



Full STEM Ahead Long Island – Aviation Resources for Your Classroom

Background: Aerospace is the combination of science, engineering, and technology into an industry designed to manufacture and maintain both aircraft and spacecraft. While aviation is defined as the actual operation of an aircraft. The concept of flight started from ancient Greek mythology, transitioned into grandeur visions of flight by Leonardo DaVinci and then took off with the hot air balloon. In 1903 we had the first successful airplane and less than 100 years later, man on the Moon! Careers in aviation and aerospace include: flight operators, TSA agents, cybersecurity specialists, scientists, engineers, pilots, and of course astronauts to name a few.

Objective: Introduce students to aviation. Provide students an opportunity to explore aerospace through hands-on experiments and engineering.

Vocabulary:

Below are terms commonly used when learning about aerospace and aviation -

Flight Plan	Nautical Mile	Propulsion	Airfoil
Fuselage	Gravity	Eccentricity	Magnetosphere
Altitude	Jet Stream	Velocity	Payload

Materials:

50 sheets of white printer paper (per 3 students); 10 sheets of colored paper (per 3 students); scissors, 5 roles of tape (per 3 students); 2 bags of paperclips (per 3 students); markers; stopwatch

Procedure:

Airplanes are designed and manufactured by numerous companies. Currently, Boeing and Airbus are two of the most popular working to create aircraft for ease of travel and for efficiency. In this program, students will form teams of aviation companies. Each person will be assigned a role – Company President, Design Engineer, and Pilot. Company presidents will be the communicators of the program and final presenters of their work. Design engineers will collaborate to create a plane able to complete the task and the pilot will be the person participating in the ‘flight’ of their plane.

Students will work together to form an aviation company. Every company should receive all of the materials listed above with the exception of colored paper. Then the students are introduced with the challenge – construct a new paper glider to be launched without external power (but optimized for speed) and made only from one piece of printer paper.

Each company received their funding from the government – paper, scissors, tape, and paper clips – to manufacture their design. Students can test their various aircraft before ‘piloting’ the winning design against the other class companies. Once the students have test flown a few options provide the companies their colored



paper, they should be cautious, this material is also limited to the initial 10 sheets. Overall, each company should only be given 15 minutes to complete their whole process.

Get the race underway! The team whose design stays in-flight the longest amount of time will be the winning company. Students can have a few test runs and you may opt to also provide them the average of the two flights as their 'company submission.'

At the conclusion of the event, all the companies should discuss their model compared to the winning selection. What made that aircraft different from the others? How did the team work together on their design? Who (if anyone) arose as the team leader and why? How would you propose your design to a formal company for manufacturing and purchase on a large scale?



Lesson Resources:

There are great activities for students of all ages to introduce aviation activities. All lessons are aligned with NGSS learning standards -

Space Place

<https://spaceplace.nasa.gov/>

Aerodynamics Design Challenge!

https://www.grc.nasa.gov/www/k-12/BGP/PAT/Design_Challenge_act.htm

AIAA Aerospace Micro-Lessons

<https://www.aiaa.org/get-involved/students-educators/k-12-teacher-resources/aerospace-micro-lessons/1>

AOPA – You Can Fly

<https://youcanfly.aopa.org/high-school/high-school-curriculum>

Airplanes Everywhere

https://www.teachengineering.org/lessons/view/cub_airplanes_lesson08