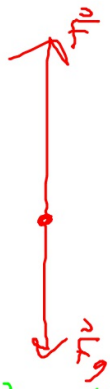
· fish jumps

Salmon length: 1.5 m, mass: 61 kg




$v_0 = +3\ m/s$

$v = 6\ m/s$ after $2/3$ of length

$a = ?$ $\quad |\vec{F}| = ?$

$v^2 = v_0^2 + 2a\Delta x$

$v^2 - v_0^2 = 2a\Delta x$

$a = \dfrac{v^2 - v_0^2}{2\Delta x}$

$a = \dfrac{(6\ m/s)^2 - (3\ m/s)^2}{2(1\ m)}$

$= \dfrac{27\ m^2/s^2}{2\ m} = 13.5\ m/s^2$

$F_{net} = F - f_g \rightarrow ma = F - mg$

$F = ma + mg$

$= (61\ kg)(13.5\ m/s^2) + (61\ kg)(9.8\ m/s^2)$

$= 1421\ N$

· boat

$m = 1000\ kg$


$F_{net} = F_{prop} - F_{bow} = ma$

$a = \dfrac{F_{prop} - F_{bow}}{m} = \dfrac{2000\ N - 1800\ N}{1000\ kg}$

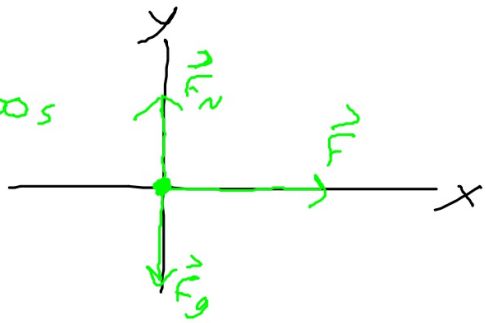
$= 0.2\ m/s^2$

$x = x_0 + v_0 t + \frac{1}{2} a t^2 \rightarrow x = \frac{1}{2}(0.2\ m/s^2)(10\ s)^2$

$= 10\ m$

# Moving Crate

$a = ?$ $\quad \Delta x = ?$ after $t = 2.00\,s$




$|\vec{W}| = mg \rightarrow m = \frac{W}{g} = \frac{300\,N}{9.8\,m/s^2}$

$\approx 30.6\,kg$

$F = ma \rightarrow a = \frac{F}{m} \rightarrow a = \frac{20.0\,N}{30.6\,kg} = 0.654\,m/s^2$

$x = \cancel{x_0} + \cancel{v_0 t} + \frac{1}{2}at^2$

$x = \frac{1}{2}at^2 = \frac{1}{2}(0.654\,m/s^2)(2.00\,s)^2 = 1.31\,m$