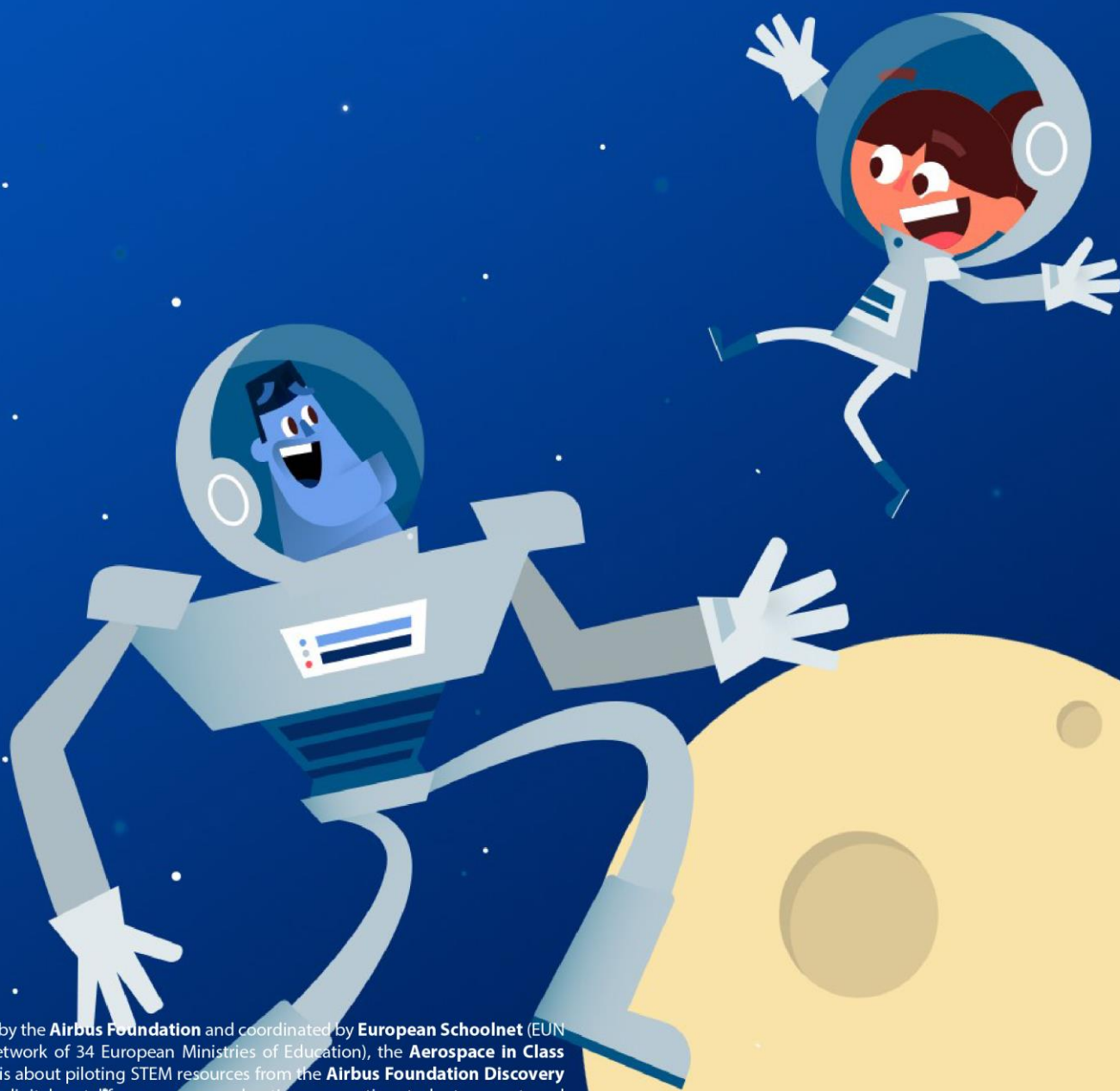


**AEROSPACE IN CLASS
LEARNING SCENARIO**

**Mission to the Moon:
Designing your Moon Base**



Funded by the **Airbus Foundation** and coordinated by **European Schoolnet** (EUN – the network of 34 European Ministries of Education), the **Aerospace in Class Project** is about piloting STEM resources from the **Airbus Foundation Discovery Space**, a digital portal for aerospace exploration, connecting students, parents and educators across the globe with professionals in the field, bringing today’s research and technology to life. The creation of this Learning Scenario is supported the **STEM Alliance** (an initiative that brings together industries, Ministries of Education, and education stakeholders to promote STEM education and careers to young Europeans) and by **Scientix**, funded from the European Union’s H2020 research and innovation programme – project Scientix 4 (Grant agreement N. 101000063). The content of the document is the sole responsibility of the organizer and does not represent the opinion of the European Commission (EC), nor is the EC responsible for any use that might be made of the information contained.

Mission to the Moon: Designing your Moon Base.

