



Wingin' It!

Don't forget to make an Achievery account for each student! [Make your account for the Achievery in English](#) or [Make your Account for the Achievery in Spanish](#)

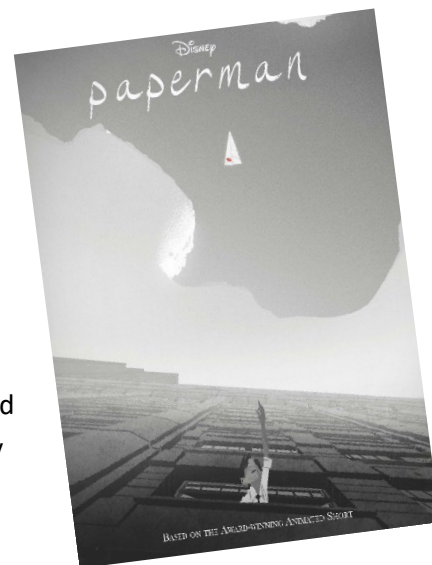
Objective: Students will describe and explain how material structure and shape, weight, and weight distribution impact a paper airplane's performance. They'll design and conduct a structured inquiry into the design of a paper airplane. To determine why one plane flies farther than the others, they'll compare and contrast different paper airplane designs.

They will also understand that an algorithm is a list of steps that you can follow to finish a task and they can use algorithms to help describe things that people do every day.

Grade Span: 5th-12th, but tips and resources are included for modifying for other grade levels.

Subjects: STEM

Lesson Introduction: Watch This! Introduce the lesson and the topic of paper planes to students by watching the Oscar-winning Disney short film [Paperman](#). In the film, what role do paper airplanes play? What are they made of? What were the steps George took to make the planes?



Lesson: Watch [From Failure to Flight: Throw a Paper Airplane 100 Feet with NASA](#).

Albert Einstein once said, "Failure is success in progress". On their first attempt(s) NASA staff failed to design and throw a paper airplane 100

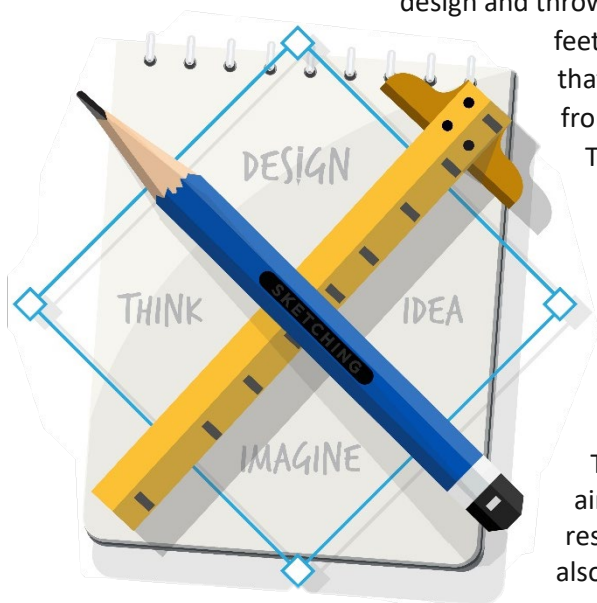
feet. But they didn't let that failure stop them from asking questions.

Those questions lead us to the principles that NASA engineers use to make flight optimal and

sustainable. Explore engineering design principles with a NASA engineer to take paper airplane design to new heights.



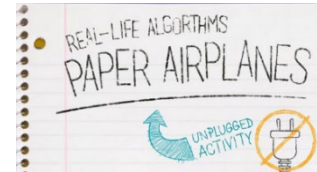
To learn more about how they can design and throw a paper airplane farther than ever, students then try the Student Portal resource NASA's ["Wingin' It" paper airplane project](#) (instructions are also available in Spanish).





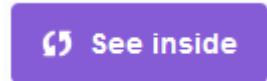
In the “Wingin’ It” activity, students will learn that engineers at NASA must consider various factors when designing the next generation of sustainable aircraft. Student teams will explore the impact of aircraft design on flight distance by testing designs of paper airplanes. Students will continue their investigation by testing the effect of adding weight, as well as the distribution of that weight, on the flight distance of their paper airplanes.

Additional Resources: Incorporate elements from The Achievery lesson [Real-life Algorithms: Paper Planes](#) during the Wingin’ It project. Students complete an unplugged activity from Code.org and create algorithms by putting together instructions to make a paper airplane.



Game Time: It's a bird! No! It's a digital paper plane!

[Play with animated paper planes](#) on the Student Portal resource Scratch before animating their own. Students can also click 'see inside' to explore the code used to create the games. Can they make their own?



Take it farther! Build on this lesson with additional lesson plans from The Achievery such as:

[Make it Fly!](#) Grades 3-8 Pick any character or object and learn how to make it fly in Scratch! This learning activity is for students and can be done on your own or with a peer. With this activity, you'll be

able to make your own flying game or animation. This learning activity is for students and should be done with guidance from an educator, parent, or caregiver.

[Build a Glider](#) Grades 6-8 Engineers get to use science and their imagination to make some cool things, like roller coasters, bridges, and planes. But they also learn from what is around them to help spark ideas. Learn about lift, drag, and gravity to help you design and build a paper bird that can fly.

[How Do We Know Where Far Away Spacecraft Are?](#) Grades 5-12 NASA has dozens of robotic spacecraft exploring our solar system and beyond. So how exactly do we navigate spacecraft that are so far away?

[What Does an Airforce Pilot Do?](#) Grades 9-12 What's it like to be an Air Force Pilot? You'll learn all about the skills you need and why someone might like this kind of job.

[What Does a Wind Turbine Technician Do?](#) Grades 9-12 What's it like to be a wind turbine technician? You'll learn all about the skills you need and why someone might like this kind of job.