

Explore and travel tasks

1. "Mysterious sixteen"

Were you thinking about how we could transfer short messages if we could only rotate the "head" of a robot? You can get an idea from the movie *The Martian*. The Pathfinder robot made exactly this.

Your task is to find a way to code the letters into numbers and show these messages in some way. You can use a LEGO Mindstorms robot to demonstrate this process. (The school can provide you one if you need that.) Or you can realize any other ideas, for example a program you write (e.g. in Python, JavaScript, Scratch etc.)

Contact teacher: *Eszter Kard*



2. 3D-spaghetti

Make a research about 3D printing! How does it work? Design some food (e.g. pasta) in 3D and print it! (We can use the school's 3D printer and print what you designed.)

Contact teacher: *Eszter Kard*

3. Eat like a Martian

Why do we need starch on Mars? Experiment! What contains starch? Test for the starches in food! Select foods (as many as possible 😊) in which you can test for the presence or absence of starch using iodine. Look for fake products (for example sour cream)! Perform an adulteration test to prove that a fake product is being sold.

Contact teacher: *Gabriella Brutovszky*

4. "I will survive"

Why is starch important as an energy source on Mars (too)? How can our bodies break down starch? Experiment! Demonstrate the breakdown of starch using enzymes!

Contact teacher: *Gabriella Brutovszky*

5. Ready, steady, go... boom!

Starch is a very important nutrient that our bodies need, but what amazing "starchfire" you can make with it! Make "fireworks" that are admired from the Earth!

Contact teacher: *Enikő Zaha*

6. Be the best water-maker!

During the Mars expedition, we'll need water! Briefly demonstrate the production, physical and chemical properties of hydrogen using experiments!

Contact teacher: *Enikő Zaha*

7. Proof of gravity!

Build a maths pendulum!

Contact teacher: *Enikő Zaha*

8. Step by step on Mars!

Model the quicksand: make non-newtonian fluids.

Contact teacher: *Enikő Zaha*

9. Build your own spacecraft!

Build a spaceship from PET bottles!

Contact teacher: *Enikő Zaha*

10. Visit the Red Planet!

Use the following table and questions to make an exciting presentation about Mars!
(can also be a commercial!)

Featuring	Earth	Mars
diameter	12 756 km	6794 km
mass	$5,974 \cdot 10^{24}$ kg	$6,4185 \cdot 10^{23}$ kg
rotation time around the axis	23 hours 56 minutes	24 hours 37 minutes
average solar distance	149 600 000 km = 8,3 light minutes	227 900 000 km = 12 light minutes
time period around the Sun	365,25 day	1,88 Earth year
axial velocity	$23,5^{\circ}$	$25,2^{\circ}$

- How long is a Martian day (called sol)?
- How long is a Martian year?
- Are there seasons on Mars?
- Because of the great distance, radio communication between Earth and Mars cannot be very lively; it takes a long time to exchange messages. About how many minutes?
- Find out what causes the characteristic colour of Mars, which is why it is also called the "red planet"!
- How would a traditional kitchen scale taken from Earth to Mars or a digital kitchen scale be used on Mars?

Contact teacher: *Enikő Zaha*