

Flight of fancy: An imaginative though realistic idea

The online implementation of an AERO Learning Scenario with 8th graders

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Abstract

Flight of fancy is an AERO Learning Scenario (LS) that was designed during the Aerospace in Class MOOC, coordinated by European Schoolnet (EUN), and part of the “Aerospace in Class” project. The participation in the MOOC provided me with the incentive, knowledge and the materials to design and implement the LS with my students. I am a teacher of English in a lower secondary public school in Greece and I was so excited with all the information I had acquired during the MOOC that I really wanted to share it with my students. STEM subjects have always fascinated me and with the “A” added to the term - STEAM - I have the opportunity to combine my discipline - language Arts - with science, technology, engineering and mathematics to my everyday teaching. The learning scenario was implemented exclusively online (March-April 2021) with my 8th grade students (13-14 years old) as in Greece we have been in an emergency remote teaching (ERT) situation since October 2020 (with few in between small onsite teaching breaks). The LS was submitted in the STEM ALLIANCE & STE(A)M IT COMPETITION / 2021 STEM DISCOVERY CAMPAIGN in the “Scientix Competition 2: STEM Resources”. English, History, Engineering, and Technology are combined with the resources of the Airbus Foundation and offer students with no previous familiarity with the topic, a unique way of experiencing the science of flying.

“Flight of fancy: An imaginative though realistic idea” is a learning scenario that focuses on the science of flight and leads the students into a journey to the history of flying and the pioneers who made the imaginative task of flying realistic and achievable. Through the stories of the Wright Brothers, the inventors of the airplane and Amelia Earhart, the first woman pilot to cross the Atlantic, students discover how flying machines were invented, powered, designed and evolved to satisfy the need for fast and safe long distance transportation. The videos from the resources of the Airbus Foundation Discovery Space are an excellent means of inspiring students to explore aviation and learn the how, what and why of flying!

Key words: History of flying, pioneers of flying, Aerospace in Class, Airbus Foundation, STEM

Aims and objectives

The general aim of the lesson is to acquaint students with aviation. Additional aims of the learning scenario are for students to learn about the history of flight, to learn about the design and engineering of airplanes, to meet the pioneers who made travelling by air possible, to design their own paper planes, to guess the causes of a flight not going well. Other objectives are online collaboration and communication, engaging in project work and using web 2.0 tools and web resources to achieve learning outcomes.

Procedure

The screenshot shows a Zoom meeting window. At the top, there are social media icons (Twitter, Facebook, Messenger, LinkedIn) and the text "Planes in the sky Finding your way through the clouds". The main content is a video player with the title "The history of flying" and a subtitle "Discovery Space · 19 February 2019". The video content shows an illustration of a man with a beard and a woman. Below the video, there are download options: "MP4 704KBPS 8MB", "HD 720P 63MB", and "Full HD 1080P 113MB". On the right side of the video player, there is a "Speaking:" panel with a grid of participants: "TEODORA", "Marvel... (Host...)", "Ραφαηλα", and "MARINA". At the bottom of the Zoom window, the Windows taskbar is visible with the date and time "9:30 πμ 23/3/2021".

The screenshot shows a Kahoot! quiz interface. At the top, there is a "Speaking:" panel with a grid of participants: "Τρεντιδου Ελενη-Αθανασια Β3", "Marvel... (Host...)", "ΔΗΜΗΤΡΙΟΣ", and "ΔΗΜΗΤΡΑ". The main content is a quiz question: "He flew 2500 flights with his own glider before he crashed". Below the question is an image of a man with a glider. There are four answer options: "Leonardo da Vinci" (red button), "Otto Lilienthal" (blue button), "Auguste Montgolfier" (yellow button), and "George Cayley" (green button). A large purple circle with the number "18" is visible on the left side of the quiz. At the bottom, the Windows taskbar is visible with the date and time "11:39 πμ 30/3/2021".

In the second lesson we read about the history of the Wright Brothers and the invention of the airplane. Students studied the webpage about the [Wright Brothers in Ducksters](#) and answered a [10 question trivia quiz](#) to evaluate the knowledge gained on the topic.

