Europeana Learning Scenario

Title

A paper plane parade

Author

Alina Marilena Buduleanu

Abstract

Since the beginning of their existence, the humans looked up to the sky and dreamt to fly above the clouds. During the learning activity, the students are challenged to investigate the flying machines which helped the mankind to travel through the air. They become aerospace engineers who learn how does an airplane fly and build their own paper planes. The paper plane parade lesson let the children understand that dreaming is the first step to happiness and daring is the first step to success.

Keywords

flying machine, paper plane, build, fly, feedforward

Table of summary

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Subject	Science, Mathematics, ICT, Arts
Topic	Science: Forces Mathematics: Shapes, Measurements ICT: Online searching and brainstorming Arts: Origami - folding paper technique
Age of students	9-10 years
Preparation time	1 hour for the LS creator No time for preparation needed for teachers who follow this LS and use the resources provided.
Teaching time	60 minutes
Online teaching material	Mindmup The clip `How do airplanes fly?` by Airbus Foundation The clip `How to build a paper airplane?`
Offline teaching material	A4 white or colored paper Cardboard target Exit ticket sheets

Europeana resources used	Pictures of flying machines:
	Zeppelin
	Hot-air balloon
	Parachute
	Helicopter
	Airplane
	Pictures of airplanes' design in different decades:
	The airplane in the 10's
	The airplane in the 40's
	The airplane in the 60's
	The airplane in the 80's

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Integration into the curriculum

The Romanian curriculum gives to teachers the opportunity to build learning scenarios which meet STEM based topics. A lesson about investigating the existing flying machines and building paper planes is focused on topics such as forces, shapes, measurements, and origami techniques which are mentioned in the curriculum table of contents for Science, Mathematics and Arts.

Aim of the lesson

At the end of the lesson, the students will be able to:

-recognize and name different flying machines;

-identify airplanes' design during time;

-name the parts of an airplane;

-know how does an airplane fly;

-build a paper plane able to fly;

-give constructive feedback to their peers.

Outcome of the lesson

The students improve their creative and critical thinking skills. They feel motivated and engaged in a learning by doing activity of making and testing paper planes. They build paper planes, use them to fly in a parade and celebrate their success. They feel confident in themselves and dare to dream about jobs of the future based on STEM skills.

Trends

Learning by doing

STEM learning

Feedforward based assessment

21st century skills

Critical thinking: Students reflect on open questions and find their own solutions for real life problems: how airplanes fly; how to build a flying paper plane.

Creativity: Students exercise their creative thinking skills, taking information and conclusions from their analysis of a problem and use them to create their own products.

Investigation: Students investigate materials and photos to discover new things: the parts of a plane; how and if the airplane's design changed during the past 100 years.

Problem solving: Students define real life problems, such as what does a plane need to fly, develop and deliver a solution.

Communication: Students engage in constructive dialogues and listen to each other's feedback focused on constructive criticism, suggestions, and opinions.

Activities

Name of activity	Procedure	Time
How do humans fly?	The teacher challenges the students to find answers to the driving question **How do humans fly?** The students know that the human body isn't biologically designed to fly, so the mankind invented and used special machines and devices to travel through the air. As result of their answers, the students use **Mindmup.com** to gather all the flying machines they know in a mind map. The students also search the **Europeana.eu** platform to find pictures of the flying machines; the teacher will also provide pictures: Zeppelin Hot-air balloon Parachute Helicopter Airplane The large amount of Europeana.eu materials about airplanes help the students to **conclude** that the most common flying machine of the flight history is the airplane.	10'
Airplanes in a time-lapse	The teacher presents to the students Europeana.eu images with **airplanes' design** in different decades: The airplane in the 10's The airplane in the 40's The airplane in the 60's The airplane in the 80's	5'

	The students observe the pictures and identify **the parts of an airplane**: body, wings and tail – the same parts of a bird's body. They also **conclude** that, in the past 100 years, the plane's structure didn't suffer major changes.	
Building my paper plane	The students **watch the clip** `How do airplanes fly?` by Airbus Foundation **and learn** that an airplane requires 3 characteristics to be able to fly in the air: ✔ the body parts of a bird (pointed cockpit, large wings, light body); ✔ a proper lifting angle; ✔ a force which pushes it in the air. The students are asked **to build a paper plane** with no tutorial provided. They use only an A4 paper sheet and their imagination to fold the paper and build a flying plane.	15'
A paper plane parade	● The students organize **a paper plane parade** where they **test the airplanes** to see how fast, how far and how precise they fly. They have 3 attempts to throw the paper plane to a target. ● The teacher provides to the students the tutorial clip `How to build a paper airplane?`. The students watch the video and give feedback to each other, from the improvement perspective, with only constructive critique remarks: ✔ **Step 1.** They establish that all of them had a good start: they built paper planes. ✔ **Step 2.** They investigate and tell what went wrong: the paper plane didn't lift enough; it didn't fly long enough or it didn't hit the target. ✔ **Step 3.** They establish what is to be done to improve the model: a better folding technique; a much pointier cockpit; a higher force to be applied when throwing the plane to the target point. The students have 10 minutes to improve their planes and test them one more time.	25'
Exit ticket	The students fill in the Exit ticket questionnaire (annex).	5'

Assessment

The students assess their products = paper planes in peers, by giving feedback to each other from the feedforward perspective, with a focus on the promise of the future rather than the mistakes of the past: How the paper plane can be improved to fly better?

For more information about how to teach students to give feedforward, please, see the clip `The story of Austin's butterfly` by Ron Berger.

Student feedback

To receive my students' feedback on the lesson I asked them to fill in an exit ticket questionnaire.

The students enjoy such lessons which challenge them to build and test their products. Through learning by doing tasks and feedforward peer assessments, they become engaged, responsible and more confident in themselves.

Teacher's remarks

My main goals for this learning activity were to develop my students' STEM skills and a growth-mindset. By asking them to be aerospace engineers who investigate, design and build paper planes which fly, I motivated them to take their own decisions with courage and not to be afraid of mistakes. I am convinced that by the end of the lesson my students learned to embrace challenges, to see the continuous effort as the path to mastery and to learn from constructive criticism.

About the Europeana DSI-4 project

Europeana is Europe's digital platform for cultural heritage, providing free online access to over 53 million digitised items drawn from Europe's museums, archives, libraries and galleries. The Europeana DSI-4 project continues the work of the previous three Europeana Digital Service Infrastructures (DSIs). It is the fourth iteration with a proven record of accomplishment in creating access, interoperability, visibility and use of European cultural heritage in the five target markets outlined: European Citizens, Education, Research, Creative Industries and Cultural Heritage Institutions.

European Schoolnet (EUN) is the network of 34 European Ministries of Education, based in Brussels. As a not-for-profit organisation, EUN aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. European Schoolnet's task in the Europeana DSI-4 project is to continue and expand the Europeana Education Community.

Annex

Exit ticket

3	Write 3 things that you have learnt during the lesson: 1. 2. 3.
2	Write 2 things that you found interesting: 1. 2.
1	Write 1 thing that you didn't understand and would like to work on it a bit more: 1.