



Drexel-SDP GK-12 LESSON

- ***Flight***
- *Engineering Module*
- Subject Area (Unit): ***Engineering***
- Concept: Packaging, Flight, Forces
- Objectives: *Students complete an experiment by test flying 3 different paper airplane designs to find what aspects create longer flight and better lift.*
- PA Academic Standards: *3.1.7ABCE, 3.2.7ABC, 3.4.7AC, 3.6.7BC, 3.7.7E*
- Grade Level: **6**
- Setting/Group Size: Classroom split into small groups or working as individuals.
- Duration/Time Required: ***2 60 minute sessions***
- Materials List: Several types of paper, both heavier and lighter, paper clips and other materials to provide weight to the designs.
- Context: *This is a continuing part of the engineering module that gives students a sense of what engineers do. This lesson can also be tied to several physics and science concepts including flight, lift and forces. The activity lends itself to several discussions in the field of science that can be initiated by student questions and guided by the instructor*

- **Methods and Procedure:**

1. Begin with a short classroom discussion of flight, how does a large metal airplane fly miles into the sky? Introduce Bernoulli's principle and other concepts associated with flying and wind.
2. Have each student construct several airplanes from paper to test fly. Each plane should be test flown 3 times, keeping a record of each distance. After the first flight, the student should modify their design and then test fly again, recording 3 flight distances again. Finally a final design that is again test flown 3 times. They should keep all of their planes for reference, building a new one each time. After all test flights are complete, the instructor can have a flight distance contest if they choose to as well.
3. Remind students to keep records of their flights, mainly distances but also observations such as how straight the plane flew, if it flipped upside down, how did it land etc.
4. After completion, have each student calculate the average distance of each plane.

- *Assessment: Ask each student to create a report on the each of the three designs, which flew the furthest, which flew the straightest etc. Have them hypothesize what caused detrimental behaviors in their planes.*

- **Keywords:** Flight, Lift

- **Author:** Eric Gallo