Kahoot! | Wright Brothers: Inventors of the... | You're sharing Google Chrome | Stop | Shared

ducksters.com/biography/wright_brothers.php


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The boys grew up loving to invent things. They got interested in flying when their dad gave them a toy helicopter than flew with the help of rubber bands. They experimented with making their own helicopters and Orville liked to build kites.

Who flew the first flight?

Orville made the famous first flight. The flight took place at Kitty Hawk [North Carolina](#) on December 17, 1903. They chose Kitty Hawk because it had a hill, good breezes, and was sandy which would help soften the landings in case of a crash. The first flight lasted 12 seconds and they flew for 120 feet. Each brother made additional flights that day that were slightly longer.

This wasn't a simple or easy task they had completed. They had worked and experimented for years with gliders perfecting the wing design and controls. Then they had to learn how to make efficient propellers and a lightweight engine for the powered flight. There was a lot of technology, know how, and courage involved in making that first flight.



Speaking:

- Maravela... (Host...)
- ΓΕΩΡΓΙΑ
- Ραφαηλι
- ΓΕΩΡΓΙΑ
- Χρήστος
- ΣΤΑΜΑΤΗΣ

11:50 πμ 26/3/2021

Kahoot! | Biography Quiz: The Wright Bro... | You're sharing Google Chrome | Stop | Shared

ducksters.com/biography/quiz/wright_brothers_questions.php

10 Question Quiz

1/10

1) In what two states did the Wright Brothers spend most of their childhood in?

- North Carolina and Virginia
- Illinois and New York
- South Carolina and Georgia
- North Carolina and Alabama
- Indiana and Ohio

Submit

Speaking:

- ΙΩΑΝΝΗΣ

Chat

- from Ζωη (privately): 11:45 AM
- κουρία να το κάνουμε σε ομάδα
- from Maravela Sofronia to everyone: 11:54 AM
- https://www.ducksters.com/biography/quiz/wright_brothers_questions.php
- from ΣΤΑΜΑΤΗΣ (privately): 11:56 AM
- 7/10
- from Ζωη to everyone: 11:58 AM
- 8/10
- from Ραφαηλι to everyone: 11:59 AM
- 7/10
- from ΓΕΩΡΓΙΑ to everyone: 11:59 AM
- 8/10
- from ΖΑΜΒΑΚΟΥΛΑΣ to everyone: 11:59 AM
- 6/10
- from ΓΕΩΡΓΙΑ to everyone: 11:59 AM
- 8/10

To: Everyone

Enter chat message here

11:59 πμ 26/3/2021

In the third lesson students watched the video [How to design an airplane](#) from the AF. The aim was to provoke students' curiosity in order to research the topic, in the Wright Brothers webpage, of how the [Wright Brothers designed their plane](#) and what they had to take into account in order to make it fly.

Chapter 2
How to design an airplane?

When designing an airplane...
But, how about safety? Let's...
today!

MP4 704KBPS 7MB
HD 720P 61MB
Full HD 1080P 114MB

Chat
from Maravelaki Sofronia to everyone: 9:04 AM
How is an airplane designed and manufactured? What things do you have to take into consideration?
from [redacted] Pagonis to everyone: 9:05 AM
the bird
To: Everyone
Enter chat message here

KITTY HAWK

Available in Française, Español, Português, Deutsch, Poccuo, 中文, 日本, and others.
Select Language

