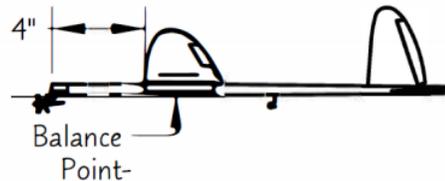


The center of gravity (CG) of a plane is the point at which it can be balanced. By balancing the wing on your fingertips on the point shown in the illustration below, you can find the plane's center of gravity.



Pilots of full-scale as well as model aircraft must correctly determine the CG before flight to ensure that the airplane is balanced. To fly any aircraft safely, flight control surfaces (ailerons, elevators, rudder) must be capable of providing effective control of a carefully balanced plane in order to maintain level flight.

In the case of models, the CG can be adjusted by placing clay or other weight on the nose or tail of the aircraft. Placing weight on the nose moves the CG forward, causing the plane to be more stable and fly in a more straight and level manner. Moving the CG to the rear has the effect of making the plane less stable. Between these two extremes is an appropriate location for the CG to maximize duration and distance, typically $\frac{1}{4}$ of the way back from the leading (front) edge of the wing. The ALPHA comes with a unique design system that allows you to move the wing back and forth on the fuselage to change the location of the CG rather than adding weight to the nose or tail. Experiment with different wing placement, adjusting the CG, to maximize duration or distance.

(box?) DISCUSSION POINT Moving the wing is just one way to change the CG of an aircraft. If the wing could not be moved, how else might you change the CG? If you have some clay, you can experiment with adding some weight to the nose of the ALPHA to see how that impacts your flight.

For the center of gravity lab, each pair or group of students will need

- An assembled AMA ALPHA
- A stopwatch or other timing method
- Student handout
- Pencil or pen

If you haven't already, show students how to wind the rubber motor and launch the aircraft, as they will need to do a few flight trials for this activity.

Make sure you are flying in a suitable space, such as a gym or wide-open outdoor area.

Divide your students into pairs or small groups, giving each a copy of the student handout for center of gravity. Have each group carefully mark their aircraft with a group name, so they can use the same aircraft for all activities.

