The project has two goals: to investigate sampling from a conceptual population and to use a continuous random variable to model this population. This project may be done in groups of 2 or 3 (no solo projects).

In this project you will design a paper airplane with the goal of designing a plane that stays aloft a long time. Some examples of designs can be found at http://games.yahoo.com/blogs/plugged-in/high-fliers-5-great-paper-airplane-designs-211731336.html but you may design your own.

Here the conceptual population is the possible flights of the airplane. The variable is flight time.

1. Construct a paper airplane. While there are no formal rules, an informal rule is that it “looks like” an airplane. In other words, a paper ball is not a paper airplane. The airplane should be made out only out of paper although the use of a paperclip (for stability) or a few small pieces of tape are permissible.

2. Fly the plane at least 30 times. You should attempt to ensure that the launch is the same each time. You must launch the plane from the ground (no balconies or stairwells) and on reasonably flat ground (no flying the plane down a hill).

3. Record the time for each flight (from launch to the moment that the plane hits the ground). You should measure to tenths of seconds. You must use a timing device that has at least that precision. (I have a really cheap watch and it registers in units of .01 seconds.)

4. Turn in written answers to the following questions:

   (a) Describe your plane design by either attaching a diagram or turning in the plane. (Put your names on the plane.)

   (b) Describe carefully your data collection. You should include a description of the launch process and the timing process that indicate what kinds of things that you tried to control. You should also discuss any features of these processes that you think might have introduced variation that might be ascribable to something other than the natural variation in individual flights.

   (c) Describe the sample distribution of the flight times including a description of shape, center, spread and any unusual features. This description will include, at minimum, a histogram and various appropriate numerical summaries.

   (d) It might be argued that the normal model is a reasonable model for variables such as this one. Fit a normal model to your sample. Which normal model (i.e., which $\mu$ and $\sigma$) did you use and why?

   (e) Discuss the fit of the model to your data. Do the data suggest that a normal model is an appropriate one for this population?

   (f) Answer this question: do you think that you achieved the goal of constructing a paper airplane that stays aloft a “long time?”

   (g) Attach your data to your submission.