



PLTW Flight and Space Virtual Learning

8th Grade/Cardboard Helicopters

May 12, 2020



8th Grade/Flight and Space
Lesson: May 12, 2020

Objective/Learning Target:
**Students will utilize the design process while designing
and testing a model cardboard helicopter.**

Warm-Ups:

Record your answers to the following question on your [Cornell Notes](#) or notebook paper.

- What creates lift for helicopters?

Lesson Introduction/Background Information:

CARDBOARD HELICOPTER DESIGN CHALLENGE

PROBLEM STATEMENT

A local toy company has decided that it needs something cheap to offer its customers that they might sell as an impulse item at their front counters. Mrs. Burke, the CEO of KAB Toy Company, has decided to enlist the Flight and Space Class at Bingham Middle school to design this toy.

DESIGN STATEMENT

KAB Toy Company has an overabundance of cardboard that it receives when new shipments come in. Mrs. Burke would like to return value on this cardboard in the form of a helicopter that when dropped from an elevated height will spin like the blades on a rotor. She was hoping that with a minor adjustment of the wings that it would spin the opposite way. Design, build, test, document, and present a helicopter that is made from the scrap cardboard. The helicopter must provide appropriate entertainment for children ages 5-9.

Practice:

CRITERIA AND RESTRAINTS

- The helicopter must be fabricated from one piece of cardboard and paper clips.
- It must be properly weighted so that it will spin when dropped from a height 8'.
- You must be able to manipulate the wings so that it will spin both ways.
- The source of power is air and gravity.

DELIVERABLES

In your Notes, summarize your work with the following documentation:

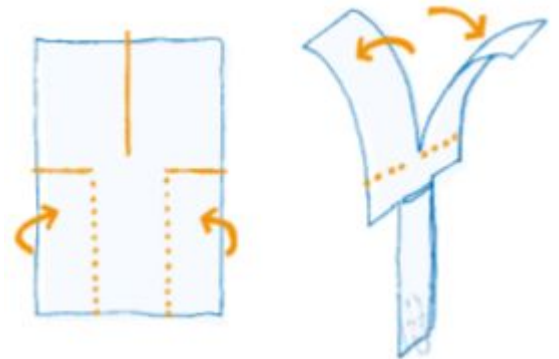
- Brainstorming of possible helicopter concepts
- Thumbnail sketches of possible cardboard helicopters
- Prototype of your cardboard helicopter

Practice:

Procedure:

- Take a piece of paper or cardboard and make three cuts as shown in the illustration. Then fold the paper in on itself at the bottom half - use a paperclip to keep the sides together.
- Fold the two halves of the remaining paper away from each other, to form the helicopter blades.
- Stand carefully on a chair or high surface and drop your helicopter, making sure it stays upright as you let go.

Adjust the “blades” and see how the resulting change effects how it flies.



Self-Assessment:

In your notes, describe what was the best way to angle the blades. Why do you think this made the best airfoil?

Extend Your Learning/Continued Practice:

Learn more about [Helicopters from NASA](#).

See how Helicopters Work.

