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*"Wingin' It" Density Altitude's Effect On Lift*

Because I live in the higher elevations of Colorado, I asked myself if density altitude (a climatic condition caused by a combination of altitude and heat) would have a profound effect on the performance of general aviation aircraft. I hypothesized that density altitude would prove to cause a lack of lift in general aviation aircraft. I built a wind tunnel in order to test a standard airfoil wing design. My wind tunnel contained two metal rods on which my wing could rise and fall under the effect of a fan at the end of the tunnel. I mounted a thermometer within the wind tunnel to accurately measure the inside temperature. I exposed the interior of the wind tunnel to three different temperatures, 30°F., an International Standard Atmosphere Temperature of 59°F to 60°F., and an elevated summertime temperature of 90°F. Using a ruler mounted inside the wind tunnel, I logged (in inches) how much lift the wing would create. The fan speed (relative wind), the wing's angle of attack (30 degrees), and the elevation of my test sight (8,000 ft. above sea level), remained constant. Only the inside air temperature of the wind tunnel was changed. I found that at the lower temperature, my wing was highly effective in lift (off the scale of my wind tunnel). However, when exposed to the ISA temperature or higher, the wing's ability to create lift decreased substantially.