Schools Tune Into Mars lesson plan

**Title**

Panda Mission to Mars

**Author**

Sara Melada

**Abstract**

In this lesson, students will use the mBlock software (educational robotics) to create in groups simple exploration video game on Mars. This activity will allow students to learn about Mars and coding while playing. The protagonist will be Panda, an mBlock sprite.

The lesson includes creation of a simple quiz game with several questions about Mars. For each correct answer student accumulates a point (a ball) that will be used to hit the spaceships in the next screen. If student does not guess even one question, he won't be able to go to the next step.

**Keywords**

mBlock, Mars, Game, Educational robotics, Coding.

| **Table of summary** | |
| --- | --- |
| ***Subject*** | Computer science |
| ***Age of students*** | 14 years |
| ***Preparation time*** | 2 hours |
| ***Teaching time*** | 4 hours (plus 1 hour of home preparation) |
| ***Online teaching material*** | Moodle  Software mBlock <https://www.mblock.cc/en-us/download/>  Marte Exploration <https://it.wikipedia.org/wiki/Esplorazione_di_Marte> |
| ***Offline teaching material*** | No offline materials. |
| ***Resources used*** | <https://www.esa.int/Education/Teachers_Corner/>  <https://www.nasa.gov/stem> |

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**Integration into the curriculum**

The national curriculum of Computer Science for the first year of Technical School in Italy.

This topic is included in the fifth module: Educational robotics that includes base of coding using an IDE tools of programming. The first course of the Technological Institute provides for the discipline of information technology, which with three hours a week, two of which are laboratory, is an introduction to computer science with the first notions on how the calculator is made and how it works, the operating system, networks and the Office Suite (word processor, spreadsheet and presentation tools). The last module of the course until last year is dedicated to a creative module, based on educational robotics.

**Aim of the lesson**

The aim of the lesson is to teach students how the planet Mars is made and why it is important to study its characteristics. Lesson focuses on basic imperative programming, with sequence, selection, iteration.

**Outcome of the lesson**

At the end of the lesson, students create a simple video game that simulates a virtual exploration of Mars through a point quiz.

**Trends**

Game Based Learning & Gamification: learning is mixed with games or with game mechanisms.

STEM Learning: Increased focus on Science, Technology, Engineering, Mathematics subjects in the curriculum.

**21st century skills**

Critical thinking because of reflection about the importance of this item in future developments.

Creativity and initiative involving in implementing code.

Collaboration and communication for working in groups, also leadership, as each group has to find a team leader.

Information and Technology literacy because of the instruments are all digital.

**Activities**

|  |  |  |
| --- | --- | --- |
| **Name of activity** | **Procedure** | **Time** |
| **Prepare** | At home, each student looks at the materials posted on NASA website. | 1 hour |
| **Create 1** | In groups using Google Meet students start to create a game, matching information from NASA website (data about Mars). Students create a 5-questions quiz that Panda offers to the player. | 1 hour |
| **Create 2** | The same groups implement a simple screen play using Panda as main figure. | 1 hour |
| **Evaluation part 1** | Each group presents to other groups the work that was done.  The teacher collects the elements for evaluation. | 1 hour 30 min |
| **Evaluation part 2** | The teacher exposes the assessments given, the result of the average between the assessments of of students and teacher, explaining the reasons for this choice. | 30 min |

**Assessment**

Each group presents the work to the whole class group using Google Meet.

With an evaluation section that considers deepening and completeness of information inserted in the video game on Mars, exhibition capacity and development of the code, each group is evaluated. The evaluation rubrics can be found in the Annex.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* **AFTER IMPLEMENTATION** \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Student feedback**

Presentation of the work done by each group using sharing tools like Google meet. Each group compiles an evaluation survey of the other groups. Track of the questionnaire used to evaluate groups (Likert scale on 5 points, where 1 is for nothing, 2 is for Little, 3 is for quite, 4 for very and 5 for very much):

* The presentation was effective: 1 • 2 • 3 • 4 • 5 •
* You liked the video game: 1 • 2 • 3 • 4 • 5 •
* The content was expressed well: 1 • 2 • 3 • 4 • 5 •
* Overall evaluation of this work: 1 • 2 • 3 • 4 • 5 •

**Teacher’s remarks**

Future developments: ability to insert multiple levels of quizzes and game.

**About the Schools Tune Into Mars project**

The overall objective of the Schools Tune Into Mars (STIM) project is to provide pedagogical materials with high-quality inspirational lessons related to planetology. The project’s materials are based on the latest developments in space research and pedagogy and meet teachers’ needs for opportunities in professional development, making use of particular scientific concepts in planetology and planetary seismology.

Schools Tune Into Mars (STIM) is a project that brings together a network of schools and organizations with an interest in space education and studies related to the planet Mars. Thus, STIM provides adequate guidance and underpins innovative activities that are developed in a co-constructive process between researchers and teachers. Find out more about the Schools Tune Into Mars project: <https://insight.oca.eu/fr/stim-resources>

Annex

Rubrics for students’ assessment:

| **CRITERIA** | **INDICATORS** | **Point 1(low)** | **Points 5(high)** | **Points 3(medium)** |
| --- | --- | --- | --- | --- |
| **Completeness and significance of the documentation on Mars** | Is the documentation complete?  Did you organize the work according to a logical schema?  Have you entered all the key information in the document? | The documentation is not complete and is not organized according to a logical scheme. Key information is missing. | The documentation is complete and is organized according to an effective logical scheme. All the key information is present. | The documentation is quite complete and is organized according to a logical scheme. Key information is present but not well specified. |
|  |  |  |  |  |
| **Clarity of the presentation** | Did you use a good color / font combination?  Did you make good use of the space available in the slides?  Have you entered any personalization? | Wrong matching of colors / fonts.  Slides too rich in content.  No personalization. | Color / font matching effect.  Slide with a lot of balance between space and content.  Brilliant personalizations. | Little studied color / font matching.  Slide full of content.  Some personalizations. |
|  |  |  |  |  |
| **Language skills** | Do you express yourself correctly?  Do you read the slides or explain them?  Do you make adequate use of the time available? | Make grammar mistakes.  He/she reads the slides, he/she can't use the times. | He/she always expresses herself/himself correctly.  Brilliantly comment on the slides. He/she knows how to use the times in an excellent way. | He/she does not always express her/himself correctly.  Not always adequately comment on the slides. He/she does not always know how to use the times well. |
|  |  |  |  |  |
| **Quality of the script** | Is the script complete?  Is the script well structured?  Is the script robust?  Is the script working? | The script does not work, it is not structured, it is incomplete. | The script works, is well structured, complete and robust. | The script works, is poorly structured and fairly complete. |
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