Date: _____ Name: _____

Flight Challenge

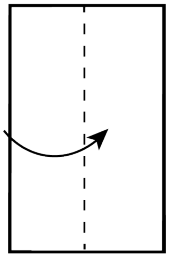
This activity was created by Amaris, Olivia & Zoe.

In this activity you will be building multiple types of paper airplanes and using your knowledge of gravity, lift and drag. You will have to guess which plane will fly the furthest. Follow the instructions on the next few pages to build 4 different airplanes. All you will need is some paper and a pencil.

Airplane #1

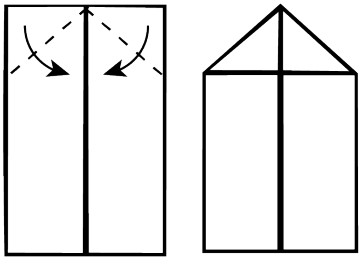
STEP 1

Fold the paper in half lengthwise. Then unfold it.



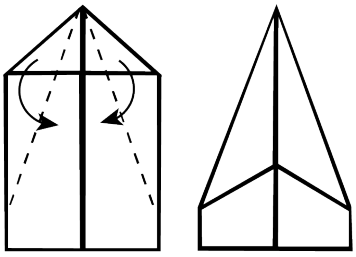
STEP 2

Fold the top two corners of the paper down so that the corners meet at the middle of the paper and make a triangle.



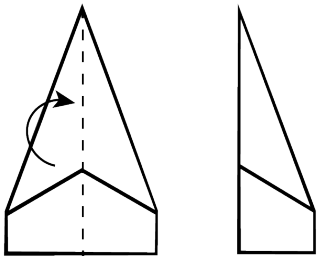
STEP 3

Fold each side of the paper inward at an angle so that the outside edges of the triangle now touch and meet in the middle.



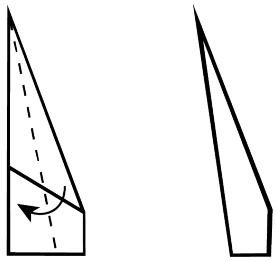
STEP 4

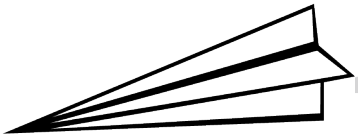
Fold your paper in half along the middle line.



STEP 5

Fold both free ends of the paper down to meet the bottom of the paper.





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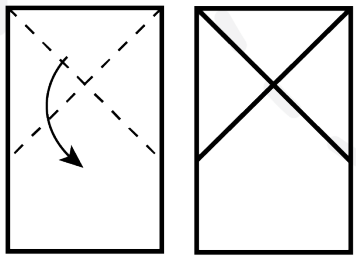
Airplane #2

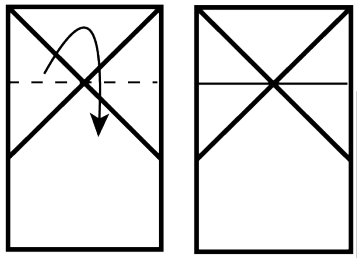
STEP 1

Make 2 diagonal folds so that the top edge of the paper lines up with the sides.



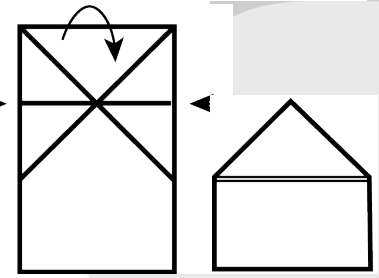
STEP 2

Turn the paper over and make a crease in the paper that's in line with where the two diagonal folds meet.



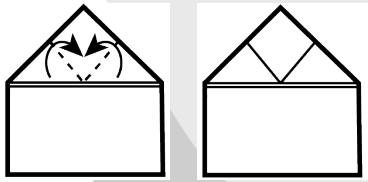
STEP 3

Turn the paper over and push down on the point where all the lines meet. This should make the paper fold towards you. Grab the two ends of the horizontal fold and bring them together to meet in the middle and push it down so that the paper lies flat.



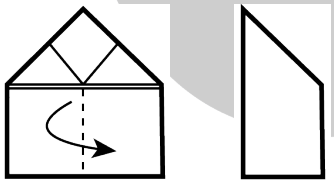
STEP 4

The triangle will have two distinct layers to it. Take one corner of the top layer and fold it upward so the side corner of the triangle touches the top corner. Repeat on the other side.



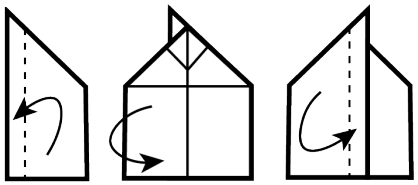
STEP 5

Fold the paper in half along the line of symmetry.



