



PARSEL teaching –learning materials compiled by the consortium
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Planning a space trip to Mars (Students)

Instructions

With this task, we want you to plan a space trip to Mars, during which you are not allowed to use techniques for suspending life. You will be allocated with a different character within the group: 1) doctor; 2) scientist; 3) person responsible for the mission; 4) engineer. All of them together have the responsibility for planning the trip, for maintaining the spaceship and for guarantying crew's survival. The group will have to develop a plan for the trip.

Procedure

1. Compose groups of 4 students and choose a character to play.
2. After choosing a character, collect and analyse information with the aim to write an individual report that resumes your contribute to the trip (maximum two pages A4).
3. You can seek information on the following websites:

NASA <http://www.nasa.gov/>

ASK-A-SCIENTIST – *NASA-wide resources: Extremely interesting site with varied information about spatial trips, universe, solar system, effects from lack of gravity, etc.*

<http://science.msfc.nasa.gov/FAQ/ask-a-scientist.htm>

Exploring Mars <http://www.exploringmars.com>

Life on Mars? <http://www.jsc.nasa.gov/pao/flash/>

Mars Missions

<http://mpfwww.jpl.nasa.gov/>

<http://mars.jpe.nasa.gov/classroom/teacher.htm>

4. Given the complexity of the theme under analyses, following, there are some guiding questions that can support your search and analysis.

Developers: Galvão, C., Reis, P., Freire, A. e Oliveira, T. (2006). Avaliação de competências em ciências: Sugestões para professores do ensino básico e do ensino secundário. [Competence evaluation in science. Suggestions for basic and secondary education teachers]. Lisboa: ASA.

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Character	Guiding questions
Doctor	What health effects result from lack of gravity? How these health problems can be overcome? How can one guarantee no health problems to the crew?
Scientist	Which provisions are necessary? How can one get food for such a long trip? How can one store food? How will the air and water needed for survival be recycled? What to do with garbage and other waste? How can crew take a shower? How can crew eat fruit?
Person responsible for the mission	Who should form the crew? Who should take leadership and how should the leader manage the crew? Which rules should be drawn to ensure mission success? How can one get financial support? How can one justify citizenships the need for doing this trip?
Engineer	Which form should the spatial trip have in order to optimize its movement? Which materials should it be built from? How will it move? How can we obtain energy for spaceship working and maintenance? What is its maximum speed?

Table 1 – Relationship between character and investigation questions

- After writing the individual report, you have to discuss in group your individual contributions. The group then writes up a trip proposal taking into consideration each character points. While writing your group report, you should have in mind that trip success will depend on the environmental conditions created inside the spaceship, such as earth's survival depends on environmental conditions. This idea should be considered in your trip proposal, and for that group should reflect on which conditions can guarantee crew survival and ship environment preservation.
- In the end, each group will present its work to the overall class that will discuss viability of the proposal and will establish a parallel between spaceship and earth environmental conditions, and both (ship-system and earth) survival.

For assessment, see tables presented in the inter-planet trip_assessment.doc