

## Answer on Question #51614 – Physics – Mechanics | Kinematics | Dynamics

A stone of weight  $W$  is thrown vertically upward with speed  $V'$  from ground level. a constant force  $f$  acting due to drag of air in its flight .the maximum height will be...

### Solution.

We write down an equation of motion:

$$\begin{aligned} dp/dt &= F_{tot} \\ md^2/dx^2 &= -mg - ma \end{aligned}$$

Since  $a \neq a(v)$ ,

$$x = -(g + a) t^2 / 2 + v_0 t + x_0,$$

$x_0 = 0$ , and  $x_{max} = h$  is reached when the velocity is zero

$$dx/dt = 0 = -(g + a)t + v_0$$

$$t_{top} = v_0 / (g + a)$$

Putting  $t_{top}$  in the final equation, we obtain

$$h = -(g + a) v_0^2 / 2 (g + a)^2 + v_0^2 / (g + a) = \frac{v_0^2}{2(g + a)}$$

### Answer.

$$h = \frac{v_0^2}{2(g + a)}$$

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