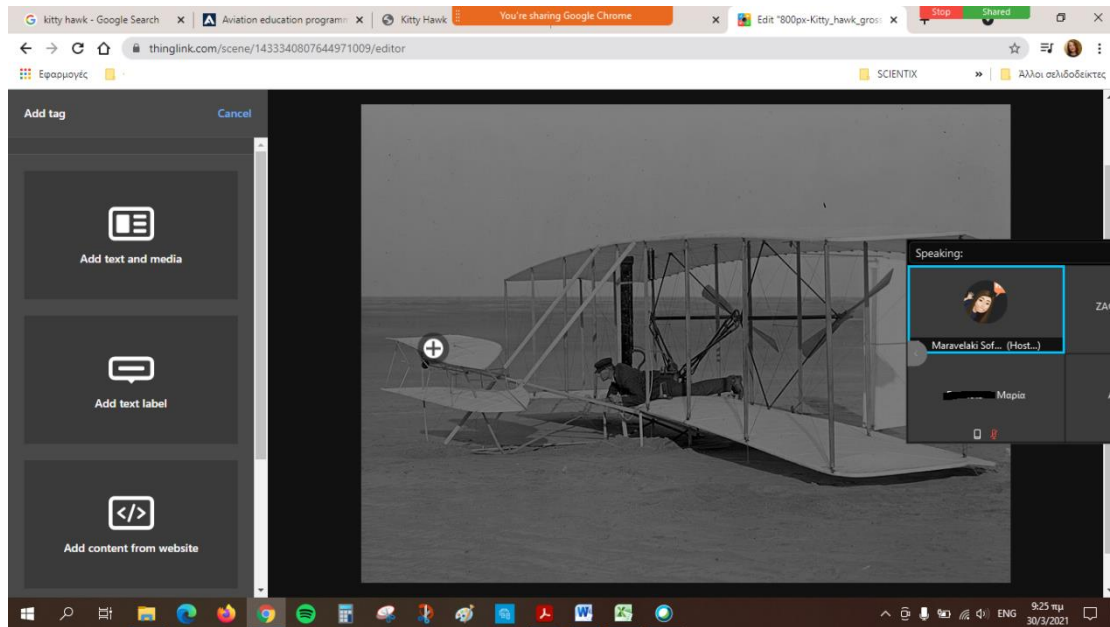
As Wilbur and Orville labored over the design of their first glider in the autumn of 1899, they faced three major engineering tasks. First the wings had to generate enough lift to support the weight of the glider and the pilot. For this, they relied on the formulas and tables of data that **Lilienthal** had gathered during his lifetime. Will calculated that a biplane with a 20-foot (6 meter) wingspan and a 5-foot (1.5 meter) chord – slightly larger than **Chanute's** glider – would do. He planned a much flatter wing camber (curved shape) than Lilienthal, however. Lilienthal had used a 1-12 camber – the wing curve was 1 inch high for ever 12 inches wide. Wilbur's kite experiments likely taught him that wings with deep cambers were harder to control than those with shallower curves. His camber would be just 1:20.

Second, the wings had to be flexible so the brothers could twist them. Chanute's glider had been completely rigid along its span (wing tip to wing tip) and chord (leading edge to trailing edge). The Wrights decided to brace their machine along its span, but to only brace the chord of the middle bay, where the pilot lay. This would allow them to twist the wings along most of their length.

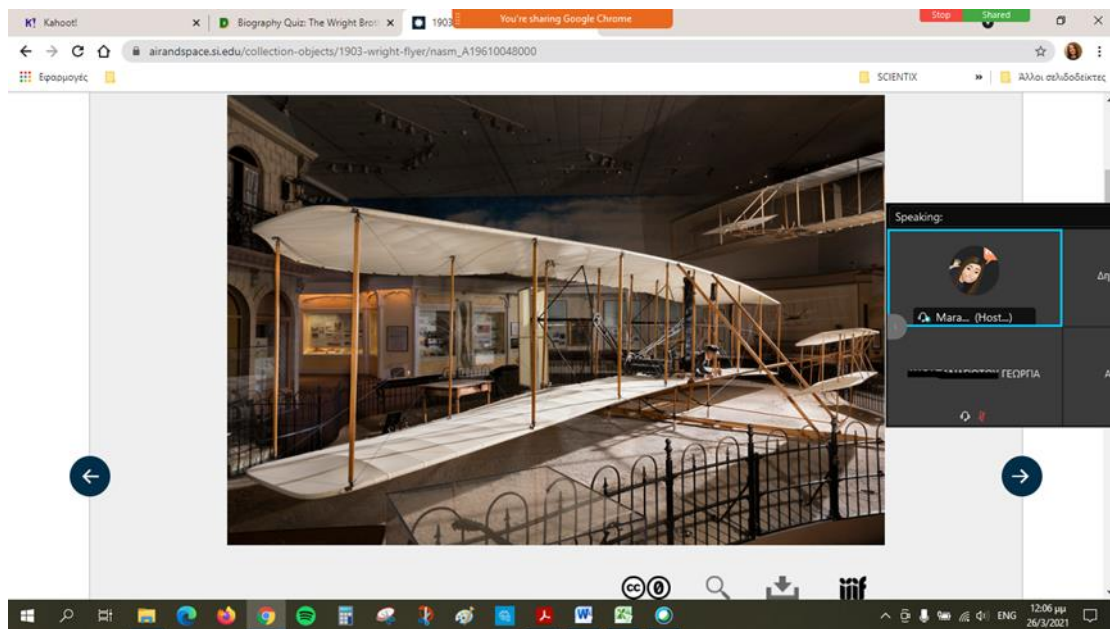
Finally, they had to add a control system – a means for the pilot to move the aerodynamic control surfaces that they hoped would balance and navigate the glider in the air. To twist the wings, they ran cables from the wing tips to a

