Establishing a Correlation Between Variation of Thermodynamics and Corresponding Aerodynamics in Descent of Maple Samara Seed

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There is a rising popularity and interest in domestic aerial delivery as well as the idea of space capsules that rely on propellors. Therefore, the autorotation of maple samara seeds can be a vessel of information crucial to understanding of the prior ideas, this was done by testing the effect of thermodynamic fluctuations on aerodynamics of the seed. The hypothesis that seeds fell at a faster velocity as the temperature rose was tested. Maple samara seeds were dropped from about 2.3 meters high in rooms with varying temperatures. 30 seeds were dropped twice in 3 different temp rooms, giving an overall sample size of 180 times. These times were then put into Microsoft Excel, average velocities/standard deviations were found. An energy equilibrium formula and Reynolds value were calculated. A difference in the 3-stage model was that the terminal velocity at a higher temperature was higher, for 27 degrees it was above 1 m/s whereas for 20 degrees it was below 1 m/s. The standard deviations of each showed a generally close set of values. As for the Reynolds number, the higher temperature had a more laminar flow and vice versa. The data showed a possible positive correlation between temperature and descent velocity, this is using 3 sets of data, using more could provide stronger evidence supporting the argument or showing little to no correlation. Additional studies may be made by using modelling software to simulate every single aspect of a maple samara seed as it falls.

Awards Won:

Central Intelligence Agency: First Award: $1000 award