

Best paper airplanes

4



Testable Question: What model paper airplane design is the best?

Prediction: I think that the double decker plane will be the best overall because four wings give it twice the flight possibility.

Procedure:

1. Fold paper airplanes into the models
2. Set throwing point and roll out measuring tape (centered)
3. Tape down measuring tape at start and end
4. Start stopwatch
5. throw paper airplane at 45 degree angle using protractor to check angle measure
6. While flying count number of flips
7. Once plane has landed stop stopwatch and record time
8. Measure paper airplane distance using measuring tape in centimeters and record
9. Measure distance from straight throwing line and record
10. Repeat steps 2-7 with same model 5 times
11. Repeat steps 1-8 with different model
12. Average data

Background:

I chose this project because I wanted to do something with rockets, but I could not, so I decided that something in the air is a good idea so I decided on paper airplanes. I like paper airplanes and wanted to make a list of the best overall. I also wanted to learn about how they fly.

In my research I found out that... a 45 degree angle is the best way to throw them, and we found some paper airplane models. I was looking at paper airplanes other people had designed, I chose them because they were the best designs other people had. I wanted to put the best designs from the internet against the best designs I knew. I also learned that when the lift which is the force upward is greater than or equal to the drag which is gravity a paper airplane will stay in the air.

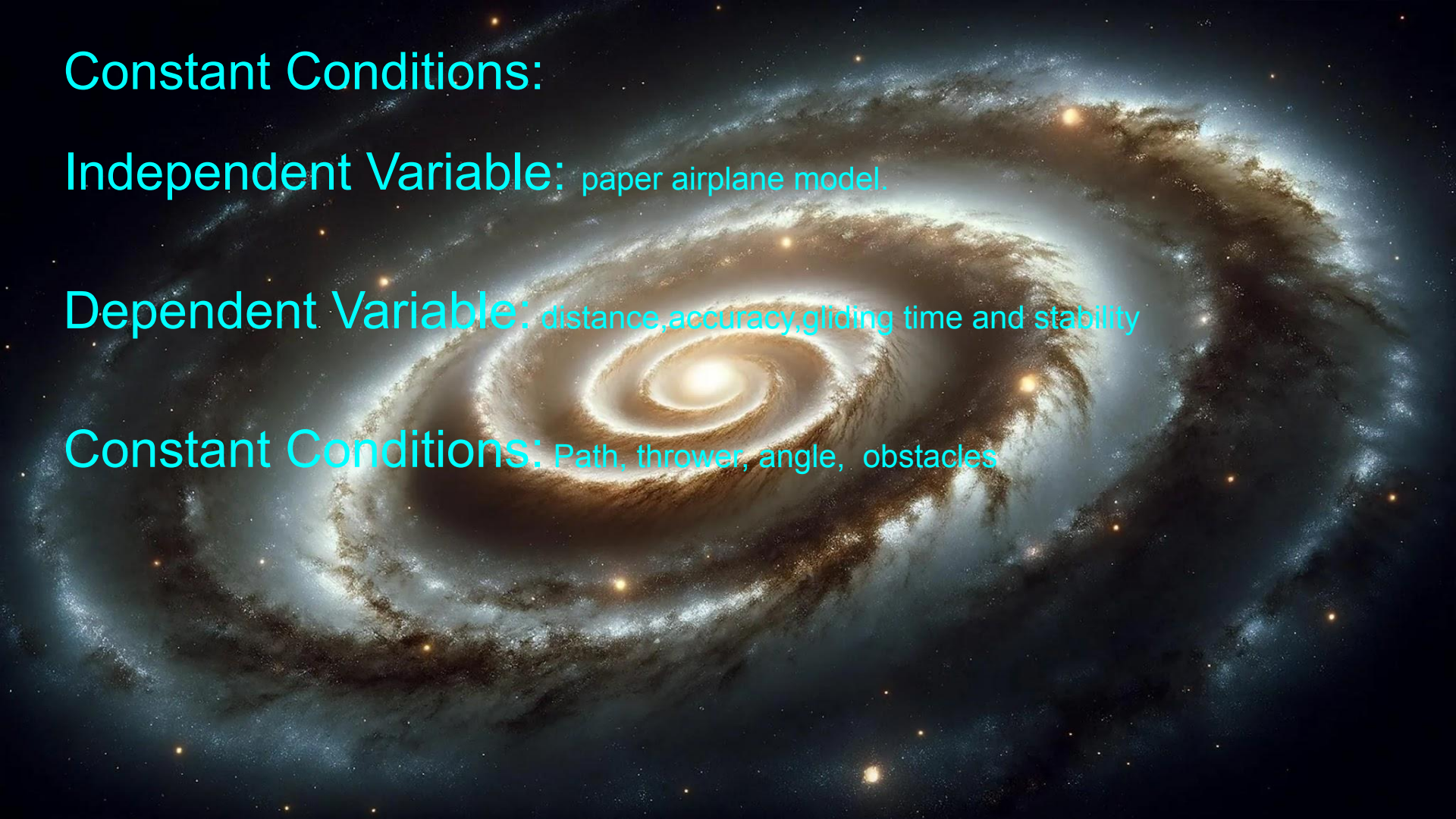
This project is important because there are a lot of people who like paper airplanes and they want to know the best one.

