**Lesson 2**

***Grammar***

***see Grammar Reference to the Module p.43-44***

***Ex.8 - Work with a partner. Add the correct prepositions to the verbs and use them in your own examples. Use Passive construction:***

***e.g.*** to rely **on** –a person to be relied on

to follow \_\_\_, to deal \_\_\_, to speak \_\_\_, to object \_\_\_, to depend \_\_\_, to refer \_\_\_, to influence \_\_\_, to work \_\_\_

***Ex. 9 - Translate into Russian:***

1. The invention of an internal combustion engine was followed by the appearance of a motor car as we know it today.
2. The improvement of our working conditions and life is influenced by the achievements of scientific and technological progress.
3. International cooperation, especially in the field of space and science, may be spoken of as a long-standing tradition.
4. Lead is very slightly acted upon by the oxygen of the air.
5. In mechanics the study of kinematics is followed by the study of dynamics.
6. It is quite evident that not every experiment can be relied upon.

C:\Users\УЛК\Desktop\Новая папка\рис.png***Ex.10 - Translate into English:***

1. На развитие физики значительно повлияло открытие радиоактивности.
2. На любой летательный аппарат действуют аэродинамические силы.
3. Против этих условий будут возражать другие ученые.
4. О новых разработках в области сверхпроводимости много пишут.
5. В механике за изучением кинематики следует изучение динамики.
6. За работами Циолковского последовал целый ряд очень важных работ в области космонавтики.

** Watch the video “A History of Space Exploration” and say what events happened in 1961, 1969, 1977, 1986, 1998, 2003, 2010, 2012.

***Reading***

***Ex.11 - Read and translate the following international words from the text “Why Should We Explore Space?”***

satellite [ˈsætəlaɪt], extraterrestrial [ɪkstrtəˈrestrɪəl], robotic [rəʊˈbɒtɪk], commercial [kəˈmɜːʃəl], telecommunication [ˈtelɪkəmjuːnɪˈkeɪʃn], prestige [presˈtiːʒ], nation [neɪʃn], strategic [strəˈtiːʤɪk], colonization [kɔlənaɪˈzeɪʃn], permanent [ˈpɜːmənənt], autonomous [ɔːˈtɔnəməs], interplanetary [ɪntəˈplænɪtərɪ], Universe [ˈjuːnɪvɜːs], astronaut [ˈæstrənɔːt], meteorology [miːtjəˈrɔləʤɪ], individual [ɪndɪˈvɪdjʊəl], Saturn [ˈsætən], Uranus [jʊˈreɪnəs], Neptune [ˈnɛptjuːn], Earth [ɜːθ], Mars [mɑːz], Venus [ˈviːnəs], Mercury [ˈmɜːkjʊrɪ], Copernicus [koʊˈpɜːrnɪkəs], Galileo Galilei [ɡaliˈlɛːo ɡaliˈlɛi]

***Ex.12 - Read and learn the pronunciation of the words from text “Why Should We Explore Space?”***

Wonder [ˈwʌndə], wandering [ˈwɔndərɪŋ], ancient [ˈeɪnʃənt], venture [ˈvenʧə], eternally [ɪˈtɜːnəlɪ], reconnaissance [rɪˈkɒnɪs(ə)ns], habitable [ˈhæbɪtəb(ə)l], celestial [sɪˈlestjəl], rover [ˈrəʊvə], species [ˈspiːʃiːz], equation [ɪˈkweɪʃn], outweigh [aʊtˈweɪ], probe [prəʊb], suit [sjuːt], crew [kruː], settlement [ˈsetlmənt], launch [lɔːnʧ]

