

## ACTIVITY #2: PAPER GLIDER



### OVERVIEW

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Bird don't just sing—they also fly! Make a paper glider and see if you can get it to soar, glide, and swoop like a flying bird.

### MATERIALS

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- Paper
- Glue stick
- Pencil
- Scissors
- Paperclips

### BACKGROUND INFO

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Birds are pretty interesting creatures for a lot of reasons: they sing beautiful melodies, build complicated nests, migrate long distances, and they have an ability that a lot of us might envy: they can fly.

Different types of birds fly in different ways. Eagles, with their wide wings and long wingspan, are great at soaring high above the ground without doing much flapping. Ducks use their long, pointy wings to fly great distances during migration. And hummingbirds, with their tiny wings, can hover in place by beating their wings many times per second. Every type of wing has its own job to do!

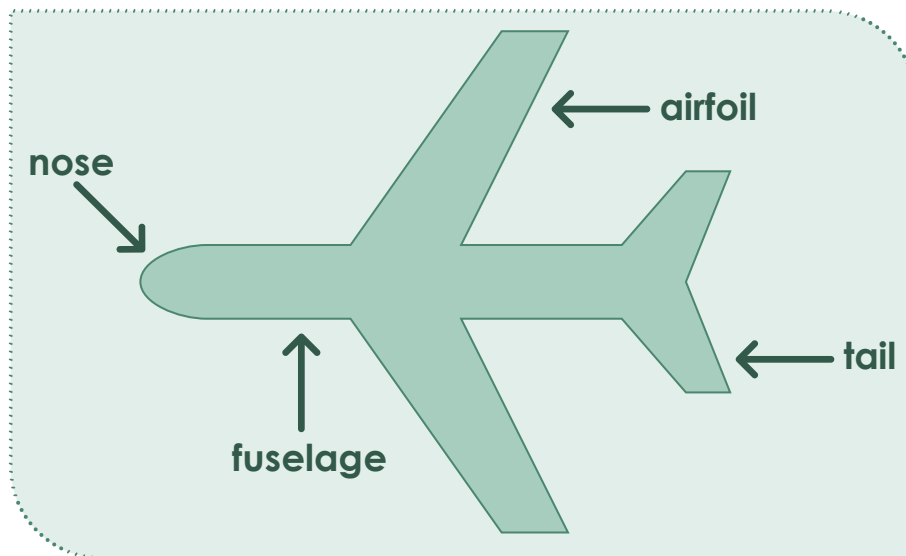
You can explore how different wings create different types of flight by building your own paper glider. You've probably built a paper airplane or two in your life. But did you know that an airplane without an engine is technically called a *glider*? Gliders move through the air like airplanes, but since they have no engine, they need another kind of force to push them forward. That's why you need to launch a paper glider by throwing or dropping it if you want it to fly.

Think about the birds you saw in the **Wings and Woodwinds** video. Are their wings all the same size and shape? If not, what differences did you notice?



All gliders have four parts:

- **Fuselage:** the main body of the glider
- **Airfoil (or wing):** the part of the glider that air flows over, creating a force to lift the glider into the air
- **Tail:** the part that stabilizes and helps control the glider's flight
- **Nose:** the very front of the glider, where a bit of extra weight or *ballast* helps increase the glider's speed



You can make a paper glider that has all four of these parts and test it to see how well it can fly. Just like bird wings, the shape of your glider's airfoil will really make a difference. Practice creating gliders with different airfoil shapes, and soon you'll have a whole flock of gliders that each fly in their own way!

## INSTRUCTIONS

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Check out the **Wings and Woodwinds** video for a visual tutorial. Or, follow these steps:

1. First, make the fuselage: Cut a strip of paper about an inch wide from the long edge of a piece of paper. Roll the paper strip around and up your pencil until it's nearly covering it. This will help give your paper the right shape.
2. Remove the pencil and roll up the paper strip tightly, so that it resembles a paper straw. Glue down the top flap of your paper straw so that it stays in place.
3. Next, make the airfoil and tail: Stack two sheets of paper on top of each other and fold them in half along the short edge, almost like you're making a book.
4. Along the folded edge, draw one airfoil (one glider wing). Along the same folded edge, draw one tail fin. Cut out your airfoil and tail, making sure to leave the folded edge intact. You should have two mirror-image airfoils and two mirror-image tails.
5. Now, assemble your glider! To attach the airfoil, make a fuselage sandwich: stack the two airfoils on top of each other with the fuselage in between, and glue in place. Do the same with your tails. Add a paperclip to the nose of your glider as ballast and voila! You are now ready for take-off.

## EXTENSIONS

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- Practice flying your glider and see what you notice. If it doesn't fly well, try making some adjustments. Could the ballast be heavier or lighter? Try throwing it with more or less force. Are there other ways to launch your glider besides throwing it?
- Take a look at the shape of your glider's airfoil. What kind of bird does it remind you of? Try making another glider with wings based on a different bird. (Use the internet or a book if you need help finding the shape of different bird wings.) You could even decorate your glider to look like a real bird!
- Once you've made a few gliders with different wing shapes, pay attention to how they fly. One glider might fly well when you throw it hard, while another might do better with a gentler throw. What differences in launching force do you notice in your glider flock?