UAMN Virtual Family Day: Wings

Design a Paper Airplane

Explore the principles of flight by building and testing paper airplanes!

Materials Needed:

Paper, colored pencils or markers. *Optional:* tape, ruler, measuring tape, scissors, stopwatch.

Instructions:

Step 1: Take a blank piece of paper and fold a paper airplane. See the folding instructions on the next page, or use your favorite paper airplane design.

Hint: Press along each fold with a ruler or fingernail. This will help make sure the fold is crisp and stays in place.

Step 2: Use colored pencils or markers to decorate your paper airplane. Be creative!

Step 3: Fly your paper airplane! Find an area clear of people and other hazards. Gently toss your airplane. How far did it fly? You can use a ruler or measuring tape to record the distance.

Step 4: Adjust your design and try again! Try folding the wing tips up, making the wings wider or skinnier, or adding a piece of tape to keep the nose from unfolding. Can you make your airplane fly farther?

Step 5: Keep experimenting! Try different airplane designs; patterns can be found at www.foldnfly.com (suggested designs include the Stable, Buzz, and Raven). Try different sizes and shapes of paper, or different throwing angles. Try using a stopwatch to measure how long your airplane stays in the air!

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Paper Airplane Folding Instructions

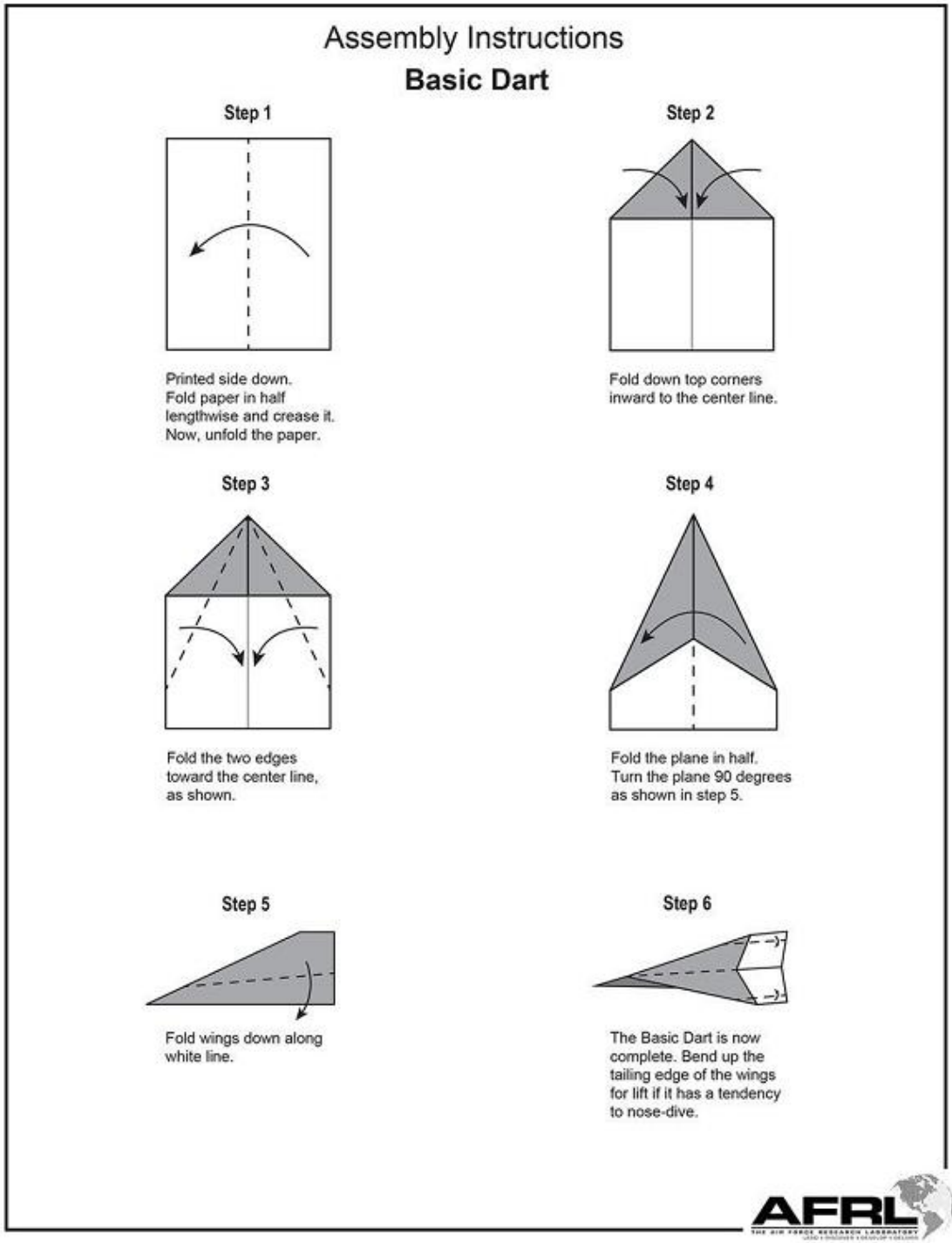

Image courtesy of Air Force Research Laboratory.

Find more paper airplane designs and how-to videos:

www.foldnfly.com

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Airplanes and Flight

How Do Airplanes Fly?

Image: Smithsonian National Air and Space Museum.

Four forces affect all flying things. A plane flies when all four forces are balanced and work together.

Lift is the force that pushes a plane upward. It is created by the *Bernoulli Effect*: the wings of a plane are curved so there is more pressure from the air pushing up on the wing than there is pushing down.

Weight is the force of gravity pulling down on the plane.

Thrust is the force that moves a plane forward through the air. Engines create thrust for airplanes, and muscles create thrust for flying animals.

Drag is resistance to moving through the air. Because of friction with air molecules, this force slows the plane.

Learn more about the four forces of flight: howthingsfly.si.edu


Space Shuttle Endeavour landing in 2001. *Image: NASA/Jim Ross.*

Did You Know? There is no air in outer space, so lift and drag do not affect spacecraft. However, they do need thrust to launch, which is provided by rockets. NASA's space shuttles were designed much like an airplane, with specially-shaped wings to re-enter the atmosphere and glide to a landing. NASA is currently designing new kinds of spacecraft to carry astronauts to outer space.

Airplanes in Alaska

Airplanes have played an important role in the history of Alaska. In the 1920s, pilots like Carl Ben Eielson and Noel Wien first flew airplanes across the state. Airplane travel transformed the lives of Alaskans; they could now communicate more quickly with people in other areas, and receive supplies on a regular basis.


Right: Noel Wien and his Stinson Detroiter airplane. *Image: UAF Archives, UAF-2010-50-401.*

Many parts of the state do not have roads, and one of the only ways to reach them is by airplane. Planes also deliver mail and supplies. Today, flying is an important part of life for many Alaskans.

Left: Eielson's Curtiss JN-4D "Jenny" airplane, on display at the Fairbanks airport. *Image: Theresa Bakker.*