Comparing the rigging of the 1896 Chanute-Herring Glider with the 1900 Wright Glider. Both have bracing wires along the span (shown in red). However, every bay on the Chanute is braced.

After investigating the topic, we downloaded the picture of the [Kitty Hawk from Wikipedia commons](#) and uploaded it to [Thinglink](#). Then we included the parts of the plane in the picture (wings, chords, cables, tail, rudder, etc) and explained their function according to what students have read.



Finally we visited online the [Smithsonian Air and Space Museum](#) to see the Kitty Hawk which is exhibited in the museum. The students were impressed that the plane was still intact and in good condition and that someone could actually see it from up close.



In the fourth lesson students learned about Amelia Earhart, the first woman to cross the Atlantic solo, and were very impressed by her achievements. But they were also very sad to know that she got lost and was never to be found. Students studied the webpage about [Amelia Earhart in Ducksters](#) and answered a [10 question trivia quiz](#) to evaluate the knowledge gained on the topic.

Amelia Earhart

Biography

- **Occupation:** Aviator
- **Born:** July 24, 1897 in Atchison, Kansas
- **Died:** She disappeared on July 2, 1937 over the Pacific Ocean. She was declared dead on January 5, 1939
- **Best known for:** Being the first woman to fly solo across the Atlantic Ocean

Biography:

Where did Amelia Earhart grow up?

Amelia Earhart was born on July 24, 1897 in Atchison, [Kansas](#). Her father, Edwin, was a lawyer who worked for the railroad. She spent a lot of her childhood playing with her younger sister Muriel.

Growing up Amelia and her sister had all sorts of adventures. They collected insects and frogs. They liked to play sports including baseball and football. Amelia even learned to shoot a .22 rifle and used it to kill rats in her Dad's barn.

Amelia's first "flight" was when she was just seven years old. With the help of Muriel and her uncle she made a homemade roller coaster. After crashing dramatically she told her sister that it "was just

Amelia Earhart from the Los Angeles Daily News

10 Question Quiz

2/10

2) According to the article, what did Amelia Earhart see at the Iowa State Fair when she was eleven years old?

Roller coaster

Flying squirrel

Jet pack

Wright Brothers airplane

Flying saucer

Submit

With this in mind, in the fifth and final lesson, we investigated the possible causes of Amelia's failure to cross the Pacific Ocean. Students watched the videos from [AF](#) "What happens when you fly", "How airplanes fly in bad weather", "The invisible highways in the skies" and made guesses and discussed the problems Amelia may have encountered during her last flight according to what they have understood from the videos. Then, in an online brainstorming activity in [AnswerGarden](#), the students expressed the most possible causes of her disappearance. They also voted in a [Tricider](#) the most plausible reason of her disappearance.

airbus.com/company/sustainability/airbus-foundation/discovery-space/kids/science-of-flight.html#medialist_copy_copy__428623560-video

Chapter 3
How airplanes fly in bad weather

Airbus Foundation • 22 February 2019

How airplanes fly in bad weather

In the sky there's no umbrella protecting airplanes from the rain. So how do they fly in the sky in any weather?

