes) and expresses the meaning of "discovering truth by building on previous discoveries". This concept has been traced to the 12th century, attributed to Bernard of Chartres**.** Its most familiar expression in English is by *Isaac Newton* in 1675: "*If I have seen further it is by standing on the shoulders of Giants.”*

In 2017, Stephen Hawking stated: "Each generation stands on the shoulders of those who have gone before them, just as I did as a young PhD student in Cambridge, inspired by the work of Isaac Newton, James Clerk Maxwell and Albert Einstein."

Whom can you call a “giant on whose shoulders stands the science” that you are currently studying?

**Ex. 9 Match the words and their synonyms:**

|  |  |
| --- | --- |
| 1. to allege e 2. to launch i 3. self-driving g 4. plagiarism m 5. attributed d 6. ancestor a 7. to epitomize l 8. subsided f 9. business-focused c 10. forerunner j 11. to file n 12. lawsuit h 13. guilty b 14. remote k | 1. forefather 2. culpable 3. market-oriented 4. assigned 5. to claim 6. relegate 7. driverless 8. litigation 9. to initiate 10. precursor 11. distant 12. to personify 13. piracy 14. Abated |

The self-driving cars personify a jump to new reality and assigning and launching programs of reducing ancestors as an ICE cars.

After 6 months since litigation was initiated, The discussion of a lawsuits of this crime finally subsided because the culpable was punished

**Ex. 10 Read the text**

Stolen innovations and inventions

In the past 10 years alone, a number of multibillion-dollar companies, such as Uber and Facebook, have wound up being embroiled in IP scandal after IP scandal, constantly testing the power of original ideas – and whether or not any inventor truly has them in the first place.

On February 23, 2017, it became known about a lawsuit filed by Waymo in Federal court in San Francisco. Documents provided by the Waymo team allege that former project employee Anthony Levandowski stole the startup's technology and patents related to the development of self-driving cars. After that, he, along with several other former project employees, founded the startup Otto, which also created self-driving cars and trucks. Way Waymo, before leaving the company, Levandowski managed to copy more than 14 thousand confidential files, which helped him create a new project. In August 2016, the startup Otto was acquired by Uber. Already in September 2016, Uber officially launched transportation on self-driving cars on the streets of American Pittsburgh. Although self-driving cars have been tested on city streets for 18 months, the Waymo team is confident that the stolen technology has helped Uber develop a new platform. According to Waymo employees, the company managed to earn more than $500 million on stolen property. "Waymo specialists spent seven years developing and creating a laser system to help drive a driverless car, but the same work took Otto employees nine months," they say. At the same time, Google is one of Uber's investors. If found guilty, Lewandowski faces up to 10 years in prison and a fine.

The precedent described above occurred recently and is far from the only one. Cases of theft of inventions, technologies, and research have occurred and continue to occur. We’re beginning to see that the most famous inventors of all time, some credited with inventing major products such as the lightbulb and the radio, merely stole their ideas from other people. Take a look!

The **lightbulb**’s story showcases the often complicated process of the invention, and how, more often than not, the credit isn’t given to those who deserve it. It is perhaps the most famous invention of all time, and its symbol actually epitomizes the concept of an idea. While Thomas Edison was indeed a brilliant inventor, he didn’t invent the lightbulb. Rather, along with a number of other inventors who you’ve likely never heard of, Heinrich Goebel was presumably the one who invented it, having tried to sell the device to Edison in 1854. Edison saw no use for it then, but shortly after Goebel’s death, he bought the patent from his widow at an extremely low price and credited himself with coming up with the invention.

125 years ago, Russian engineer Alexander Popov demonstrated a device he created for remote communication - **radio**. This invention was one of the greatest in the history of science and technology — ultimately, it was the forerunner of the current information society, making ultra-fast news delivery possible for the first time. The first sphere of application of these inventions was the Russian Navy. At first, with the help of Popov and Rybkin's devices, they detected the approach of thunderstorms and storms - and quite successfully. And in 1902, on the Black sea, Popov managed to establish radio communication between coastal services, lighthouses and ships in the coastal zone from Odessa to Sevastopol. Popov made no secret of his invention and even published a description of it. And about a year later, the Italian inventor, the Marquis Guglielmo Marconi, filed a patent application for a very similar device. Is it plagiarism or simultaneous insight? In the history of science, it is often both. Marconi was a talented radio engineer and, importantly, was able to attract patrons to his experiments. It was he who in November 1897 built and equipped the world's first stationary radio station — near the British coast, on the Isle of Wight in the English channel. Of course, this is also a major and spectacular historical event, and the merits of Marconi can not be understated. But, in fact, the arrangement of a radio station on the Isle of Wight is associated with the modernization of Popov's invention.

