

Make a Paper Plane

In this activity you will.....

Use the 4 aerodynamic forces to build and throw the perfect paper plane. You will be able to use these principles to go and design other planes to suit other challenges.

What will you need?

Like all experiments, ensure you have permission from an adult and their supervision before starting and when using the scissors and the pin.

You will need:

- An A4 piece of paper
- A big open space to throw and experiment with your planes

How to do this experiment

Step 1. Start with a piece of A4 paper, placed with the long edge going from top to bottom – this is called portrait.

Step 2. Fold your piece of paper in half, make sure those corners line up and crease the edge. Use your nail to press down on the fold to help you get a good neat edge. Then unfold it.

Step 3. Take the top corners and fold them down to meet the centre line, bringing the top edge to the middle fold, you are trying to make a nice triangle shape. Do this to both top corners, you will end up with what looks like an arrow pointing up.

Step 4. The fold you just made, we are going to take that line and bring it into the middle. Making a pointier arrow.

Step 5. Fold your plane in half.

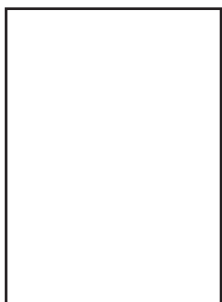
Step 6. Take one edge of your plane, and bring it down to that middle fold once more.

Step 7. Flip your plane over, and do that again on the other side. Make sure to press down on the folds to make sure they are nice and crisp.

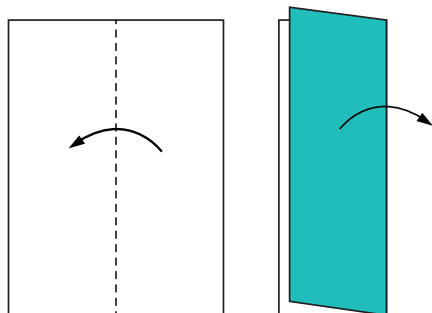
Step 8. Unfold the wings and make sure they are tilted up slightly.

Step 9. Throw your plane!

Step 1.

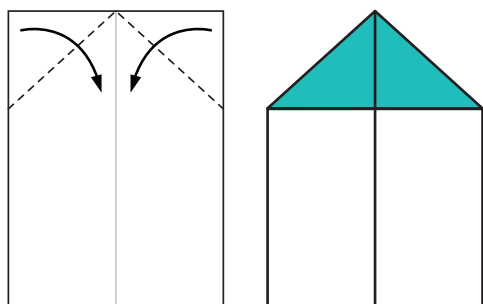


Step 2.

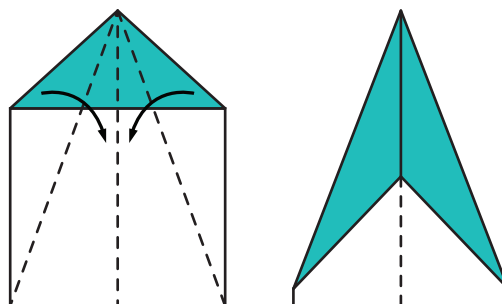


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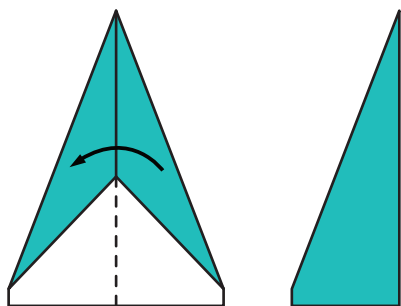
Step 3.



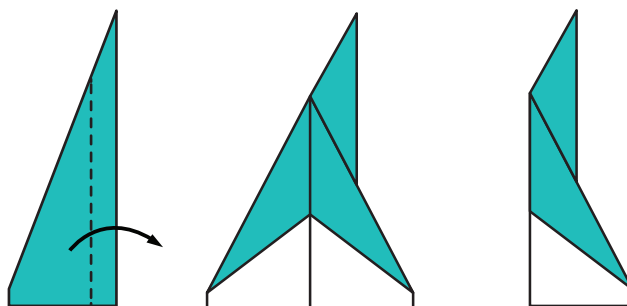
Step 4.



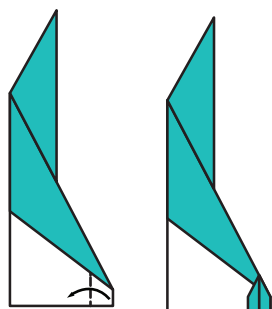
Step 5.



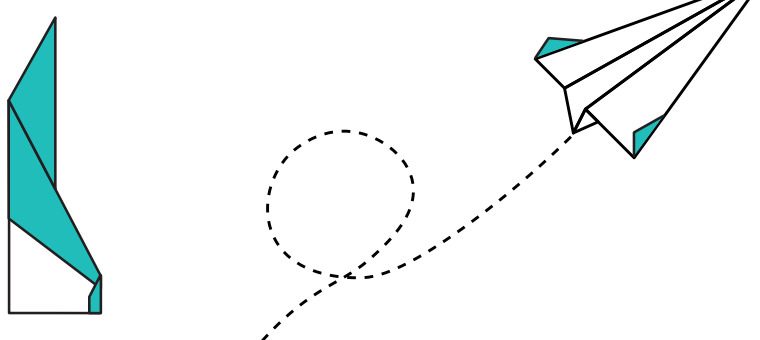
Step 6 & 7.



Step 8.



Step 9.



More to try

Plane not flying straight? Try this:

- Try tilting the wings upwards. This is called “Positive Dihedral Angle”. If the plane tries to rotate left or right the opposite wing will resist this, keeping the plane straight. This allows for straighter and more stable flight.
- You can apply small adjustments to the wings and body. Plane veering to the left? Try curling the back of the right wing to counteract this.
- Are your plane wings symmetrical? If not then you may need to refold it or make a new one.

Adjust your throw:

- How hard should you throw it? Dart designs (Long and thin wings) prefer hard throws. Glider designs (short and wide wings) tend to prefer gentle throws.
- Adjust your angle. Should you throw it straight (parallel to the ground) or at an upwards angle?
- Where should you hold your plane when throwing it? Front, middle or back? Try marking on the plane where you held it with a pen and record the distance it flew.

Change your design:

- Try different styles of planes. Different wing shapes work for different jobs.
- Look at foldnfly.com for ideas and maybe try your own!
- Tip: Your starting paper doesn't have to be A4. Some plane designs work better by starting with a square or thin rectangle.

Change up the challenge!

- Greatest distance travelled
- Longest time in the air
- Best stunts (loop-de-loops, barrel rolls)
- Extra Hard: Make a plane that flies back to you!

Fun facts

- The World Record for greatest distance travelled by a paper plane is 69m! That's the height of a football pitch!
- Paper Plane competitions are very popular around the world. Competitors take making paper planes very seriously!
- An unusual paper plane design is the 'Ring Wing Glider' which is a circular paper plane! Its been experimented with by NASA as a more fuel efficient wing design (ref: <https://www.jpl.nasa.gov/edu/teach/activity/ring-wing-glider/>)
- If you were to throw a paper plane in space it wouldn't fly, rather float in a straight line.

Share your paper planes with us on social media using #GSCAtHome



“Paper planes” has been supported by Boeing. To find out what Boeing are doing to support STEM engagement, visit boeingfutureu.com

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