Wing load is the total mass of an airplane divided by the area of the wing. This calculation tells us how much load the wing is bearing in order to keep the plane in flight.

In order to calculate the wing loading of the AMA ALPHA, we will need to determine both the mass of the airplane and the area of the wing. Don't forget to use corresponding units for your measurements! For example SI (grams, centimeters) or US (ounces, inches)

Mass of the airplane: For our purposes, we will use the weight of the aircraft. Because the ALPHA includes balsa wood, a natural material, the density of the balsa may vary slightly from one plane to the next. This means that your ALPHA's weight may be different than others, even though they all appear to be the same.

Using a scale, weigh your entire aircraft including the rubber motor. Remember to record what units your scale is using (ounces, grams, etc.). No scale? No problem! Your teacher can provide you an "average weight" from their information. Write it in.

Weight of aircraft: _____

Area of the wing: The ALPHA's wing has an irregular, roughly elliptical shape, so we are going to *estimate* the area rather than performing an exact calculation. For ease, we will find the area of one wing and then double it in order to determine the area of both wings total.

Semi-axis (a)
To find the semi-axis, measure the widest part of the base of the wing and **divide that number in half**. For our estimate, we'll ignore the small cut-out area there.
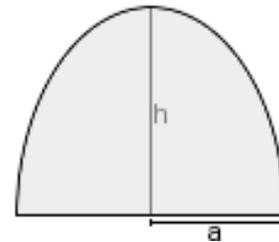
Height (h)
To find the height, measure from the root to the tip of the wing.

Semi-axis measurement (a): _____

Remember, measure the base of the wing and **divide that number in half** to find the semi-axis.

Height measurement (h): _____

Pi (**π**)

We will also need to use the constant called Pi (**π**). Pi is the ratio of a circle's circumference to its diameter, and is the same regardless of how big or small a circle is. Because we are estimating the area for half an ellipse, we will also calculate **half** of pi in our equation

(**π**) = 3.14

Time to estimate the area! Plug in your semi-axis measurement (a) and height measurement (h). Here's the equation we'll use:

Area = (**π**/2) * a * h

Area = (3.14/2) * _____ * _____

Solve! Then multiply it by two in order to get the total area estimate for both wings.

Total wing area estimate: _____

Wing loading final estimate: Remember, wing load is the amount of weight carried by the wings of an airplane. To calculate, you will take the total mass of the airplane divided by the area of the wing.

Weight of aircraft _____ / Area of wing _____

Wing load estimate: _____