MP4 704KBPS 6MB | HD 720P 63MB | Full HD 1080P 101MB

Speaking: Marvel..., BAZIAHE, LHMHPTA, Ekyw-A8ava...

airbus.com/company/sustainability/airbus-foundation/discovery-space/kids/science-of-flight.html#medialist_copy_copy__428623560-video

Chapter 3
The invisible highways in the sky

Airbus Foundation • 22 February 2019

The invisible highways in the sky

How do airplanes find their way through the sky? Do they use roads or GPS navigation like we do?

MP4 704KBPS 13MB | HD 720P 66MB | Full HD 1080P 170MB

Speaking: Marvel..., TIOPPOE, BAZIAHE, LHMHPTA

Chat
 from [redacted] to everyone: 9:17 AM
 ice stuck on the engine and it stopped so the plane fell
 from [redacted] to everyone: 9:17 AM
 maybe she ran out of fuel

answergarden.ch/1860620

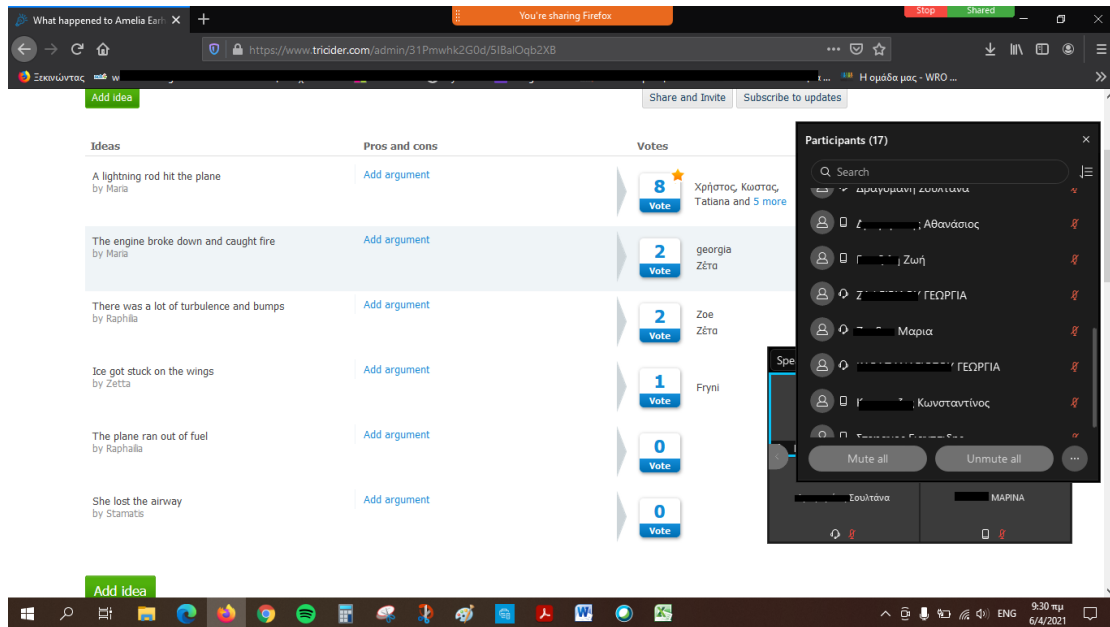
AnswerGarden

What happened to Amelia Earhart's airplane?