The invention of **television** cannot be attributed to one person. There are many television pioneers, but John Logie Baird, Charles Francis Jenkins, and especially Philon Taylor Farnsworth and Vladimir Zworykin made important contributions in the early 20th century. Although the concept of having something that transmits moving images existed long before the invention of the first TV, several individuals and corporations competed around the world to provide a device that replaces the previous technology.

As a teenager, Philo Taylor Farnsworth realized that emerging electronic technology could scan images more accurately and much faster than any mechanical tool. At the age of 21, he invented the first fully functional electronic television system. He successfully demonstrated the first electronic television in San Francisco, which can scan images using an electron beam to create and display an image. The first image transmitted by Farnsworth was a simple straight line. It is the direct ancestor of modern television. Farnsworth further improved the device in 1929, eliminating the motor-generator, so that there were no mechanical parts in the TV. In the same year, he was able to transmit the first live human images using this TV, showing a 3.5-inch image of his wife. Meanwhile, Russian engineer Vladimir Zworykin has filed several patents for television system modules. He built a television transmitting and receiving system using cathode-ray tubes. Working with the American radio Corporation (RCA), Zworykin developed several components that accelerated the development of televisions in the early 1930s. His notable inventions include charge storage type tubes and a new camera tube called an iconoscope, which produced a much stronger signal than previous mechanical televisions.

The debate about which of the two scientists was the first, has not subsided to this day. Early computer systems were primarily command-line driven, meaning you needed to know all of the inputs to type into a keyboard to tell the machine what you wanted it to do. Many people credit Microsoft Windows with introducing the world to the **Graphical User Interface** (GUI), where you can use a mouse to click on-screen objects to tell it what to do, making the whole process much more user-friendly. However, a lot of the progress in GUI development happened much earlier. A pioneer was Douglas Engelbart, who demonstrated an Operating System with a mouse pointer in 1968. This idea was then taken up by Xerox, who released their Alto computers which were the first with a mouse and GUI. As legends go, Apple’s Steve Jobs saw an Alto while visiting Xerox’s PARC research center and inspired him to make sure the Apple Macintosh would have a GUI, the first mass-market GUI computers. This then paved the way for the more business-focused Microsoft Windows Operating System, which took the idea truly mainstream.

In conclusion, it is necessary to say the following. There is an expression “history is written by winners”. But in some cases, it is written by the lucky ones — especially when human civilization begins to sort out the merits of people. Often, important breakthroughs made by little-known people set the stage for other people to claim the discoveries for themselves. In other cases, these breakthroughs simply go unnoticed. And our task is to know the truth in tribute to the innovators.

**Ex. 11 Match the 2 parts of the sentence:**

|  |  |
| --- | --- |
| 1. Zworykin’s notable inventions include charge storage type tubes and a new camera tube called an iconoscope… | 1. …meaning you needed to know all of the inputs to type into a keyboard to tell the machine what you wanted it to do. |
| 1. Although the concept of having something that transmits moving images existed long before the invention of the first TV,… | 1. …which can scan images using an electron beam to create and display an image. |
| 1. This then paved the way for the more business-focused Microsoft Windows Operating System,… | 1. …which also created self-driving cars and trucks. |
| 1. Early computer systems were primarily command-line driven,… | 1. …which produced a much stronger signal than previous mechanical televisions. |
| 1. Levandowski, along with several other former project employees, founded the startup Otto,… | 1. …which symbolizes actually the concept of an idea. |
| 1. Philo Taylor Farnsworth successfully demonstrated the first electronic television in San Francisco,… | 1. …several individuals and corporations competed around the world to provide a device that replaces the previous technology. |
| 1. The lightbulb is perhaps the most famous invention of all time,… | 1. …but the same work took Otto employees nine months. |
| 1. Waymo specialists spent seven years developing and creating a laser system to help drive a driverless car,… | 1. …which took the idea truly mainstream. |

