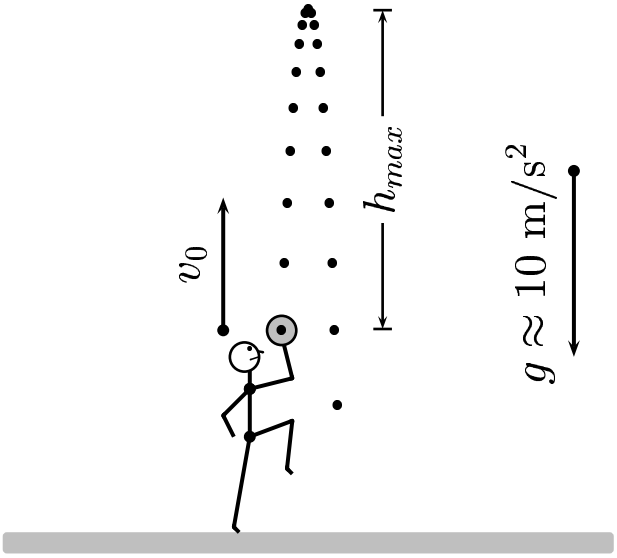
Given: The initial vertical velocity is $v_0 = 30$ m/s.
Throw a ball up to a maximum height h_{max}.



The maximum height h is

A) $h \approx 45$ m.

B) $h \approx 60$ m.

C) $h \approx 75$ m.

D) $h \approx 90$ m.

Applying the constant acceleration equation $v_f^2 = v_0^2 + 2\,a\,\Delta y$ for the motion from O to B gives

$$0 = v_0^2 + 2\,(-\mathrm{g})\,h\,, \quad \text{so}$$

$$h = \frac{v_0^2}{2\,g} \approx \frac{(30\,\mathrm{m/s})^2}{2\,(10\,\mathrm{m/s^2})} \approx 45\ \mathrm{m}\,.$$

Answer **A**.

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