By Ana Živković

Abstract

Living and working on the Moon is not an all too distant future anymore. However, designing a base on the Moon can be difficult due to the harsh climate conditions, solar radiation, lack of building material etc. Using Airbus Foundation Discovery Space videos to open this lesson will spark students' curiosity and boost creativity and motivation. Through describing their drawings and plasticine models of Moon camp settlements, students will revise and expand their vocabulary in English and learn to use prepositions of place.

Keywords

Moon base, Living on the Moon, Moon, Rooms, Furniture, Writing a Description, Model House, Young Learners

Table of summary	
<i>Subject</i>	<i>English (as a foreign language), Art, Science</i>
<i>Topic</i>	<i>Base on the Moon - Rooms and furniture</i>
<i>Age of students</i>	<i>8-12 years old</i>
<i>Preparation time</i>	<i>30 min</i>
<i>Teaching time</i>	<i>90 min (2 lessons of 45 minutes each)¹</i>
<i>Online teaching material</i>	ESA kids resources - Paxi explores the Moon: https://youtu.be/PxqltnER8E4 <i>Optional:</i> <i>VR video about Moon landing</i> https://www.youtube.com/watch?v=aYT5IKxyX4Q
<i>Offline teaching material</i>	Plastic bottle caps, plastic cups, cardboard, drinking straws, egg carton, plasticine clay/Playdough, glue, Scotch tape, scissors (optional – Lego bricks)
<i>Airbus Foundation Discovery Space resources used</i>	<i>Architect to the Stars – making a home (designing your Moon base) video: Building your home on the moon</i>

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¹ More time might be needed, about 20 min for drawing and 30-45 min for 3D modeling, depending on the student age and skills with arts-and-craft supplies.

Integration into the curriculum

This learning scenario takes a cross-curricular approach and is linked to the learning outcomes of different subjects taught at primary school as listed below:

English as a foreign language: Students will be able to describe a place and the position of a certain object using prepositions of place.

Art: Students express their ideas creatively through designing and drawing and use recyclable materials to make a model.

Science: Students will be able to recognize and name all the planets of The Solar System.

Aim of the lesson

Students will revise the vocabulary related to rooms, furniture and appliances, as well as learn some new vocabulary. They will describe their drawing using sentence prompts or write a short description on their own using target vocabulary and prepositions of place (in, on, under, behind, above, below).

Outcome of the lesson

Students will have drawn a Moon base and labelled the rooms, furniture and appliances. They will have written short descriptions of their drawing and will have made a 3D model based on their drawing / sketch using the recyclable materials and arts-and-crafts supplies.

Trends

Peer learning, Playful learning, BYOD (bring your own device), Augmented reality

21st century skills

Creativity and collaboration – in the Draw-and-write activity, students are given a chance to express their creativity while making a sketch of their Moon base. Also, they can give each other feedback on the written description and collaborate in groups (as well as discuss, negotiate and agree on the final look of their model), while making a 3D model based on one or several of their drawings.

Activities

Name of activity	Procedure	Time
	Lesson 1 (English as a foreign language)	45 min
Warm up	Use a quiz like the one provided in this presentation (can also be used in any other quiz tool or format) to revise target vocabulary (rooms, furniture, appliances).	10 min
Introducing the topic	Watching the Airbus Foundation Discovery Space videos under “Architect to the Stars: Building your home on the moon ” and a short discussion about what	10 min

Name of activity	Procedure	Time
	the students already know about space, planets and the Moon.	
Game: Match the sentences with the pictures	Students will match the sentences with the pictures of the worksheet in Annex 1 (correct answers provided in Annex 2).	5 min
Drawing and writing	Students use their imagination and draw / sketch a Moon base, label the rooms and write 3-5 sentences description using target vocabulary and prepositions of place (e.g. <i>My Moon base has 3 rooms. There is a bunkbed in the bedroom and a computer. In the lab, there are boxes for plants and a telescope. The third room is a garage for my Moon rover.</i>).	10 min
Presentation	Students read their descriptions and show their drawings – peers give comments	10 min
Lesson 2 (Art)		45 min
Warm up	Watching the YouTube video “ Paxi explores the Moon ” and discussing what a Moon base should look like, what it needs to be built of, what it must protect the astronauts from etc. <i>Optional activity:</i> <i>Where possible students bring their smartphones and VR goggles – watching “Moon landing 360 video”</i>	10 min
Building a model: Groups of 4 students	Using recyclable materials and arts-and-craft supplies students work in groups of four and make a 3D model of the moon base settlement based on the drawings from the previous lesson.	25 min
Oral assessment	Students describe their models to other groups using the acquired vocabulary (rooms, furniture, appliances, prepositions of place).	10 min

Assessment

The teacher can assess the acquisition of target vocabulary and proper use of prepositions of place based on the students’ ability to describe their drawing or a 3D model. Example of evaluation rubric can be found in [Annex 3](#).

