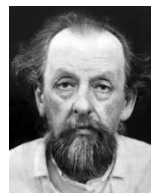
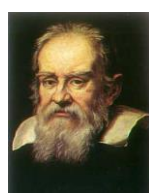
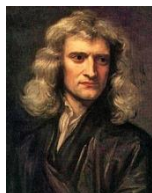


You don't have to be great to get started but you have to get started to be great

1 - Match the photos of famous scientists and space pioneers to their names. Then choose one and prepare a talk about him.



1. _____

2. _____

3. _____

4. _____



5. _____

6. _____

7. _____

8. _____

1 *Isaac Newton*2 *Konstantin Tsiolkovski*3 *Yuri Gagarin*4 *Valentin Glushko*5 *Wernher von Braun*6 *Vladimir Chelomey*7 *Galileo Galilei*8 *Sergey Pavlovich Korolyov*

The mighty space rockets of today are the result of more than 2,000 years of invention, experimentation, and discovery. First by observation and inspiration and then by methodical research, the foundations for modern rocketry were laid.

Building upon the experience of two millennia, new rockets will expand human presence in space back to the Moon, Mars and the asteroids, and beyond. These new rockets will be versatile. They will support Earth orbital missions, such as the International Space Station (ISS), and off-world missions millions of kilometers from home. Already, travel to the stars is possible. Robot spacecraft are on their way into interstellar space as you read this. Someday, they will be followed by human explorers. Often lost in the shadows of time, early rocket pioneers “pushed the envelope” by creating rocket-propelled devices for land, sea, air, and space. When the scientific principles governing motion were discovered, rockets graduated from toys and novelties to serious devices for commerce, war, travel, and research. This work led to many of the most amazing discoveries of our time.

- **Galileo Galilei, (1564 – 1642):** In addition to his many other accomplishments, this Italian astronomer and mathematician rekindled the spirit of scientific experimentation and challenged old beliefs relating to mass and gravity. He proved that an object in motion does not need the continuous application of force to keep moving. He called this property of matter, which causes it to resist changes in velocity, “inertia.” Inertia is one of the fundamental properties that Isaac Newton would later incorporate into his laws of motion.

- **Isaac Newton, (1642 – 1727):** English scientist Sir Isaac Newton condensed all rocket science into three elegant scientific laws. Published in *Philosophiae Naturalis Principia Mathematica* his laws, previously understood intuitively by early rocketeers, provided the foundation for all modern rocket science. (The “Rocket Principles” chapter focuses on these laws and the “Practical Rocketry” chapter demonstrates the applications of these laws.)
- **Konstantin Tsiolkovski (1857 – 1935):** Konstantin Tsiolkovski was a teacher, theorist, and astronautics pioneer. Son of a Polish forester who emigrated to Russia, he wrote and taught extensively about human space travel and is considered the father of cosmonautics and human space flight. Tsiolkovski advocated liquid propellant rocket engines, orbital space stations, solar energy, and colonization of the Solar System. His most famous work, “Research into Interplanetary Space by Means of Rocket Power,” was published in 1903, the same year the Wright brothers achieved powered and controlled airplane flight. His rocket equation, based on Newton’s second law of motion, relates rocket engine exhaust velocity to the change in velocity of the vehicle itself.
- **Yuri Gagarin (1934 – 1968):** On April 12, 1961, space became the domain of humans with the launch of cosmonaut Yuri Gagarin. His space flight lasted 1 hour and 48 minutes. During that time, Gagarin orbited Earth one time inside his *Vostok I* space capsule, reaching a maximum altitude of 315 kilometers (196 miles). Upon reentry, Gagarin ejected himself from the capsule at an altitude of 6,100 meters (20,000 feet) and parachuted safely to the ground.
- **Wernher von Braun (1912-1977):** One of the leading figures in the development of pre-war Germany’s rocket program and the development of the V2 missile, von Braun (1912-1977) became a leading proponent of America’s space program. He left for the United States after the war. He worked there on the development of intercontinental ballistic missiles and led the development team that launched *Explorer I*. Dr. von Braun was the chief architect and engineer of the Saturn V Moon rocket. His popular writings and collaboration with Disney on a “Tomorrowland” TV series did much to inspire the next generation of rocket scientists and astronauts.
- **Valentin Glushko (1908 – 1989):** Soviet rocket scientist, a pioneer in rocket propulsion systems, and a major contributor to Soviet space and defense technology. After graduating from Leningrad State University (1929), Glushko headed the design bureau of Gas Dynamics Laboratory in Leningrad and began research on electro-thermal, solid-fuel, and liquid-fuel rocket engines. Working together from 1932 to 1966, Glushko and renowned rocket designer Sergey Pavlovich Korolyov achieved their greatest triumphs in 1957 with the launching of both the first intercontinental ballistic missile and the first successful artificial satellite, Sputnik I. In 1974 he was named chief designer of the Soviet space program, in which he oversaw the development of the Mir space station. Glushko received numerous official honours.
- **Vladimir Chelomey (1914 – 1984):** Soviet aerospace designer who was the chief architect of the Proton launch vehicle and the Almaz (Salyut) military space station. After an early career in 1944–53 designing copies of the German V-1 “buzz bomb,” Chelomey formed a new design bureau known as OKB-52, in Reutov, outside of Moscow, in 1955. There he began working on a series of advanced naval cruise missiles. In 1959 he initiated development of new rockets and spacecraft for the emerging Soviet space program. In 1960s Chelomey started working on several intercontinental ballistic missiles (ICBMs), military satellites, launch vehicles, cruise missiles, antiballistic missiles, and the transport-Supply Ship (TKS), which was designed as the resupply vehicle for Almaz. He was twice awarded the Hero of Socialist Labour (1959, 1963), the highest award given to civilians during the Soviet era.
- **Sergey Pavlovich Korolyov (1907 – 1966).** Soviet designer of guided missiles, rockets, and spacecraft. Korolyov was educated at the Moscow N.E. Bauman Higher Technical School, where he studied aeronautical engineering under the celebrated designers Nikolay Zhukovsky and Andrey Tupolev. Becoming interested in rocketry, he and F.A. Tsander formed the Moscow Group for the Study of Reactive Motion, and in 1933 the group launched the Soviet Union’s first liquid-propellant rocket. During World War II Korolyov was held under technical arrest but spent the years designing and testing liquid-fuel rocket boosters for military aircraft. After the war he modified the German V-2 missile, increasing its range to about 685 km (426 miles). He also supervised the test firing of V-2 missiles. In 1953 he began

