



Airplanes!

Lesson Summary



Intended Audience: What age group is this project targeted towards?

- This project is intended toward students in grades K – 8th

Time Estimate:

- The time required for this project is approximately 30 – 60 minutes.

Prior Knowledge Required:

- Students do not need any prior knowledge for this project.

Learning Standards:

This lesson satisfies the following Next Generation Science Standards:

- K-PS2-1.** Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- K-PS2-2.** Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- 3-PS2-1.** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Objectives:

Topics intended to be taught:

- 1.) Aircraft Components
- 2.) Forces on an Aircraft: Lift, Weight, Thrust, & Drag
- 3.) Gravity
- 4.) Construction of Paper Airplane OR Balsa Wood Glider
- 5.) Understanding Forces and Interactions

Agenda:

- 1.) Introductory matching game – interactive + explanation of each component (10 minutes)
- 2.) Coloring activity with matching components handouts (5 minutes)
- 3.) Introduce the concepts of Lift, Weight, Thrust, and Drag (2 minutes)
- 4.) Pass out paper airplane paper to students so they can build and color their own airplane OR Pass out wooden gliders so students can build and color (8 minutes)
- 5.) Students will be allowed to flight test (15 minutes)
- 6.) Friendly competition to see which students have Maximum Range (10 minutes)
- 7.) Follow Up/Question and Answer Session (5 minutes)



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Intended Results:

- Learn components of aircraft
- Learn forces acting on an aircraft
- Plan and conduct an investigation to compare the effects of different strengths of throws on the range of the paper airplane
- Analyze flight path and determine if control surfaces are necessary
- Design and implement control surfaces and determine if they work as intended
- Understand that the forces are balanced while in rest (incorporate Newton's 3rd Law)
- Understand forces not in balance while in flight (not steady level flight: no continuous thrust)
- Potentially spark interest for students in the field of aerospace engineering.

Future Learning:

- Potentially students could look up different types of aircraft and learn how they differ
 - Jets vs. propellers
 - Flying wings vs. tails
 - Different shapes to correspond to different missions.
- Made from scratch wooden balsa Gliders with control surfaces
- Made from scratch wooden balsa powered gliders
- R/C aircraft
- Age appropriate children's books about airplanes