**Ex. 12 Write a retelling of the text you have read in 10-15 sentences. Exchange your retellings with a classmate. Mark in the received text with colors: green - important information, yellow - has no semantic load, red - extra information.**

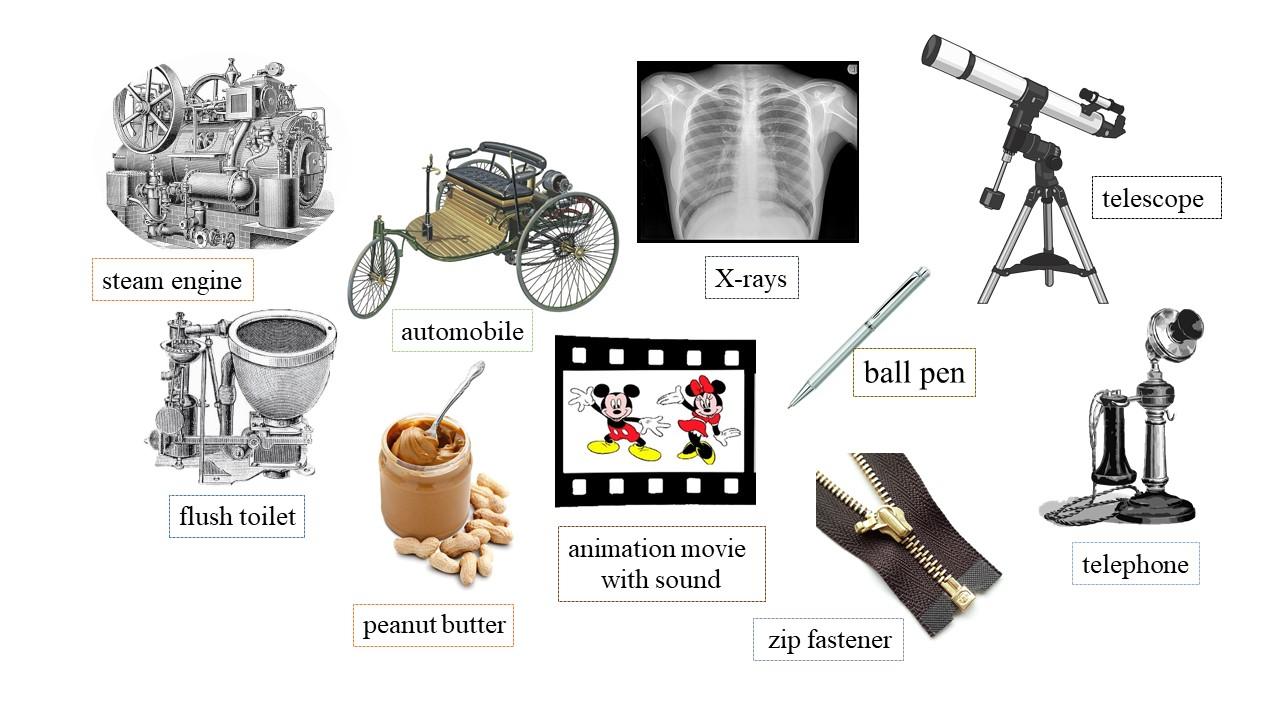
This text is about a problem of stolen innovations and inventions. There are some examples of stolen ideas.

First is invention of **lightbulb. So Tomas Edison in fact, stole it’s idea from Genrich Gebel and patented it is his own. More specifically, he bought this patent for very low price.**

