TEMPLATE for BEST PRACTICE EXAMPLES - SOLVED TASK

1. **Name of the task:**

   Planetarium

2. **Why did you choose this task?**

   For a long time we have been looking for a task that would enable us to collaborate with different schools and organizations in our hometown. When we saw this one we just realized it's perfect if we do some modification and raise the bar in a challenge.

   We called another school to help us in the process of creating a large scale Solar system. In this way we included more than 60 students working on different tasks. We also included organizations from our hometown, as participants, as we decided to create a large scale model, so that the whole town is covered. Different planets where located at different locations around the town.

   This was also a chance to include arts in the process of creating a poster for planets.

   Finally, we included a treasure hunt game to make the process of learning about the planets more fun and educative at the same time. Our school organizes a treasure hunt each year, but now we have took it to space!

3. **Subjects covered from STEAM areas:**
   Math, geography, astronomy, physics, arts, computer science, biology, chemistry

4. **Target group (age range and size of the group):**
   15 – 18, the size of the group depends on the scale of the event

5. **Duration of the activity:**
   One month to prepare
   One day to play the game

6. **Key words:**
   Solar system, model, art, treasure hunt

7. **Key sentence describing context of the activity, followed by short description (200 words):**

   We created a treasure hunt with 3D solar system theme.

   We calculated the size of the planets, and then their locations using a map of our town. For this two different scales were used for practical reasons.

Students were split in 4 groups.
The first group was in charge of creating a 3D model of planets keeping scale in mind.
The second group created an info poster for each planet.
The third group worked on creating a stand with a theme for each planet (a short play, T-shirts, interesting facts, etc.)
Fourth group was in charge of creating tasks that would be solved by treasure hunters.

This was done by students from two schools who had an opportunity to meet and work together for the first time.

After the treasure hunt game was created we decided to expand collaboration and create mixed teams, with students from both schools (Gimnazija Zaječar and Medical School Zaječar), as we know that collaboration is a big part of education.

To include the local community, we tried to place locations of planets near local organizations such as the Youth Center, theater, museum, etc., carefully watching that the distance fits the scale of the real Solar system.

8. **Description of the activity environment, including the list of materials and tools needed:**

Models of planets were created with different techniques. Some students used paper mache created from recycled paper. Others used toys or balls to create models. Naturla materilas such as clay were also used. Each model was painted so that it resembles the planet it represents.

Posters were done at home suing Canva and Freepix.

In order to create the Sun, a large balloon was covered in paper mache.

The team in charge of creating problems for the game worked from home, with occasional meetings to check-in on the progress.

Materials and tools needed: recycled paper, colors, models or balls, balloons, various tools (depending on ideas), computer with access to the internet

9. Step by step, detailed description of the activity, including teaching and learning strategies:

STEP 1

Gather the students and create a plan for future work. The teacher gives the class a driving question: Can we create a fun 3D model of our Solar system? After that, students suggest ideas. The teacher prepares following question to guide them: Can we include the local community? Can we include games? What more do we need to know? How can others learn from our model? Etc.

By the end of this session, an idea on what you want to build should be clearly defined.

In our case it was to create a 3D Solar system model located all over town with a treasure hunt game.

STEP 2

We created an action plan for what needs to be done.
Students were then split in 4 teams according to their desires and capabilities. Each team created its own action plan with timelines of what needs to be done. In that way we helped students develop time-management skills.

