Supporting Gifted and Talented Students in your Classroom

Lesson Plan Template

1 SUMMARY INFORMATION

YOUR NAME & SURNAME: Tryfon Spyropoulos

TITLE OF YOUR LESSON: Unmanned rovers for Space Exploration

TIME FRAME: 8 hours

SIZE OF CLASS: 20 students

OTHER RELEVANT REMARKS:

SHORT DESCRIPTION OF THE LESSON AND HOW IT FITS INTO YOUR ONGOING CURRICULUM:

At this time in our school there is an educational group with stem education and robotics activities. In this group we build unmanned vehicles with the WeDo2 robotics kit.

LEARNING OBJECTIVES:

- to build an unmanned vehicle with Lego materials
- to collaborate on an educational platform
- to produce educational materials
- to exchange thoughts and reflections within the group

EXPLANATION OF WHY THIS LESSON PLAN IS INCLUSIVE, WITH A SPECIFIC FOCUS ON MEETING THE NEEDS OF ACADEMICALLY GIFTED STUDENTS:

Initially the topic itself is challenging because it concerns issues of cutting-edge technology. Lego robotics is very attractive to gifted children and offers them opportunities to safely demonstrate their cognitive and mental skills. Also, topics related to special missions and vehicles sent by space companies such as NASA are among the rare interests that can be detected in gifted children. Finally, the use of digital educational platforms helps the personalized learning of these children and offers them the time and comfort they need to express themselves and achieve their learning goals.

2 ACTIVITIES

ACTIVITY 1	
Learning Outcomes, Skills, and Competencies	Introduction to unmanned vehicles

What are the main objectives of this activity? Consider the Bloom's Taxonomy and write here the skills the learner will develop and demonstrate during this activity (e.g., communicative skills, computational thinking, problem solving, etc).	The skills that will be developed are the following: - communication skills and exchange of ideas - digital skills communications and learning - critical Thinking The following learning objectives are expected to be achieved by Bloom's taxonomy: - knowledge - comprehension - application
Time What's the estimated duration of this activity?	2 hours
Role of students What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	Students will enter the educational platform and use the educational material that is posted and use it according to the instructions that come with it. They will express their thoughts and the knowledge they have acquired from the educational material on the wiki and there will be a student who will have the role of moderator in the discussions. Finally, it will be optional for any student who wants to post similar educational material after a search they have made themselves.
Role of the teacher What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	The teacher's role is organizational and he has to post on the platform the educational material that the students will use. He will also be responsible for approving the educational material that students will propose for registration on the platform.
ICT Tools and Resources required What ICT tools, resources or other technologies will be required? Choose the tool(s) and explain how you will use it.	As mentioned, the e-me digital platform will be used.
Description of the activity Share here the description of the activity.	In this activity we will use the pedagogical technique of the flipped classroom. Specifically, students at home will go to the e-me educational platform (Ministry of Education of Greece) and study the educational material: https://www.youtube.com/watch?v=rzmd7RouGrM https://spaceplace.nasa.gov/space-robots/en

	On a wiki there is the question why do space companies send unmanned vehicles into space? The main goal is for students to get to know the rovers that space companies send and understand why they prefer them over human missions. On the wiki they can exchange thoughts post texts on which they think critically why it is preferable to have unmanned missions. In this way the students exchange opinions and will be prepared for the activities that will take place in the classroom.

ACTIVITY 2

Learning Outcomes, Skills, and Competencies What are the main objectives of this activity? Consider the Bloom's Taxonomy and write here the skills the learner will develop and demonstrate during this activity (e.g., communicative skills, computational thinking, problem solving, etc).	**Building a Rover** The skills that will be developed are the following: • communication in groups • problem solving • critical thinking • construction skills • computational thinking The following learning objectives are expected to be achieved by Bloom's taxonomy: • application • analysis • synthesis • creation
Time What's the estimated duration of this activity?	2 hours
Role of students What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	Students will work in teams and build an unmanned vehicle which they will program. All students will participate in all procedures, but each will assume a distinguished role according to their needs and skills. These roles are as follows: • Responsible for construction • Responsible for programming • Responsible for materials and equipment • Responsible for the operation of the construction

Role of the teacher What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	The teacher's role is to have the robotics kit ready and the tablets charged. He also moves around the classroom and observes students as they work and intervenes when asked to facilitate procedures or provide assistance.
ICT Tools and Resources required What ICT tools, resources or other technologies will be required? Choose the tool(s) and explain how you will use it.	Students will use the WeDo robotics kit and tablets to program the rover they will build unmanned vehicle such as NASA's rovers.
Description of the activity Share here the description of the activity.	20 students will be divided into groups of five and each will build an unmanned space vehicle. Each group will receive a text describing a planet that has many rough surfaces and are difficult to approach. Each team has a plan to create the best unmanned vehicle that can adapt to the specifications of the planet's morphology. After the completion of the creation, each team presents their vehicle and analyzes what are its advantages and why their own vehicle best responds to the descriptions of the planet's morphology.

ACTIVITY 3

Learning Outcomes, Skills, and Competencies What are the main objectives of this activity? Consider the Bloom's Taxonomy and write here the skills the learner will develop and demonstrate during this activity (e.g., communicative skills, computational thinking, problem solving, etc).	**Discussion on better construction** The skills that will be developed are the following: • communication skills and exchange of ideas • digital skills communications and learning • critical Thinking The following learning objectives are expected to be achieved by Bloom's taxonomy: • analysis • synthesis • creation
Time What's the estimated duration of this activity?	2 hours

Role of students What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	Students will search for material on the education platform. They will express their point of view and their Padlet arguments. They will vote and decide which build is the best to be featured.
Role of the teacher What is the role of the students in this activity? Write here what the students will be doing during this activity and what is their specific role for it.	The role of the teacher is coordinating and he will undertake to organize the platform on which the students will post material as well as to organize the padlet in which the students' arguments will be submitted.
ICT Tools and Resources required What ICT tools, resources or other technologies will be required? Choose the tool(s) and explain how you will use it.	The e-me digital platform, a padlet and a wiki.
Description of the activity Share here the description of the activity.	Students will visit the e-me digital platform and post a written report on the group construction they created. The members of each team will work on a wiki in which they will create a text and describe the construction and advantages of the unmanned vehicle they created at school. After all the groups have studied the texts that will have been posted on the digital platform, they will visit a padlet created by the teacher. The padlet will have four axes and each axis will include the name of the team and the photo of the structure created by that team. Each student will have the right to express his opinion as to whether the particular construction is the best and has real advantages based on the descriptions given at the beginning.

3 ASSESSMENT

How will students be assessed on their learning?

The evaluation will be differentiated and will be done in the following ways:

1) Students can use canva or any other digital tool they like or even colored paper to create a poster showing an unmanned vehicle accompanied by a message about why we choose these over

manned missions. The work can be individual or in dyadic collaboration.

2) To answer an open-ended question such as the following: *Are unmanned vehicles the future of space missions*?

3) Create questions for a potential interview with an unmanned vehicle engineer.

The first assessment task is compulsory and from the next two they have to choose one.