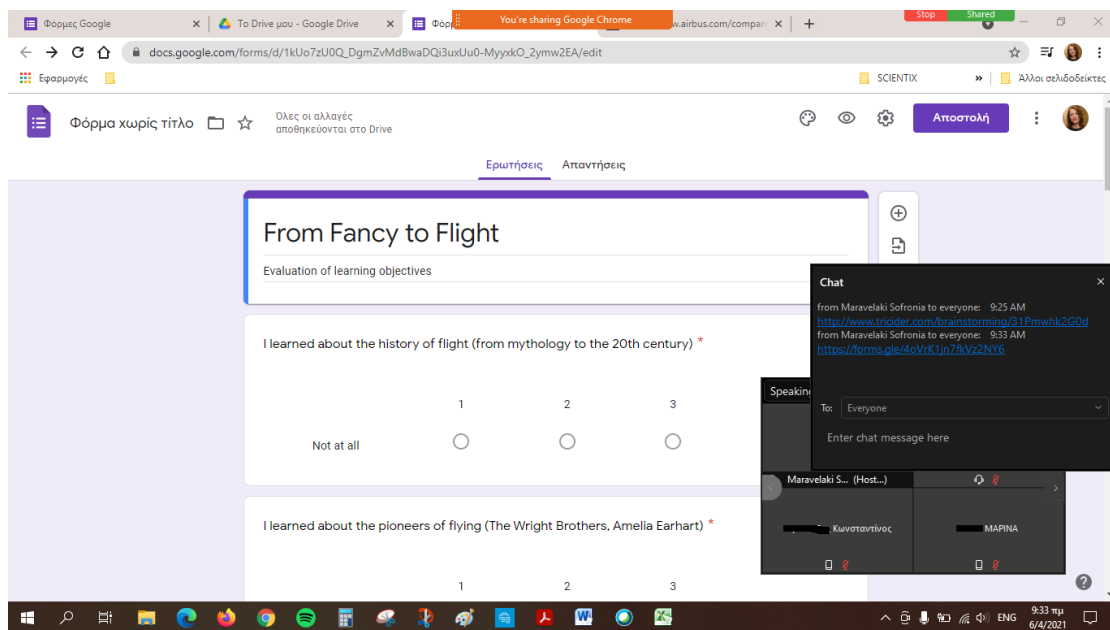
Thanks! Type another answer here... Submit

ice stuck on the engine and the plane fell
 a strong wind took her plane down
 maybe the wind of the plane broke maybe the pilot is dizzy
 maybe the wind of the broke
 a stroco wind took the plane down she lost the airway
 maybe she ran out of fuel lightning rod struck maybe she run out of fuels
 she didnt have gps maybe the pilot fell off
 lightning rod stuck her plane

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At the end of the lessons, students expressed satisfaction or dissatisfaction of learning and knowledge acquisition by filling in a [Google form](#) administered to them at the end of the lessons. Students reacted to statements and expressed their views by choosing from a likert type scale from 1. Not at all, 2. Enough, and 3. A lot, what they learned (or not) and liked (or not) in the lesson. Then, teacher and students will discuss the results of the Google form in order to exchange views and opinions and suggest possible ways of improving teaching and learning objectives.



Discussion

Most of the learning objectives have been achieved. From the 21 students that have filled in the form, most of them learnt about the history of flight, about the pioneers of flying, about the invention of the airplane, how to design their own paper airplane, the causes of a flight not going well. Most of them liked the videos from the Airbus Foundation, enjoyed making and playing the Kahoot quiz, enjoyed making the Thinglink picture of the Kitty Hawk, enjoyed their visit to the Smithsonian Air and Space Museum, enjoyed playing the quizzes about The Wright Brothers and Amelia Earhart, think they know what happened to the airplane Amelia Earhart was flying in and why she got lost, liked the online lessons, liked the

online communication and collaboration with their classmates and most of them think their English teacher is great and enjoyed her lessons (20/21! You can't please them all, can you?)

Teacher and student relationships have played an important role in achieving these learning outcomes. I have been working with these students since last year and they are used to doing collaborative group activities and using web 2.0 tools for projects. Their level of competency in English varies, from A2 to B1 according to the CEFR, and I tried to simplify the procedure for the weaker students (using mother tongue, explaining) and make it more interesting and challenging for the stronger ones (assigning roles, giving initiatives).

Personally I was surprised at the students' reactions towards the topic of the LS. When I suggested it they gladly agreed to take part and their enthusiasm during the implementation was obvious. I gained a lot of satisfaction and useful insights of how to better prepare online lessons, teach and engage all students and making effective use of resources while designing this LS.

This LS could have been implemented with the aid of other colleagues, e.g. the teacher of technology who would help the students make a model a plane, the teacher of Physics who could talk to the students about aerodynamics and turbulence, the History teacher who could describe in detail the historical context of the topic of flight. Collaboration among teachers of other disciplines is hard while teaching online during a pandemic that has isolated the school community to their personal premises behind a screen. Let's hope and pray this situation ends soon and be positive and optimistic about the future!