Storm Activity:

This storm activity uses the methods we developed in the Vpython tutorial Lab. Use those materials and develop a program that simulates the trajectory of a projectile subject to the force called weight:

\[ \vec{W} = m_{\text{OBJECT}} \vec{g} \]

and to Rayleigh drag:

\[ \vec{F}_D = \frac{1}{2} C_D \rho_{\text{FLUID}} A_{\text{OBJECT}} v^2 \left( - \hat{v} \right) = m_{\text{OBJECT}} g \left( \frac{v}{v_{\text{TERM}}} \right)^2 \left( - \hat{v} \right) \]

where the symbols (except one) are all as described in lab class (email if you need them again). The one new symbol is \( v_{\text{TERM}} \), which is defined by the equation above. (Qualitatively, it is the speed at which the weight of an object is equal to the Rayleigh drag force).

Use this to analyze the effect of drag upon the Projectile Lab we did. That is, find the initial launch angle at which an object with and without the drag force reaches maximum range. Do this for a sphere made of aluminum and of cork. Set the initial speed to a high, medium and low speed. (You will have to assess what “high” and “low” mean in this context.)

OUTPUT: For this lab, you should be able to specify the launch angle giving maximum range for three (3) initial speeds for each of two (objects). So six total angles. Discuss any trends you see.