***Vocabulary:***

|  |  |
| --- | --- |
| to gaze (v) –вглядываться | to suit (v) – подходить, соответствовать, быть пригодным |
| to wonder (v) – интересоваться, желать знать | rather than - скорее чем; не столько ... сколько |
| wandering - мерцающий | prominent (adj) – выдающийся |
| venture (v) - отважиться, рискнуть | to result in/from (v) – приводить к, иметь результатом/ являться результатом |
| cradle (n) - колыбель | to figure out (v) – вычислять, понимать, постигать |
| eternally (adv) - постоянно | to manage to do (v) – суметь сделать что-либо |
| reconnaissance (n) – разведка, расследование | to overweigh (v) – перевесить, оказывать большее значение |
| habitable (adj) – пригодный для жилья | profound (adj) – основательный, глубокий |
| essential (adj) – необходимый, непременный | to replenish (v) – пополнять |
| extraterrestrial (adj) - внеземной, находящийся за пределами Земли | to commit oneself to (v) – посвящать себя чему-либо |

*«The Earth is the cradle of the mind-but   
one cannot eternally live in a cradle».   
K. Tsiolkovsky*

***Ex. 13 – Read the text and be ready to discuss it***

**Why Should We Explore Space?**

People have gazed up at the night sky for thousands of years and wondered what the countless wandering points of light were. Improved technology means we can observe and explore further into the Universe. Just as ancient explorers travelled across uncharted lands and oceans to see what was there, modern explorers venture into space. By studying space, scientists can discover what is out there, find out how the Universe began, and learn more about Earth.

**Space exploration** is the ongoing discovery and exploration of celestial structures in outer space. While the study of space is **carried out** mainly by astronomers with telescopes, the physical exploration of space is conducted both by unmanned robotic probes and manned spaceflight. Spaceflight is also used in commercial activities like space tourism and satellite telecommunications, reconnaissance and other earth observation satellites. Space stations and manned spacecraft in orbit are also **satellites**. Many space missions are more suited to telerobotic rather than crewed operation, due to lower cost and risk factor. Outer planets such as Saturn, Uranus and Neptune are too distant to reach with current crewed spaceflight technology, so **scientists** suggest that telerobotic probes (landers and rovers) should be the only way **to explore** them.

There are many reasons for space exploration. The most important reasons are advanced scientific research, national prestige, unity of different nations, development of military and strategic advantages and the interest of humans to learn more about outer **space**. It is **essential** that space exploration should give people an **opportunity** to discover new, habitable worlds, which could allow our species to survive beyond the lifespan of this planet. Space colonization would be the **permanent** autonomous human settlements outside Earth on extraterrestrial objects such as Moon or Mars.

Space research has a long history and is based on the works of prominent scientists from all over the world. Galileo Galilei and Nicolaus Copernicus were the first who wanted to reach out for the stars. But only in the XX century thanks to the revolutionary works of Konstantin Tsiolkovsky people realized that interplanetary travel could be a possibility. Without ever launching a single rocket himself, Tsiolkovsky was the first **to figure out** all the basic equations for **rocketry**. His ideas were followed by a number of very important works in the field of astronautics, which in its turn resulted in creation of powerful spacecraft, capable of moving into and out of gravitational fields and even staying in the orbit for a long time.

One of the most ambitious and successful project of this kind is the International Space Station (ISS) which has been in **continuous** use for 15 years. Its first component was launched into orbit in 1998. But before the ISS could serve as a home beyond Earth, it had to be built. ISS components were launched by Russian Proton and Soyuz rockets as well as American space shuttles. There were many interconnected parts from so many countries that it was impossible to predict how they would interact. It was also very important that all of these elements should fit together and work exactly as planned. The engineers managed to fulfil their task. The station works as if it was a unique complex assembly and serves as a microgravity and space environment research laboratory in which crew members **carry out** **experiments** in biology, physics, astronomy, meteorology, and other fields. The station is designed for testing space craft systems and equipment required for missions to the Moon and Mars.

You might ask, why do people spend so much time, investments and effort on space research when there are so many problems on Earth that haven’t been solved yet. It is because all the possible benefits outweigh the costs that governments and companies spend on this industry. Future space exploration could have a profound effect on humanity. A better understanding of our place in the universe could change long standing beliefs. Space mining could help replenish Earth resources or provide new minerals. Colonization of other worlds might even save humanity itself. So, in the end, we should commit ourselves to it, because it can benefit us, as individuals and as species, in unexpected ways.

