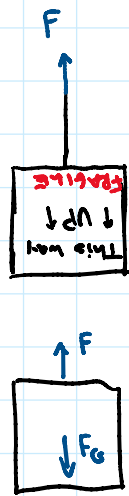


## 20-R-WE-DK-2 Beginner Work

Inspiration: None



A crane lifts up a crate with mass  $m = 30 \text{ kg}$  by a cable. If the crane applies a force  $F = 400 \text{ N}$  and lifts it up to a height  $h = 5 \text{ m}$ , determine the work done by both the crane and gravity, and the crate's final velocity if it started from rest.

$$\sum F_x = 0$$

$$\sum F_y = F - F_g = ma_{gy}$$

$$400 - (30)(9.81) = 30 a_{gy}$$

$$a_{gy} = 3.5233$$

$$W_g = -mgh = -30(9.81)(5) = -1471.5 \text{ J}$$

$$W_F = Fh = 400(5) = 2000 \text{ J}$$

$$v^2 = v_0^2 + 2ad$$

$$v^2 = 0 + 2(3.5233)(5)$$

$$v = 5.935767 \text{ m/s}$$