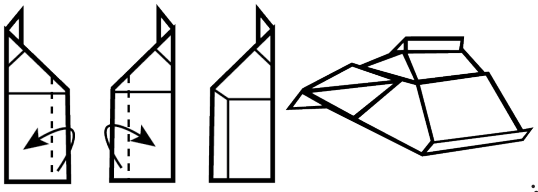
STEP 6

Make a crease about 1.5cm from the center line on both sides and fold outward.



STEP 7

Fold the paper inward about 1.5cm from the edges on both sides. And you're done!



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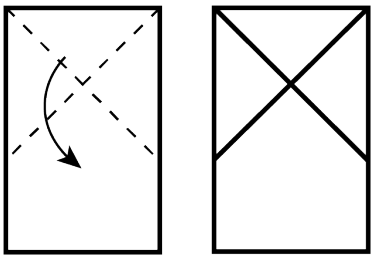
Airplane #3

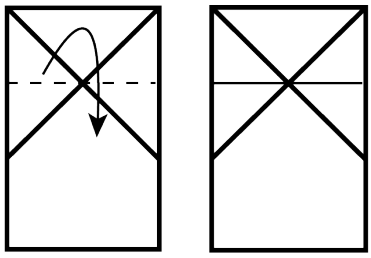
STEP 1

Make 2 diagonal folds so that the top edge of the paper lines up with the sides.



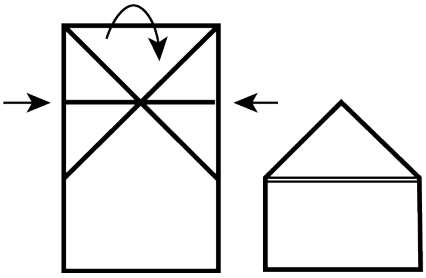
STEP 2

Turn the paper over and make a crease in the paper that's in line with where the two diagonal folds meet.



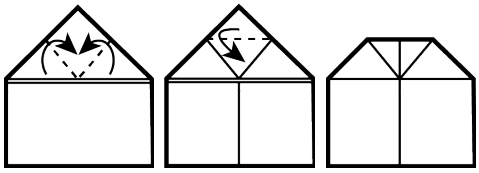
STEP 3

Turn the paper over and push down on the point where all the lines meet. This should make the paper fold towards you. Grab the two ends of the horizontal fold and bring them together to meet in the middle and push it down so that the paper lies flat.



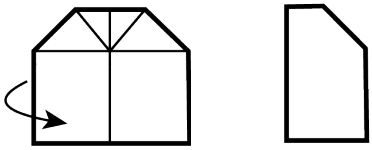
STEP 4

Fold up the outer points of the big triangle shape so they line up and create a diamond. Then fold down the tip of the diamond.



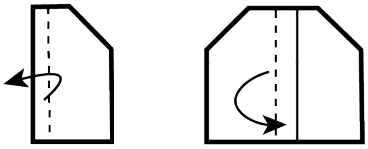
STEP 5

Fold the paper in half so the triangle is on the inside of the fold.



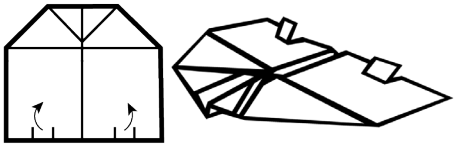
STEP 6

Fold the edges outward to create the wings. The body of the plane should be around 1/2 an inch tall.



STEP 7

Cut two small flaps at the tail end of the wings to change the way you plane moves. And you're done!



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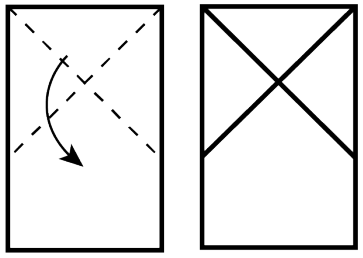
Airplane #4

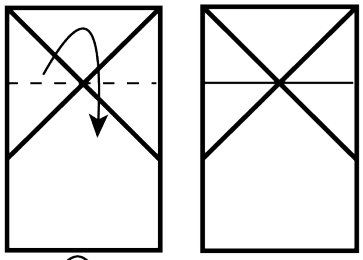
STEP 1

Make 2 diagonal folds so that the top edge of the paper lines up with the sides.



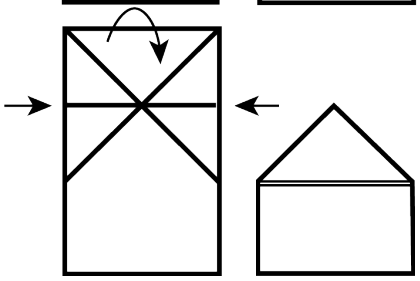
STEP 2

Turn the paper over and make a crease in the paper that's in line with where the two diagonal folds meet.



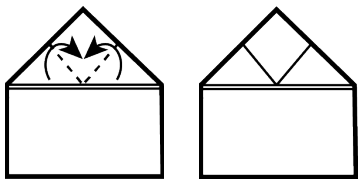
STEP 3

Turn the paper over and push down on the point where all the lines meet. This should make the paper fold towards you. Grab the two ends of the horizontal fold and bring them together to meet in the middle and push it down so that the paper lies flat.