***Ex.14 - Find the sentences with the Subjunctive Mood construction in the text.***

***Ex.15 - Based on the information from the text and your own knowledge, decide whether these statements are true (T), false (F), or the information is not given (NG).***

1. Space exploration means investigation of interplanetary or interstellar space, its properties, biology and the bodies that exist within it.
2. Space research is carried out by astronauts during their missions.
3. Space travel without science is tourism.
4. Outer planets like Venus and Jupiter could be reached with current crewed space flight technology.
5. Tsiolkovsky was the first to launch a rocket into space.
6. The ISS is an international endeavor (попытка, стремление) of global collaboration, with more than 220 astronauts from 17 countries visiting the ISS since 2000.
7. The ISS was designed for testing space craft systems and equipment for missions to the Moon and Mars.
8. The possible benefits from exploring space outweigh the risks and money spent on this industry.

***Ex. 16 - Answer the questions.***

1. How is the space exploration carried out?
2. Why are many space missions suited to telerobotic?
3. What are the most important reasons for space exploration?
4. What do you know about Konstantin Tsiolkovsky?
5. Why is the ISS one of the most ambitious and successful projects?
6. What was the ISS designed for?
7. How could future space exploration benefit people?

***Ex. 17 - Work with a partner. Take turns to ask and answer the questions, using information from the text. Use the question words like what, which, how, why, who etc.***

Example:

* Question: What does the term “space exploration” refer to?
* Answer: It refers to…

***Ex. 18 - Find terms/words in the text corresponding to the following definitions.***

1. a person who studies the physical world (n)
2. man-made device put in orbit round a planet (n)
3. travel into or through an area in order to learn about it (v)
4. a test, trial; an act or operation for the of discovering something unknown or of testing a principle, supposition(n)
5. to do or complete something, especially that you have said to do(v)
6. the area beyond the earth around the planet and stars (n)
7. to find something by thinking, to find a solution for, calculate (v)
8. the branch of science that deals with rockets and rocket propulsion (n)
9. necessary, most important (adj)
10. an occasion or situation that makes it possible to do something that you want to do, or the possibility of doing something (n)
11. lasting for a long time or forever (adj)
12. profit, gain (n)
13. sort, type (n) (pl. unchanged)

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|  |
| --- |
| Carry out scientist explore experiment be created satellite presence discover can exist not find analysis send |

(1) \_\_\_\_\_\_ have already (2) \_\_\_\_\_\_ (3) \_\_\_\_\_\_ (4) \_\_\_\_\_\_ the surface of Mars, and (5) \_\_\_\_\_\_ (6) \_\_\_\_\_\_ to see if they can (7) \_\_\_\_\_\_ any signs of life. So far, they (8) \_\_\_\_\_\_ any, but the (9) \_\_\_\_\_\_ of rocks from Mars has confirmed that they (10) \_\_\_\_\_\_ by the (11) \_\_\_\_\_\_ of water and wind. In other words, life (12) \_\_\_\_\_\_ in the past.

***\*time consuming exercise***

***Ex. 20 - Combine the two parts from the table to make one sentence:***

|  |  |
| --- | --- |
| 1. Space exploration | 1. are more suited to telerobotic rather than crewed operation due to lower cost and risk factor. |
| 1. Many space missions | 1. for testing space craft systems and equipment. |
| 1. It is essential that | 1. a microgravity and space environment research laboratory. |
| 1. Tsiolkovsky’s ideas were | 1. space exploration should give people an opportunity to discover new, habitable words. |
| 1. The ISS serves as | 1. is the ongoing discovery and exploration of celestial structures in outer space. |
| 1. The station is designed | 1. because the benefits of it outweigh all the possible risks and money spent in this field. |
| 1. We should explore space | 1. followed by a number of very important works in the field of astronautics. |

***Ex. 21 -******Highlight all the benefits of space exploration mentioned in the text. Start to fill in the table below, giving reasons for and against space research. Add some more after watching the movie and listening to audio files:***

|  |  |
| --- | --- |
| Pros | Cons |
|  |  |

** ***Ex.22 –***

***a) Watch the video:***

***Before watching:***

***Predicting content – you will watch a movie about space exploration.***

***With a partner, decide which topic a presenter will probably NOT talk about. Circle your answer.***

* + - 1. Survivals – humanity should colonize space
      2. Aliens – we are not alone in the universe
      3. Inventions made in space are valuable
      4. Asteroids are of great danger to our planet.
      5. Remote controlled machines are preferable in space exploration.
      6. Raw materials – space mining is very important.