STEP 3

Team 1

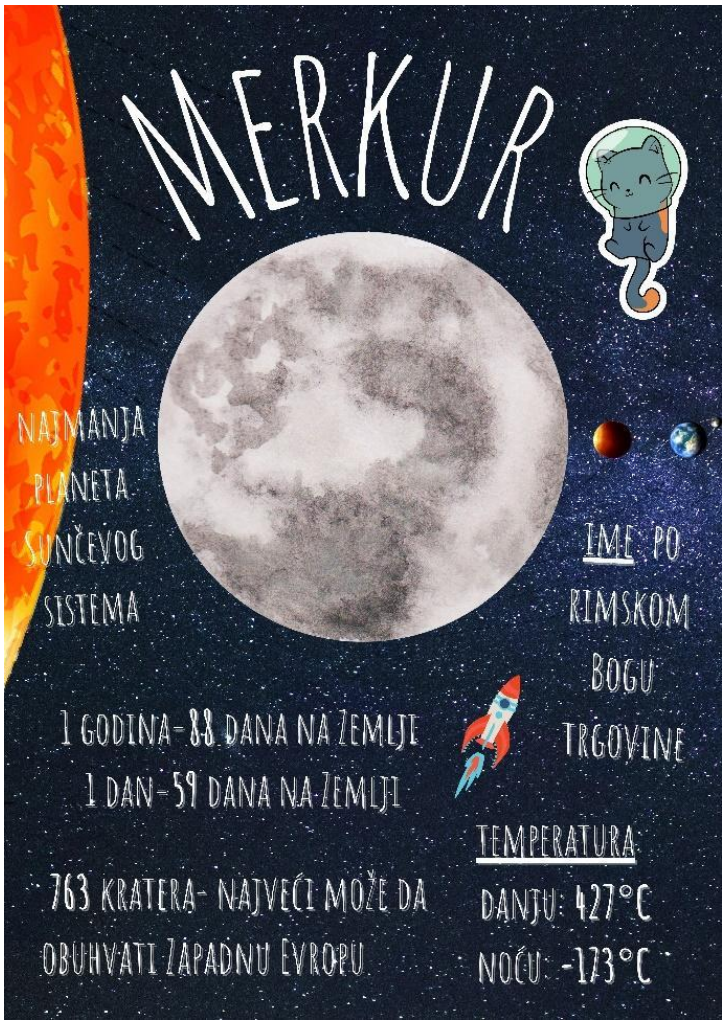
Creating a model of planets. Using various materials and data on the planets, the team was tasked to find the best scale. The challenge was to make even the smallest planet visible, and yet to maintain the Sun small enoug to be able to be built. The team proposed following measures:

Planet	Diameter in km	Ratio to earth	Proposed size
Mercury	4800	0.376	0.4 cm
Venus	12100	0.949	0.9 cm
Earth	12750	1.00	1 cm
Mars	6800	0.533	0.5 cm
Jupiter	142800	11.2	11 cm
Saturn	120660	9.46	9 cm
Uranus	51800	4.06	4 cm
Neptune	49500	3.88	3 cm

Sun	1 393 000	109	109cm

Team 2

Using Canva, the team was tasked to cretae posters for each planet. This meant that they had to use artistic skills as well as to discover interesting facts about planets and present them to the audience.



Team 3

This team was given a task to think of a way to promote a planet once the treasure hunt starts. The students proposed different things from recycling old T-shirts and redesigning them to include images of the planets, to creating an exhibition about famous books with specific planets.

Examples
Venus (Frederic Pohl Merchant of Venus)

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Mars (Terrafomrng Mars a game to be played in classroom)
Jupiter (Arthur Klark Odissey)

Team 4

Team 4 was in charge of creating tasks for the treasure hunt. They decided not to use a classic treasure hunt, but rather a version of the game called scavenger hunt. At each site the planet team would get a different task, and the winner would be the team that solves the most of them. Some of the tasks proposed were:

Vector image
Students were given coordinates of dots that needed to be connected in order to relieve a picture.

Create a planet system with at least three planets
http://www.scigames.org/game.php?id=planetfamilies2

Land a space ship
http://moonlander.seb.ly/

Moon landing challenge
https://netmind.net/en/play-the-moon-landing-exercise/

Quiz about climate change

STEP 4

Choose a location to place planets.
For this task we have gathered together, used a map of Zaječar, and drawn circles to see where planets would be in our model. After that we contacted a couple of local organizations to help us set up a model.

STEP 5

Organize the treasure hunt. Set up stands at locations chosen for each planet. Prepare the students to act as hosts and guides in the game, and bring the players.

STEP 6

Evaluate the activity.

10. Learning objectives/competencies:

Enable students to learn more about solar system through practical work
Practice artistic skills like paper mache, poster design and others.
Combine math and geography into space planning and choosing scales.

11. Evaluation/Assessment guidelines:

Evaluation was done in two steps.

The work has been evaluated using rubrics with following criteria:

Science

- The chosen values are in correlation with each other and the Solar system
- All mentioned facts are true
- Created models/ poster / tasks correspond to real life problem
- Students can explain why they have chosen a certain technique
- Students can explain the main properties of each planet

Creativity

- Materials used are ecofriendly
- The poster is pleasant to eye and can be easily red
- Tasks created for the game are correlated to the students' experience

Teamwork

- Each group can explain how they split the task
- Each member contributed to a certain task

During the treasure hunt we followed each team and noted the difficulties they had with certain tasks. This was later analyzed in order to increase future performance.

12. Lessons learned:

Most students have had a hard time when they needed to work with their hands. This is why tasks like this one are important.
Creating posters helped students develop digital skills but in the same way they had to choose which date they will show and that proved to be challenging to some students.

Creating a 3D model of the Solar system is easy and not to challenging to students in this age group. However, by adding a treasure hunt we can turn this task to a real challenge.

13. Additional information/Links:
    An example of a 3D planet designed from paper mache

14. Contact person:

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