Constant Conditions:

Independent Variable: paper airplane model.

Dependent Variable: distance, accuracy, gliding time and stability

Constant Conditions: Path, thrower, angle, obstacles



Data and Trials:

Trial 1	distance (cm)	accuracy (cm)	stability (x/10)	gliding time (sec)	flight path
plane #1 (NI)	900	79	9.5	1.74	straight barely any curve, but flipped at the end
plane #2 (sonic mess up)	777	45	10	2.16	nothing close to flipping, arcs.
plane #3 (mix up)	145	80	10	0.87	hit wall
plane #4 (BP)	555	80	3	1.95	hit wall, 2 flips
plane #5 (DD)	618	80	10	0.64	hit wall, straight slight curve at end

Trial 2	distance (cm)	accuracy(cm)	stability (x/10)	gliding time (sec)	flight path
plane #1 (NI)	720	53	10	1.2	arced flight lands on nose at end
plane #2 (sonic mess up)	655	80	9.3	1.96	hit wall, arcs but turns and flips over and lands on wings at end
plane #3 (mix up)	280	95	9.7	0.61	curved completely left , up dives down and turns
plane #4 (BP)	444	80	1.3	1.68	hit wall, 3 flips and a half, forward flips other direction flips other direction flips and half flips
plane #5 (DD)	652	80	10	0.92	hit wall, stays low but doesnt curve until end

Trial 3	distance (cm)	accuracy (cm)	stability (x/10)	gliding time (sec)	flight path
plane #1 (NI)	676	29	10	1.44	same flight as trial 2
plane #2 (sonic mess up)	584	80	10	1.59	hit wall, arcs to right side
plane #3 (mix up)	102	80	10	0.71	hit wall, immediate u turn
plane #4 (BP)	525	80	8	1.51	hit wall , gentle curve to left
plane #5 (DD)	500	80	10	1.36	straight with gentle curve, hit wall

Trial 4	distance (cm)	accuracy (cm)	stability (x/10)	gliding time (sec)	flight path		
plane #1 (NI)	623	44	9.9	1.47	same as 2		
plane #2 (sonic mess up)	863	44	10	2.11	arced path but landed gently and slid forward		
plane #3 (mix up)	50	80	10	2.3	u turned and lands where started		
plane #4 (BP)	560	0	9.7	2.45	arcs while veering towards right then close to landing turned left		
plane #5 (DD)	639	64	10	1.29	straight then veers to left		
Trial 5	distance (cm)	accuracy (cm)	stability (x/10)	gliding time (sec)	flight path		
plane #1 (NI)	700	13	10	1.21	arcs slightly then down touches ground and bounces into slide		
plane #2 (sonic mess up)	577	80	10	1.65	hit wall, veer to side slightly		
plane #3 (mix up)	86	80	0	0.68	hit wall, immediatly turned right side and flips into dive bomb		
plane #4 (BP)	665	80	6.6	2.18	hit wall, flys veers right a little and then glides straight		
plane #5 (DD)	569	80	10	1.57	hit wall, mostly straight veering to side		
Average	distance (cm)	accuracy (cm)	stability (x/10)	gliding time(sec)			
plane 1 (NI)	723.8	43.6	9.88	1.412			
plane 2 (sonic mess up)	691.2	65.8	9.86	1.894			
plane 3 (total faliure)	132.6	83	7.94	1.034			
plane 4 (BP)	549.8	64	5.72	1.954			
plane 5 (DD)	595.6	76.8	10	1.156			

Conclusion and Reflection:

I found out that larger wings gave longer gliding time. The total mess up (mix up) was bad, but I expected it because it opens up when you release. There were five trials which were averaged from those we selected which ones did the best (highlighted in yellow). Plane 1 (NI) was the best in distance and accuracy. Plane 4 (BP) best in gliding time. Plane 5 (DD) best at stability. Plane 3 (Total failure) and Plane 2 (sonic mess up) both did not win in any category, and Total failure did the worst in everything but stability. From this data we determined that NI did the best because it was the best in the most categories and did well in both of the others.

I was surprised that Sonic mess up did not win in any categories because it did really well in everything and so I thought the averages would make it win in something.

If I did this project again I would use more models and try to fold the models better.

Safety

In our original idea we used a hammer and nails and my mentor did that for me. We used a clear path for flying the planes

Bibliography:

<https://www.foldnfly.com/lounge/best-paper-airplane.php#:~:text=To%20optimize%20your%20throw%20for,the%20backs%20of%20the%20wings.>

<https://www.foldnfly.com/lounge/paper-airplane-launcher.php#:~:text=In%20fact%2C%20the%20simplest%20launcher,than%20you%20can%20by%20hand.&text=It%20is%20possible%20to%20use%20spinning%20wheels%20to%20launch%20a%20paper%20airplane.>

<https://www.foldnfly.com/41.html#Sonic-Jet>
My mentor

Planes ranked.

Plane #1 is the best

first place

Plane #2 is good but not the best in any category

fourth place

Plane #3 is the worst and horrible never make this

fifth place

Plane #4 is good and best in 1 category

third place

Plane #5 is good and best in 1 category

second place