Activity: Going the Distance

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By now, the students have explored each force independently. They have even had a bit of experience on how lift and weight oppose each other, and how drag and thrust oppose each other. To fully understand flight, they need to explore how they all work together for, level, and extended flight. When do we want the forces to be balanced (cruising) and unbalanced (ascending, descending, speeding up, slowing down)?

Materials:

Tape Measure

Paper

Activity: Going the distance

Goal: Using what you know about the forces of flight, create a paper glider you think will travel as far as possible. It doesn’t need to be an airplane shape. Investigate different types of gliders and how they travel.

* You’re going to test the glider, but remember, a fair test includes multiple trials for each test. Test the glider from the same starting point 3 times. Measure and record the distance travelled for each trial.
* How do you think you could make the glider go farther? First think about weight and lift. How can we adjust these two forces to make the glider travel farther? Remember weight and lift must be equal for sustained flight. Design it, test it 3 times, and write the distance travelled in for each trial.

Think: If we increased the size of the wing to provide more lift, it increases the drag (how?), slowing it down again. Now what do we do? Answer: add more thrust! (How?)

* Thinking about drag and thrust, how can we adjust these two forces to make the glider travel farther? Remember thrust must be equal to or greater than drag for sustained flight. Design it, test it 3 times, and write the distance travelled in your journal for each trial.

Think: Were you able to find the right proportions of all four forces to create a glider that traveled as far as possible? What other modifications could you make to increase flight distance?

Extension: Further modify your glider for increased flight distance. Try and make it go as far as possible!

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|  | Total Distance | Average Distance per glider (mean) |
| Glider 1, Trial 1 |  |  |
| Trial 2 |  |  |
| Trial 3 |  |  |
| Glider 2, Trial 1 |  |  |
| Trial 2 |  |  |
| Trial 3 |  |  |
| Glider 3, Trial 1 |  |  |
| Trial 2 |  |  |
| Trial 3 |  |  |