

AEROSPACE IN CLASS
LEARNING SCENDARIO

How Things Fly: Gliders



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.

How Things Fly - Gliders

By Jennifer McGarry

Abstract

This lesson plan takes into consideration the 4Cs of Learning and Innovation Skills (critical thinking, communication, collaboration, creativity).

Students begin to understand how gliders move through the air through watching a teacher-led demonstration of how hot air rises. New concepts are introduced through reading a set of slides. Students will then watch an Airbus Foundation Discovery Space video to understand how planes fly and learn new vocabulary. They will then construct their own cardboard glider and/or 3D Tinkercad model.

Keywords

Gliders, Thermals, Flight, Instructables, STEAM

Table of summary	
<i>Subject</i>	<i>Maths, English, Science, STEAM</i>
<i>Topic</i>	<i>“Things that Fly” Maths - 2D shapes and measuring length English - oral language Science - heat transfer, flight</i>
<i>Age of students</i>	<i>10 – 12 years old¹</i>
<i>Preparation time</i>	<i>Ca. 30 mins</i> <ul style="list-style-type: none">- <i>print off glider PDFs from Instructables</i>- <i>print off “Keywords” worksheet</i>- <i>make some spare gliders</i> <i>(Extra time may need to be considered if you need to go to the art and hobby shop to buy foam board or for ordering online)</i>
<i>Teaching time</i>	<i>80 mins (one lesson)</i>
<i>Online teaching material</i>	<i>Real-time voting / feedback app (for instance, Mentimeter.com) DIY Glider https://www.instructables.com/id/DIY-Glider/</i>
<i>Offline teaching material</i>	<ul style="list-style-type: none">- <i>Cardboard - 1.5mm, 2mm, 3mm (foam board also works well instead of cardboard)</i>- <i>Double Sided Tape</i>- <i>Sticky Tape</i>- <i>Printer & Laptop/Computer</i>- <i>A4 White Paper</i>- <i>Safety Knife</i>- <i>Scissors</i>

¹ This learning scenario can be adapted to be more simple or convoluted according to the level of the class.

	<ul style="list-style-type: none"> - Safety Cutting Mat - Metal Ruler - Pencil/Pen - Elastic Band
Airbus Foundation Discovery Space resources used	<u>How do airplanes fly?</u>

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Integration into the curriculum

Maths (5th/6th Class)

- **Strand:** Shape and space; Measures
- **Strand Unit:** 2D Shapes; Length
- **General learning outcomes:**
 - use 2D shapes and properties to solve problems.
 - select and use appropriate instruments of measurement,
 - estimate and measure length using appropriate metric units

Science (5th/6th Class)

- **Strand:** Energy and Forces
- **Strand Unit:** Heat; Forces
- **General learning outcomes:**
 - Know that heat energy can be transferred

English (5th/6th Class)

- **Strand:** Oral Language
- **Strand Unit:** Communicating; Understanding; Exploring and using
- **General learning outcomes:**
 - Actively listen and attend for extended periods of time, to include other languages where appropriate, listening for more details and nuanced meanings
 - Listen and speak with increasing confidence, independence and skill in order to work collaboratively with others and to share feedback, ideas, decisions and outcomes in a range of contexts and familiar and unfamiliar audiences
 - Respond creatively and critically to what they have heard and experienced
 - Express personal needs, opinions and preferences, explaining and justifying their perspective

Aim of the lesson

I would like to have achieved the following with my students in this lesson:

- Explained how gliders make use of hot/cold air
- Discussed the students' views on how gliders work

- Demonstrated a feather's reaction to hot air rising through a teacher led experiment
- Watched Airbus Foundation Discovery Space video on "How do airplanes fly?"
- Discussed key vocabulary terms
- Enabled the students to construct functioning gliders using the Instructables resource

Outcome of the lesson

Students will be enabled to:

- Read aloud information on gliders and thermals/updrafts/downdrafts
- Infer the validity of this information through (A) watching a teacher led experiment and then (B) constructing cardboard/foam board gliders and testing its capabilities
- Evaluate their learning through questioning/exit tickets

Trends

- Inquiry-Based Science Education
- Project-Based Learning
- Collaboration Learning
- Student-Centred Learning
- Peer Learning
- STEM Learning
- Visual Search and Learning
- Open Source Learning

21st century skills

Learning Skills: **Critical Thinking, Creativity, Communication**

Literacy Skills: **Information, Media, Technology**

Life Skills: **Flexibility, Leadership, Initiative, Productivity, Social**

Learning Skills: **Critical Thinking, Creativity, Collaboration, Communication**

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Students watch an Airbus Foundation Discovery Space video pertaining to the design of gliders. They will take this information, along with the knowledge gained from this lesson and the previous lesson, to construct their own working cardboard glider. Taking the initiative to troubleshoot, being flexible and creative with their application of knowledge are some of the key skills involved in this task.

Activities

Activity	Procedure	Time
Opening lesson Real-time voting / feedback	Use a real-time voting / feedback app (for instance, Mentimeter.com) to open the lesson and discuss students' prior knowledge of gliders.	10 min
Introduction Discuss images on presentation and read information on gliders	Let the discussion from the above activity flow into a discussion regarding the image of Airbus glider on the presentation, slide 3. Discuss for a couple of minutes before asking for a volunteer to read slide 3 and slide 4 aloud. Teachers can get extra information from the Airbus website on the Airbus Perlan Mission II glider ² and take some interesting age-appropriate facts from this to suit their class.	10 min
Demonstration How a thermal holds up a feather	Students get to see the effects first-hand of how a thermal could hold up a feather through a teacher led experiment. This experiment is teacher led as it involves a hot plate burner. The teacher must ensure to position themselves in a manner so that all students can see and that all are a safe distance from the hot plate burner.	15 min
Video: “How do Airplanes Fly?”	Students watch the Airbus Foundation Discovery Space video on how airplanes fly to consider some design elements before constructing their own glider.	10 min
Activity Construct glider	Provide printed PDF of glider and other materials to allow students to construct their own glider. When testing and flying their gliders, encourage the students to use words from the “key vocabulary” box when analysing the success of their glider. Students will create their own individual glider but will work in small groups to test it and evaluate each other's design. Students could be challenged to see whose glider flies the furthest and be required to measure the distance it has flown. (NB: depending on your students' abilities, it might be useful to have some prepared elements of the glider already cut out as spares. For example, additional help/extra prep time might be required when cutting out the gap in the body of the glider that allows for the main wing to go through.)	30 min
Exit ticket	Students fill out the exit ticket (see Annex 1) and may stick this into their science journal when complete (if they keep one). It helps the students to consolidate what they learned in the lesson and can also be a useful starting point for the next lesson.	5 min

² For more information see: <https://www.airbus.com/newsroom/press-releases/en/2018/09/airbus-perlan-mission-ii-glider-soars-to-76-000-feet-to-break-ow.html>

Assessment

- Self-assessment – [Exit Ticket](#)
- Teacher observation – Creation of artefact - cardboard glider
- Teacher questioning – [Exit Ticket](#), talk and discussion

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.

3-2-1 Exit Ticket

3 things I learned from this workshop:

2 questions I still have:

1 idea that stuck with me...