***After watching:***

***With your partner take turns asking and answering the questions.***

Why are asteroids dangerous for our planet?

Why does space exploration matter? (Give 5 reasons based on the movie)

What reasons against space exploration are mentioned in the movie?

***Note:*** nitinol - нитинол

***b) Continue to list advantages (good things) about manned space exploration and possible disadvantages in the table given after the text p.11***

***Reference*:**  <https://en.wikipedia.org/wiki/Nickel_titanium>

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***English Vocabulary:***

* An **orbit** - the path an object in space takes while it moves. Generally, objects in space such as planets and comets take elliptical **orbits** around larger objects, such as a star.
* An **asteroid** - a combination of rocks and iron that is too small to form a planet. There are many **asteroids** that orbit the sun between the orbits of Jupiter and Mars.
* A **comet** - a small body of gas and ice orbiting around the solar system. We can see the tail of the **comet** because it is the sun heating and melting the ice. The most famous **comet** is Halley's Comet which is visible from Earth every 75-76 years.
* A **star** - made up of clouds of gas and dust. Many people love to go outside at night and count the **stars**, but there are so many that it is impossible for one person to count them all.
* A **constellation** - a group of bright stars that form shapes or 'pictures' in the sky. **The Southern Cross** is a constellation in the Southern hemisphere that points towards the South Pole. **The Big Dipper** is a constellation in the Northern hemisphere that is in the shape of a ladle or a large spoon.
* The **sun** - the star in the middle of our solar system. The eight **planets** in our solar system all orbit around the sun. The closest planet to the sun is **Mercury** and then comes **Venus**. The planet that we live on is called **Earth**. It is the third closest planet to the sun in our solar system. **Mars** is the fourth planet from the sun. It is a small red planet, named after the roman god of war. **Jupiter** is the largest of all the planets in the solar system. The next planet is **Saturn** which has thin rings around it. **Uranus** and **Neptune** are the next two planets after Saturn. **Pluto** used to be considered a planet, but now is called a dwarf planet because it is so small. Its orbit is further away from the sun than any of the other planets.
* A **solar eclipse** - moment when the moon's orbit comes between the earth and the sun and it looks like the sun is blacked out. We can only see the edge of the sun around the moon. A **lunar eclipse** is when the earth prevents sunlight from reaching the moon. Because the **moon** orbits the Earth and the Earth orbits the sun we can only see parts of the **moon** at a time. This cycle happens every month. A **new moon** is when we can not see any of it. This shows the beginning of the cycle. Half way through the month we can see the **full moon**. A full moon makes the sky bright at night because it reflects the light of the sun.
* The **galaxy** we live in is called **the Milky Way**. It is made up of billions of stars.
* A **telescope** - an instrument which has reflective lenses that allows us to see the objects in the sky closer and clearer. It magnifies objects that normally cannot be seen unaided. Some **telescopes** are very powerful and can be used to see thousands of light years away. There are many large powerful telescopes in the north of Chile.
* An **astronaut** - a person who leaves Earth and goes into space. Many of them work in the international space station and do scientific experiments. Astronauts need to wear **space suits** because it is very cold in space and they do not have oxygen to breath.
* A **spacecraft (plural – spacecraft)** - any type of vehicle used for travelling in space. There are many different types of spacecraft. A **space shuttle** is a spacecraft used for repeated use in between earth and a space station and contains astronauts.
* A **rocket** - the type of plane that astronauts used to use to fly into space. Now they are used to leave **satellites** in orbit around the Earth. It has a special cylindrical shape so that it can go very fast for a long distance.
* A **space probe** - a type of space craft that does not have a person inside. **Space probes** can be sent to far away distances for long periods of time to gather information about different areas in space.
* A **lunar module** - a small craft used for travelling between the moon and the larger space craft orbiting the moon. When the first men walked on the moon they came out of the lunar module. The first man to walk on the moon said "One small step for man, one giant leap for mankind."
* **UFOs** - unidentified flying objects

