



Feather Physics

Pre-class Activity



Up, Up, and Away!!

Introduction: Feather Physics is a great way for you to learn about the different factors that affect flight. This activity will give you a chance to build your own airplane out of paper and then observe/answer some questions. You can also go outside with your class and observe the flight of birds around your school. Students will need to learn the terms LIFT, THRUST, DRAG, and GRAVITY.

Directions:

- 1) Take a piece of paper and fold it to look like a plane. Get creative! Bend the wings; put paper clips on certain areas, etc...
- 2) With your class, go outside and throw your airplane. While your airplane is flying **OBSERVE ALL THE THINGS THAT ARE HAPPENING TO IT. DON'T FORGET THOSE FORCES YOU CAN SEE!!!!**
Once you have flown your plane a couple times and observed what happened, answer the following questions.
 - a. Did your plane stay in the air or fall to the ground? _____
 - b. If it fell to the ground, what force(s) caused it to fall? _____
 - c. Did your plane keep its initial speed throughout its journey? _____
 - d. What happened to its speed as it flew? _____
 - e. Did the plane fly on its own or did you have to throw it?

 - f. What gave your plane the power to stay in the air? _____
- 3) Now that you have flown your airplane and written down your observations, take a look up in the sky. **IT'S A BIRD, IT'S A PLANE, IT'S... A BIRD FLYING WITH FORCES ACTING ALL AROUND IT!** What forces are acting on the birds you see in the sky that also acted on your plane? Pick only one of these birds and answer the following questions: **Turkey Vulture, Sea Gull, Hummingbird**
 - g. When your bird is flying what type of movements does it have? (For example: Is it flapping its wings all the time, or does it just seem to float?)

 - h. Why doesn't the bird you see fall to the ground? How is it able to fly?



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Post-class Activity



Introduction: Now that you have learned the forces that affect flight and the different types of flyers, you can take your knowledge to the sky! Or maybe something not quite as high . . . how about the ceiling!

Materials: Construction paper, scissors, string, tape, hole punch, markers

Directions:

- 1) Build an airplane like you did in the Pre-Activity for Feather Physics. Get a hole punch and punch a hole at the top, in the middle of the plane. (to hang the plane off the ceiling). Then punch 4 more holes evenly at the bottom of the plane. (to hang your 4 forces off the plane)
- 2) Cut 4 squares or any shape you would like big enough to write on. On each piece of paper write a force (Thrust, Lift, Drag, and Gravity). Then under each force write a brief description of how the force affects flight. Leave enough room at the bottom of each piece of paper to punch another hole.
- 3) Using string, attach the “Force Squares” to the four holes you punched on the bottom of your plane.
- 4) Cut another 4 squares and label them: True Flyers, Soarers, Parachuters, and Gliders. Under each of these labels write one bird that would fit under this category. With 4 pieces of string attach the different types of flyers to each of the forces. There will not be enough forces for each bird to have every force, just put one type of flyer under each force. (it will end up looking somewhat like a mobile)
- 5) Get another piece of string and tie it to the very top hole you punched on your plane. With help from the teacher or another student attach the top string with tape or a paper clip to the ceiling.
- 6) Everybody’s plane should be hanging from the ceiling with all the forces and types of flyers hanging as well. A great reminder of all the aspects of flight!!!