

**Task 1.**

“Pirates of the Caribbean: Dead Men Tell No Tales” movie features a character named Carina. It is stated that she was named after the Latin name of the brightest star in the sky. Can it be true? What objects in the sky are also named Carina? Why can they be interesting? Why do pirates need to know such objects?

**Task 2.**

M 31 galaxy is often called the Andromeda Galaxy or the Andromeda Nebula. It is also said that this galaxy is placed in the Andromeda constellation. How is it possible? How can one constellation contain the whole galaxy? What is bigger – a galaxy or a constellation? How many stars are there in one galaxy and in one constellation? Can there be more than one galaxy in one constellation? Maybe all this is wrong and there are constellations inside galaxies?

**Task 3.**

In 1989, in 2004 and in 2012 mass media published news about *Voyager 1* space probe crossing the Solar System border. Does it mean that Solar System has several borders? Did *Voyager 1* really leave the Solar System? How was crossing of these borders documented? What can be called the Solar System border? Which borders did *Voyager 1* cross?

**Task 4.**

There are a lot of types of caves. Karst (solutional) caves are the most frequently occurring caves on Earth. How are they formed? Why are there no such caves on other planets? What else types of caves are presented on Earth? Can they be presented on other planets?

**Task 5.**

In October 2017 the International Astronomical Union defined a new class of objects. Now they are known as interstellar asteroids. Defining new type of objects was a result of 1I/Oumuamua observations. What interesting features does this object have? Why the whole new class was created for this object? How was it possible to define it as an interstellar asteroid and not a regular asteroid, a Kuiper belt asteroid or a comet? Why couldn't such objects be found earlier?

**Task 6.**

Is it possible to extinguish the Sun? How can it be done? Can the Sun be extinguished with water? How much water is needed to extinguish the Sun?

**Task 7.**

*Is it possible to extinguish the Sun? How can it be done? Can the Sun be extinguished with water? How much water is needed to extinguish the Sun?*

Asteroids (“star-like” in Ancient Greek) are small bodies revolving around Sun. They had such name because they move with the stars on the night sky while planets (“wanderers” in Ancient Greek) move in opposite direction. They are too light weighted to have spherical shape. That’s why they look very differently. This year (2018) Hayabusa2 mission came close to the Ryugu asteroid and found out that Ryugu has triangle shape.

The largest asteroid is called Vesta and weights as much as the Moon.

The smallest asteroids are 30 meters long. Smaller bodies are called meteorites.

Pluto was the largest asteroid in the Solar System until 24th of August, 2006, when it was redefined as a dwarf planet.

Asteroids can be found any distance far from the Sun, but most of them are placed between Earth’s and Mars’ orbits. This place is called the Main Asteroid belt.

In spite of frequent collisions between asteroids there are no more debris in the Main Asteroid belt than in other regions. Dust and small debris slowly change their orbits to ones close to the Sun and fall onto this star in some time. The light reflected from this asteroid dust creates so-called zodiacal light.

Almost all asteroids in the Main belt have orbits perpendicular to the plane of planets’ orbits. That’s why there are almost no collisions between asteroids and planets now.

The second region rich with meteorites is the Kuiper belt. It is placed behind the Neptune’s orbit.

Asteroids most often consist of metals, but the first ones to be found out were carbonaceous asteroids. They reflect light better, that’s why they are brighter and easier to spot.

NEAR spacecraft was the first to become Eros asteroid’s satellite and to perform soft landing on its surface later.

In 2016 OSIRIS-Rex mission was launched to study potentially dangerous Bennu asteroid. The spacecraft will make measurements which will let calculate Bennu’s orbit more precisely. It will also deliver samples of asteroid’s material to Earth for the first time in history.

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Don’t forget to **sign** your work (please, write the card number, your last name, school and grade) before **submitting** the work. You do not have to submit the sheet with the tasks. The tasks, their solutions and the results of the competition will be published at <http://turlom.olimpiada.ru> after November 20.