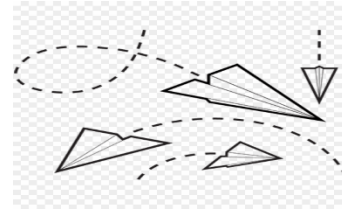


Paper Airplane Testing

90+ minutes



You are going to create a **fleet** of paper airplanes and test them. Each plane will be a different design. You will test each plane to see how it flies and you will record your results. You will also make changes to the design of each plane and observe how the plane reacts. You should build at least 3 different airplanes. **Carefully read the instructions below to complete your test!**

Materials Needed

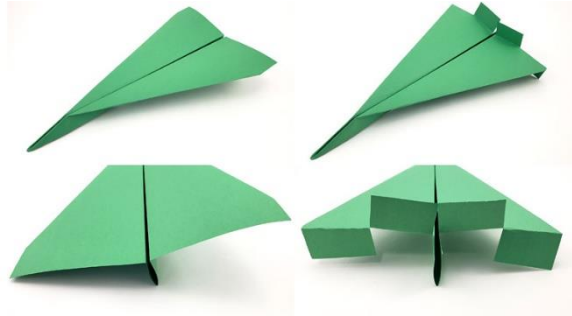
- Paper
- Tape
- Glue
- Scissors
- Paper clips or playdough(for weight)
- Paper airplane design book, idea sheets, etc. (**check out foldnfly.com for tons of ideas**)
- Testing area. Do your best to find an area in your home to fly your airplanes. You can test them outside but there should be no wind.



Steps:

1. Look through design ideas from foldnfly.com and select the one that you think will go the farthest.
2. Build 3 airplanes per the design specifications. Label each plane with its name.
3. Test the plane three times. Describe how each plane flew. For example, did it fly level or in a curved path, etc? Record which airplane flew the farthest. Did it match your prediction from Step 1?
4. Add paperclips or playdough for weight.
5. Make a prediction of how the added weight might change the plane's performance.

6. Test that prediction with three more flights and write down how the plane flew.
7. Next, make a design change to one of your airplanes - see the examples below. Choose a different change to the wings if you wish. Make a prediction on how the plane will fly and write it down.

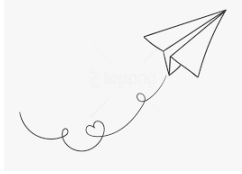


8. Fly your plane with the design change and record how it flew. Did it match your prediction?

9. Put all of your predictions and observations together in a nice neat report. You can do this any way you wish, as long as you answer all the questions from Steps 1 to 8. For example, a PowerPoint presentation, video, or simply pencil and paper. I will send you instructions on how to share your report.



Please read the explanation on the page below



Explanation:

When you toss your paper airplane, there are lots of *forces* acting on it. (Things are pushing on it.) When air goes over and under the wings of the plane, it creates *lift* that pushes the airplane up. The airplane doesn't just float up into space, though. *Gravity* is pulling your plane down. The amount of weight you add affects how much *gravitational force* is acting on the plane, but the reason we add the weight is to give the airplane more forward movement. When we add the weight, it helps create more *momentum* that keeps the plane moving forward. This helps to overpower the *air resistance, or drag*, that is pushing back on the plane. Lift up, gravity down, momentum forward, and drag backward.

Try it!

If you have time, try a different design, try moving the weight around, and do anything else you can think of to help it fly!



Real World:

The cool thing about paper airplanes is that they work just like real planes! Except, *Aeronautical engineers* design real planes so that they crash less.