to develop the series of ballistic missiles that led to the Soviet Union's first intercontinental ballistic missile. Korolyov was placed in charge of systems engineering for Soviet launch vehicles and spacecraft; he directed the design, testing, construction, and launching of the Vostok, Voskhod, and Soyuz manned spacecraft as well as of the unmanned spacecraft in the Cosmos, Molniya, and Zond series. He was the guiding genius behind the Soviet spaceflight program until his death, and he was buried in the Kremlin wall on Red Square. During his lifetime he was publicly known only as "the Chief Designer."



a) Watch the video "Five reasons Space Exploration matters to You":

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.

1. Why are asteroids dangerous for our planet?
2. Why does space exploration matter? (Give 5 reasons based on the movie)
3. 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

3- Read the transcription

Saturn ['sætən], Uranus [jʊ'reɪnəs], Neptune ['neɪtʃu:n], Earth [ɜ:θ], Mars [mɑ:z], Venus ['vi:nəs], Mercury ['mɜ:kjʊəri], Jupiter ['dʒu:pi.tər], Pluto ['plu:təʊ]

4- Use the planets below to complete the text

Mercury Venus Mars Uranus Pluto Neptune Jupiter Saturn

The Sun is 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 _____ and then comes _____. The planet that we live on is called Earth. It is the third closest planet to the sun in our solar system. _____ is the fourth planet from the sun. It is a small red planet, named after the roman god of war. _____ is the largest of all the planets in the solar system. The next planet is _____ which has thin rings around it. _____ and _____ - are the next two planets after Saturn _____ 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.

5- Search the Internet and find interesting facts about any planet you like most. Use the list below as a guide. Then present these facts to the rest of your group:

- name of the planet
- how the planet got its name
- size and diameter of the planet
- description of the planet's rotation around the sun
- moons
- your weight on the planet
- distance from Earth and from the Sun
- the planet's average temperature

6- Choose the correct alternative

1. An orbit / a comet / an asteroid / is the path an object in space takes while it moves.
2. An asteroid / a comet / an orbit is a small body of gas and ice orbiting around the solar system.
3. A comet / an orbit / an asteroid is a combination of rocks and iron that is too small to form a planet.
4. A spacecraft / s space shuttle / a space probe / is a spacecraft used for repeated use in between earth and a space station and contains astronauts.
5. A space probe / a space shuttle / a spacecraft / is any type of vehicle used for travelling in space
6. A space shuttle / a spacecraft / a space probe / is a type of space craft that does not have a person inside
7. The galaxy / a constellation / the Universe / is a grouping of millions or billions of stars, held together by gravity.
8. The Universe / a constellation / the galaxy / is a group of bright stars that form shapes or 'pictures' in the sky.
9. A constellation / the galaxy / the Universe / is all of space and its contents.