C:\Users\УЛК\Desktop\Новая папка\рис.png***Ex. 24 - Guess the words associated with the topic and circle the correct answer***

1. A \_\_\_ group of bright stars that form shapes or pictures in the sky.
   1. moon
   2. constellation
   3. satellite
   4. meteor
2. A \_\_\_ is a small body of gas and ice orbiting around the Solar system. Sometimes it appears to have a tail from the Sun heating and melting the ice.
   1. star
   2. space probe
   3. constellation
   4. comet
3. An \_\_\_ is a combination of rocks and iron that is too small to form a planet. There are many between the orbit of Jupiter and Mars.
   1. asteroid
   2. astronaut
   3. orbit
   4. eclipse
4. The Sun is a \_\_\_ in the middle of our Solar System.
   1. rock
   2. star
   3. constellation
   4. comet
5. \_\_\_ is the planet that is closest to the Sun.
   1. Venus
   2. Mercury
   3. Mars
   4. Uranus
6. The largest planet of our Solar System is \_\_\_.
   1. Venus
   2. Uranus
   3. Neptune
   4. Jupiter
7. The planet that doesn’t have rings around is \_\_\_
   1. Neptune
   2. Mercury
   3. Saturn
   4. Jupiter
8. \_\_\_ is when the Moon’s orbit comes between the Earth and the Sun and it looks like the Sun is blacked out. We can only see the edge of the Sun around the Moon.
   1. Solar eclipse
   2. Lunar eclipse
   3. Black night
   4. Solar storm
9. The galaxy that we live in is called the \_\_\_.
   1. Moonwalk
   2. Astro System
   3. Milky Way
   4. Slimy Way
10. An \_\_\_ is a person who leaves the Earth and goes into space.
    1. asteroid
    2. astronaut
    3. astronomer
    4. asterisk
11. A \_\_\_ is sent to very far for a long period of time to gather information about different areas in space.
    1. space station
    2. space shuttle
    3. space probe
    4. space bar
12. A \_\_\_ is an instrument that allows us to see distant objects in the sky closer and clearer.
    1. magnifying glass
    2. satellite
    3. telescope
    4. comet
13. The constellation in the Southern Hemisphere that points towards the South Pole is the \_\_\_.
    1. Big Dipper
    2. Skinny Finger
    3. Southern Point
    4. Southern Cross
14. The \_\_\_ is a constellation in the Northern Hemisphere that is in the shape of a ladle or a large spoon.
    1. Big Dipper
    2. Southern Cross
    3. Kitchen Spoon
    4. Great Scoop
15. The most famous comet is \_\_\_\_\_. It is visible from the Earth every 75-76 years.
    1. Harold’s
    2. Harriet’s
    3. Henry’s
    4. Halley’s
16. A \_\_\_ is made up of billions of stars.
    1. constellation
    2. galaxy
    3. Solar System
    4. Hollywood movie
17. Rockets are used to leave \_\_\_\_ in orbit around the Earth.
    1. rocks
    2. astronauts
    3. satellites
    4. space suits
18. A \_\_\_ was a small craft used for travelling between the Moon and a larger spacecraft orbiting the Moon.
    1. moon
    2. full moon
    3. lunar module
    4. lunar eclipse
19. The first words of the astronaut who stood on the Moon for the first time were: \_\_\_.
    1. “I am glad I can stretch my legs now; that lunar module is cramped”
    2. “There is much dust here, they need to sweep a bit more often”
    3. “One small step for man, one giant leap for mankind”
    4. “Can you turn the lights down? They are still a bit too bright”
20. UFO means \_\_\_.
    1. Unique Friends Only
    2. Uniform Fighting Officer
    3. Unidentified Flying Object
    4. Unusual Floating Obstacle