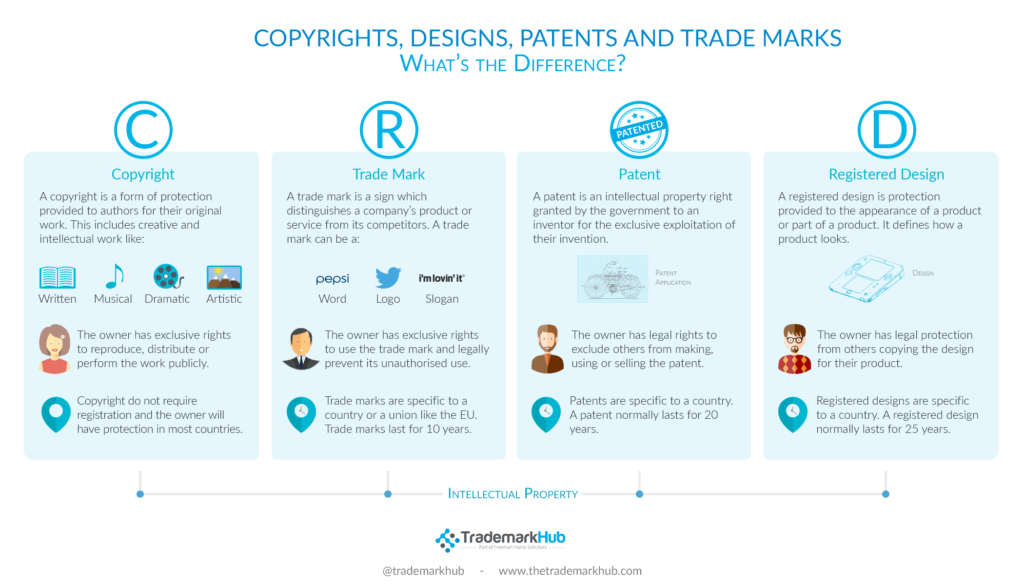
**Also there is a story of television. In fact, nobody knows who was a person which invented a television.** There are many television pioneers, but John Logie Baird, Charles Francis Jenkins, and especially Philon Taylor Farnsworth and Vladimir Zworykin made important contributions in the early 20th century. **It was a situation when** individuals and corporations competed around the world to provide a device that replaces the previous technology.

In addition one of the recent examples is a stolen patent of self-driving cars, provided by the Waymo and stolen buy Otto due to Entony Levandovsky – ex-employee of Waymo and founder of Otto. Moreover, in 2016 UBER bought the Otto and became a part of this despite. Finally, there is important idea in the text. However, many inventions or ideas of little-known people may be the stage for other people to claim the discoveries for themselves and it’s important to know the truth in tribute to the real innovators.

**Ex. 13 Below are some more examples of significant stolen ideas. Choose one of them or find your own on the Internet and create a short presentation about the story of these inventions and the crime around them.**

****

**Ex. 14 What are the four main types of Intellectual property? What are their features? Give real-life examples of each type of IP.**



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**Part 1 0.00 - 6.33**

**Before you watch**

**Ex. 1** Read the short article and answer the questions

**Hinkley groundwater contamination**

In 1952, the Pacific Gas and Electric Company (PG&E) installed a compressor station near the town of Hinkley in San Bernardino County, CA part of a gas pipeline system linking Texas to California. Since then, the company has used a carcinogenic chemical compound named chromium-6 as a corrosion inhibitor in its cooling system. The contaminated water was discharged into unlined pools, thus leaking to the aquifer serving Hinkley’s residents water needs. The leakage occurred (at least) from 1952 to 1972, the year PG&E lined the discharging pools. However, it was not until 1977 that the California state passed a Law regulating the use of chromium-6 and limiting its concentration in water to 50 µg/L. The residents of Hinkley filed a successful lawsuit against PG&E in which the company paid $333 million— the largest settlement ever paid in a direct-action lawsuit in U.S. history. The legal case, dramatized in the 2000 film Erin Brockovich, became an international cause.

Answer the following questions:

1. What do you think were the consequences of the PG&E company's actions?
2. Do you know of similar cases in your country?
3. How should the state protect people from the negative effects of industrial production?
4. What examples do you know of science being used for harmful purposes?