Teacher’s feedback

This learning scenario was adapted for online teaching by the author. Details on the online implementation can be found in [Annex 4](#).

About the Aerospace in Class Project



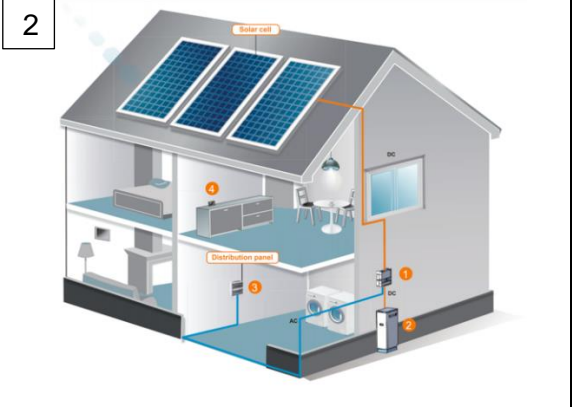

The “Aerospace in Class” Project is about integrating STEM resources from the Airbus Foundation Discovery Space in classes for 8- to 12-year-old students. The project is funded by the **Airbus Foundation** which is committed to bringing together the products and people of the global aerospace company Airbus to help address the challenges of today's society. Youth development is one of the pillars upon which the Airbus Foundation is built, empowering young people for the challenges of tomorrow. The **Airbus Foundation Discovery Space** is a [digital portal](#) for aerospace exploration, connecting students, parents and educators across the globe with professionals in the field, bringing today's research and technology to life. [European Schoolnet](#) is coordinating this project. EUN is the network of 34 European Ministries of Education, based in Brussels, which aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners.



The “Aerospace in Class” Project has also been supported by the STE(A)M Partnerships programme of Scientix, funded from the European Union's H2020 research and innovation programme – project Scientix 4 (Grant Agreement N. 101000063), coordinated by European Schoolnet (EUN). The content of the document is the sole responsibility of the organizer and it does not represent the opinion of the European Commission (EC), and the EC is not responsible for any use that might be made of information contained.

Annex 1: Printable Worksheet

Match the sentence to the correct picture:

<p>1</p> 	<p>3</p> 
<p>2</p> 	<p>4</p> 
<p>The Moon base must be underground.</p>	<p>Solar panels are on the roof.</p>
<p>Astronauts will grow food in space.</p>	<p>Maybe one day, some people will live in a Moon base like this.</p>

Picture credits and license:

- Picture 1 - https://cosmos-images1.imgix.net/file/spina/photo/21449/200309_space_lettuce.jpg?ixlib=rails-2.1.4&auto=format&ch=Width%2CDPR&fit=max&w=835
- Picture 2 - <https://www.rdawep.org.au/wp-content/uploads/2019/02/SA-Home-Battery-Scheme.png>
- Picture 3 - https://www.esa.int/var/esa/storage/images/esa_multimedia/images/2018/10/3d-printed_lunar_base_design/17891946-2-eng-GB/3D-printed_lunar_base_design.jpg
- Picture 4 - https://www.esa.int/var/esa/storage/images/esa_multimedia/images/2017/09/maybe_one_day_some_people_will_live_in_moon_bases/17883732-2-eng-GB/Maybe_one_day_some_people_will_live_in_moon_bases_pillars.jpg

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Annex 2: Key for the worksheet

Picture 1: "Astronauts will grow food in space."

Picture 2: "Solar panels are on the roof."

Picture 3: "The Moon base must be underground."

Picture 4: "Maybe one day, some people will live in a Moon base like this."

Annex 3: Evaluation Rubric

<u>Peer Assessment Rubric</u>	Complete (80 - 100 %)	Moderate (40-80 %)	Little (0 – 40%)
Target vocabulary used	The student's description contains almost all of the target vocabulary (rooms, furniture, appliances...)	The student's description contains only some parts of the target vocabulary	The student's description contains very few or no words of the target vocabulary
Prepositions of place used	Prepositions of place (in, on, under, behind, behind, above...) used correctly	Prepositions of place sometimes used correctly	Prepositions of place not used or used incorrectly
Description corresponds to the drawing	The description reflects the drawing	The description reflects the drawing to some extent	The description doesn't reflect the drawing
3D model similar to the drawing	3D model very similar to the drawing	3D model somewhat similar to the drawing	No 3D model or not similar to the drawing

Annex 4: Adaption to Online Implementation

Notes for online implementation due to school's transition to distance learning:

- Explanation for the task, videos, links etc. was posted (distributed to students) via a website dedicated to distance teaching: <http://cegar31.weebly.com/doma263i-zadaci/homework-week-4and-5>
- The initial quiz game (see [presentation](#)) intended for revision of old and introduction of new target vocabulary (planned as a group activity) was changed into flashcards game to be played online individually: <https://quizlet.com/167980229/flashcards>
- Teacher sent feedback to each student instead of peer-to-peer feedback