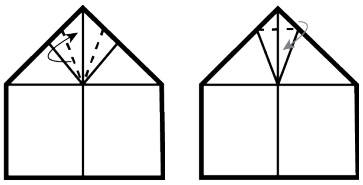
STEP 4

The triangle will have two distinct layers to it. Take one corner of the top layer and fold it upward so the side corner of the triangle touches the top corner. Repeat on the other side.



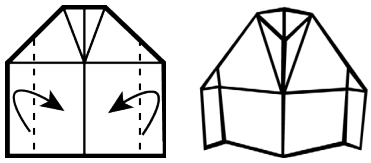
STEP 5

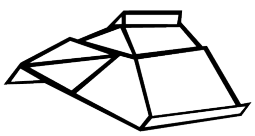
Fold up the outer edges of the diamond to create an smaller diamond, then fold down the tip of the plane



STEP 6

Turn the plane upside down and fold it in half, the fold down the edges of the wings. And you're done!





Check out the next page for some tips and tricks!

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General Tips and Tricks

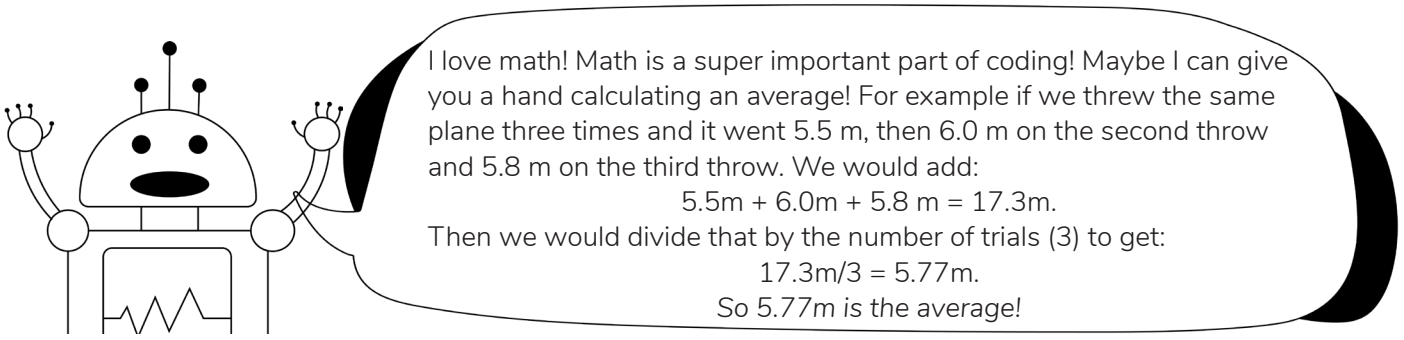
1. Make sure your folds are all crisp and tight. This ensures that your airplanes stay together and has a nice shape.
2. Make the point(s) of your plane sharp. This helps your plane fly better.
3. Angling your hand upwards will make your plane fly higher while keeping it level to the ground will make it go further. Try out different techniques when throwing your plane to make it fly higher, longer or faster!
4. Try making your plane with a heavier paper, like construction paper or cardstock. This will make the plane fly faster because there is less air resistance acting on the plane. But make sure your paper isn't too heavy, otherwise gravity will weigh it down and your plane won't fly!

Did you know that paper planes that are longer fly farther because they are well balanced and can stay straight in the air for a longer period of time?

Testing Your Airplanes

After you're done building the four different types of paper airplanes, you are going to want to grab some more supplies to be able to measure your results!
You're going to need: a pencil, a stop watch (or some kind of timer), and a measuring tape or meter stick.
Things you will be tracking :

- **Distance**, measured in meters: mark a starting point that you will use for all of your trials. This is where you will start measuring from for each trial. After each trial, measure the distance from your fixed starting point to the furthest point on your plane, where it lands on the ground.
- **Speed**, measured in seconds: Keep track of how long your plane is in the air from the moment it leaves your hand, until the moment it touches the ground. Restart your timer for each trial.
- **Average**: The average can be calculated by adding up all of the results from all three trials, and dividing this number by the number of trials it took (in this case three).



Airplane Example	Distance (m)	Speed (s)
Trial #1	5.5m	10s
Trial #2	6.0m	8s
Trial #3	5.8m	9s
Average of all trials	5.77m	9s

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Record Your Data Here:

Airplane # 1	Distance (m)	Speed (s)
Trial #1		
Trial #2		
Trial #3		
Average of all trials		

Airplane # 2	Distance (m)	Speed (s)
Trial #1		
Trial #2		
Trial #3		
Average of all trials		

Airplane # 3	Distance (m)	Speed (s)
Trial #1		
Trial #2		
Trial #3		
Average of all trials		

Airplane # 4	Distance (m)	Speed (s)
Trial #1		
Trial #2		
Trial #3		
Average of all trials		