

Your task is to build an airplane that mimics a bird's wing!

Biomimicry is the process people use when they look to nature as inspiration for a design. A well known example of biomimicry resulted in "hook-and-loop fastener" (what we commonly refer to as Velcro™) used on shoes and clothing. The idea for the "hook-and-loop fastener" came to Swiss engineer George de Mestral while removing burs from his dog and his own clothing after a walk. Burs allow seeds to become "sticky" and grip onto clothing and fur very easily, allowing the seeds to be dispersed.

Step One: Get inspired!

For this challenge we want you to make an airplane that mimics the wingspan of a bird. For inspiration, let's look at some birds in flight. With adult permission, you can go outside to watch birds or you can watch this video by [Wildlife World](#) that shows several species of birds flying. If you want to know which birds are common in the greater Whittier-area, check out this list from the [Whittier Narrows Nature Center](#).

As you watch the birds, pay attention to the shape of their wings.

- How would you draw the outline of the wing?
- How big is the wing compared to the bird's body?
- How does the wing bend when the bird moves it?

Step Two: Choose Your Materials

Birds are **aerodynamic**, which means their body's shape allows air to flow around it easily. Birds are also very light, in large part because they have hollow bones.

How do we use this information to help us choose materials for your airplane?

Suggested materials: straws, paper, cardboard

Additional helpful materials: scissors, glue, tape

Airplane's fuselage: we recommend you attach your wings to a light tube like an empty toilet paper roll. This can represent the airplane's fuselage (where passengers sit).

Step Three: Design Your Airplane

Remember to draw a picture of your ideas first. Engineers draw out their ideas to think through their designs and share their creations with others. As you draw, think about how to minimize the weight of your airplane. Also, consider how big the wings need to be in relation to the fuselage that you picked. If you need more inspiration, go back and look at the bird videos to see how big their wings are in comparison to their bodies.

Step Four: Build Your Airplane

Once you have thought through your ideas, begin building! You will want to test your airplane to see how far it can travel. Using a tape measure or other measuring tool, mark off a length of place outdoors. As you test, keep track of how far the airplane travels. Remember to always start your throw in the same place and try to throw with the same intensity each time so that you can compare your designs.

If you need help...

- Collaborate! Work with someone else.
- Think about more or different materials you can use.
- Take a short break and give yourself time to think of new ideas!
- Remember that both learning and creating something new takes time! Here are two videos about failing:
 - [Succeed by Failing](#) by Crash Course Kids -OR-
 - [The Value of Failing in Engineering](#) by Brian David Johnson

Reflection Questions:

1. How did you keep your airplane as light as possible?
2. What would you need to change about your wing design if you used a different material for your fuselage?
3. How did your airplane look and act like a bird?
4. How did your airplane look and act differently than a bird?

If you liked this challenge, check out one of the two links below:

Video & activity ideas in "[Inspired by Biomimicry](#)" by *Generation Genius*

Create paper airplanes that are inspired by different types of birds by the [National Audubon Society](#)

Step 5: Sharing Your Airplane on Instagram or email.

We want to see your airplane! With permission from your parent or guardian, share a picture of your airplane for our instagram page. Direct messaging or emailing an image of your challenge gives us the written consent to redistribute the image on our [website](#) and official instagram page.

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