**Ex. 2** Match the words and word combinations (numbers) and their Russian equivalents (letters).

|  |  |
| --- | --- |
| 1. environmental injustice | 1. обманывать |
| 1. to be exposed to | 1. высмеивать |
| 1. to cheat | 1. экологическая несправедливость |
| 1. to orchestrate | 1. подвергнуться воздействию |
| 1. cover-up | 1. организовывать |
| 1. to ridicule | 1. обратиться (к кому-то с чем-то) |
| 1. to reach out to | 1. сокрытие, прикрытие |
| 1. disregard | 1. в отличие от |
| 1. to screw up | 1. раскрыть, обнажить (правду) |
| 1. opposed to | 1. испортить, напортачить |
| 1. to uncover | 1. пренебрежение, неуважение |

**While you watch**

**Ex. 1 Mark these statements as true or false:**

1. Lead is a potent neurotoxin which is harmful to people.
2. There was conduct citywide testing to prove that Flint's water was indeed contaminated.
3. No fatalities were recorded from the consequences of the Flint's accident.
4. Flint received monetary compensation for healthcare, nutrition, education and overhauling their water infrastructure.
5. Despite being publicly known throughout the country, Flint's case did not come up for consideration by the President of the USA.
6. A local pediatrician found that cases of childhood lead poisoning did not increase in Flint during the crisis.
7. Several public experts drew attention to the problem and it helped flint residents get a state level trial.

**Part 2 6.33 - 11.41**

**Before you watch**

**Ex. 1** Comment on the quote. What does it mean?

“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”― **Isaac Asimov**

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

1. Palchinsky **implored** engineers to look at the economic, political and social consequences of their actions.
2. But **to denounce** this idea, this possibility is so completely so that you can protect research funding.
3. You'll never completely change organizational cultures, or **imbibe** **mindsets** in students and professionals to look at their work as a public good.
4. There is also a growing culture of **disengagement** between engineering students and the public.
5. And Palchinsky repeatedly got in trouble for his radical honesty and **willingness** to point out major flaws in the Soviets' mindless pursuit of rapid industrialization.
6. There are real and sometimes very painful consequences of **speaking up**.
7. But where are the discussions on ethical decision-making, or building character, or **discerning** right from wrong?

**While you watch.** Comment on the following opinions. Do you agree or disagree with these opinions?

1. Palchinsky believed that it was important to pay attention to the economic, political, and social consequences of their actions; in other words, they needed to be more socially oriented.
2. Palchinsky's view on technocrats is very different from one that is still very popular, still very common -- that of a dispassionate researcher working in his ivory tower lab, or a nerdy engineer working in his cubicle.
3. If you think, you have to get involved in something, even if it's an emergency, try finding an activist group or an NGO, and obtain the full support of the academic community -- whatever that means -- before you get involved.
4. Our education system today is focused more on creating what ex-Yale professor Bill Deresiewicz calls "excellent sheep" -- young people who are smart and ambitious, and yet somehow risk-averse, timid, directionless and, sometimes, full of themselves.

**Part 3 11.41 - 14.19**

**Before you watch**

**Ex. 1** Read a short note about “Five Fingers of the Scientific Method”.

In the twenties the late Dr. Glenn Frank, an eminent social scientist, developed a new statement of the scientific code, which has been referred to as the “Five Fingers of the Scientific Method.” It may be outlined as follows: find the facts; filter the facts; focus the facts; face the facts; follow the facts.

The facts or truths are found by experimentation; the motivation is material. The facts are filtered by research into the literature; the motivation is material. The facts are focused by the publication of results; again the motivation is material. Thus the first three-fifths of the scientific method have a material motivation. It is about time scientists acknowledge that there is more to the scientific convention than the material aspect. Returning to the fourth and fifth fingers of Dr. Frank's conception of the scientific method, the facts should be faced by the proper interpretation of them for society. In other words, a scientist must assume social responsibility for his discoveries, which means that he must have a moral motivation. Finally, in the fifth definition of the scientific method, the facts are to be followed by their proper application to everyday life in society, which means moral motivation through responsibility to society.

Do you agree with these statements? Which of the five stages do you consider the most important?

**Ex. 2** Translate the following words

|  |  |  |
| --- | --- | --- |
| 1. hold onto | 1. indifference | 1. mankind |
| 1. virtue | 1. controversy | 1. compassionate |
| 1. tremendous | 1. savior | 1. strive to |
| 1. fostering | 1. folk | 1. to master |

**While you watch.** Tick the items Siddhartha Roy mentions about 21-st scientist and his qualities:

1. Awareness of the enormous power his knowledge and decisions have
2. Developing his moral courage
3. service to the community in several fields of science
4. Service to the community
5. Does not work for a long time to develop skills
6. Instilling a public-focused mindset
7. Be easy to manage
8. Understanding that our ultimate loyalty is to society and the entire plane

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