7 - Answer the questions. Use the Internet, if necessary

1. What is the plural form of the word 'spacecraft'?
2. What does the abbreviation UFO stand for?
3. What name is often used for the Galaxy itself?
4. Could you name the constellation in the Northern hemisphere that is in the shape of a ladle or a large spoon?
5. Could you name the constellation in the Southern hemisphere that points towards the South Pole?
6. How do we call the brightest star in the constellation Ursa Minor [/ˌɜːrsə 'mæɪnər/](#), often called the Little Dipper (the Little Bear)?

8- Put the words in the correct place to get the description of the natural phenomenon which is shown in the picture. Use words more than once



Fig.1 solar eclipse



Fig. 2 lunar eclipse



Fig. 3 new moon



Fig. 4 full moon

solar eclipse

sun earth moon

1. A solar eclipse is when the _____'s orbit comes between the _____ and the _____ and it looks like the _____ is blacked out. We can only see the edge of the _____ around the _____.

lunar eclipse

sun earth moon

2. A lunar eclipse is when the _____ prevents sunlight from seeing the _____. Because the _____ orbits the _____-and the _____ orbits the _____ we can only see parts of the _____ at a time. This cycle happens every month.

new moon

sun earth moon

3. In astronomy, the *new moon* is the first phase of the _____ when its orbit is not seen from the _____; it is at this moment when the _____ and the _____ have the same ecliptic longitude.(эклиптическая долгота).

The original meaning of the term *new moon*, which is sometimes used in non-astronomical context, was the first visible crescent ['kres.ənt] (полумесяц) of the _____, after conjunction [кəп'dзʌŋk.ʃən] (соединение) with the _____.

full moon

sun earth moon

4. The *full moon* is the lunar phase when the _____ appears fully illuminated from _____'s perspective. This occurs when _____ is located between the _____ and the _____. This means that the lunar hemisphere facing _____ – the near side – is completely sunlit and appears as a circular disk, while the far side is dark. The *full moon* occurs once roughly every month.

Note: earth (also Earth, the Earth); sun (the sun, the Sun); moon (usually the moon. also the Moon)

9- 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.
 - a. moon
 - b. constellation
 - c. satellite
 - d. 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.
 - a. star
 - b. space probe
 - c. constellation
 - d. 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.
 - a. asteroid
 - b. astronaut
 - c. orbit
 - d. eclipse
4. The Sun is a ___ in the middle of our Solar System.

- a. rock
b. star
- c. constellation
d. comet
5. ___ is the planet that is closest to the Sun.
- a. Venus
b. Mercury
c. Mars
d. Uranus
6. The largest planet of our Solar System is ___.
- a. Venus
b. Uranus
c. Neptune
d. Jupiter
7. The planet that doesn't have rings around is ___
- a. Neptune
b. Mercury
c. Saturn
d. 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.
- a. Solar eclipse
b. Lunar eclipse
c. Black night
d. Solar storm
9. The galaxy that we live in is called the ___.
- a. Moonwalk
b. Astro System
c. Milky Way
d. Slimy Way
10. An ___ is a person who leaves the Earth and goes into space.
- a. asteroid
b. astronaut
c. astronomer
d. asterisk
11. A ___ is sent to very far for a long period of time to gather information about different areas in space.
- a. space station
b. space shuttle
c. space probe
d. space bar
12. A ___ is an instrument that allows us to see distant objects in the sky closer and clearer.
- a. magnifying glass
b. satellite
c. telescope
d. comet
13. The constellation in the Southern Hemisphere that points towards the South Pole is the ___.
- a. Big Dipper
b. Skinny Finger
c. Southern Point
d. Southern Cross
e.
14. The ___ is a constellation in the Northern Hemisphere that is in the shape of a ladle or a large spoon.
- a. Big Dipper
b. Southern Cross
c. Kitchen Spoon
d. Great Scoop
15. The most famous comet is _____. It is visible from the Earth every 75-76 years.
- a. Harold's
b. Harriet's
c. Henry's
d. Halley's
16. A ___ is made up of billions of stars.
- a. constellation
b. galaxy
c. Solar System
d. Hollywood movie
17. Rockets are used to leave _____ in orbit around the Earth.

- a. rocks
- b. astronauts
- c. satellites
- d. space suits

18. A ___ was a small craft used for travelling between the Moon and a larger spacecraft orbiting the Moon.

- a. moon
- b. full moon
- c. lunar module
- d. lunar eclipse

19. The first words of the astronaut who stood on the Moon for the first time were: ___.

- a. "I am glad I can stretch my legs now; that lunar module is cramped"
- b. "There is much dust here, they need to sweep a bit more often"
- c. "One small step for man, one giant leap for mankind"
- d. "Can you turn the lights down? They are still a bit too bright"

20. UFO means ___.

- a. Unique Friends Only
- b. Uniform Fighting Officer
- c. Unidentified Flying Object
- d. Unusual Floating Obstacle