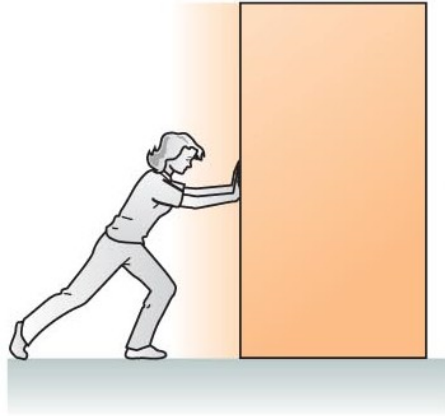


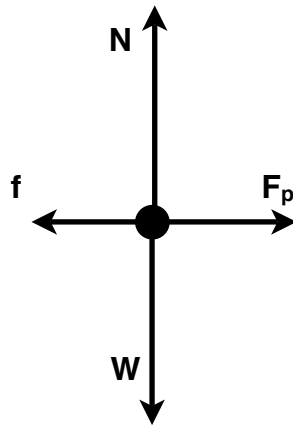
Friction problem: Pushing box

You push a 100.0 kg box along the ground with constant horizontal force 600.0 N.
For box on ground $\mu_k = 0.100$

Find the acceleration.



Free-body diagram for the box:



There is no motion in the vertical direction, so

$$N - W = 0$$

so $N = W = mg$

In the horizontal direction, net force = ma

so $F_p - f = ma$

and $f = \mu_k N = \mu_k mg$
 $= 0.1 \times 100 \times 9.8$
 $= 98 \text{ N}$

Hence

$$\begin{aligned} ma &= F_p - f \\ &= 600 - 98 \text{ N} \\ &= 502 \text{ N} \end{aligned}$$

so

$$a = 502/100 \text{ ms}^{-2} = 5.02 \text{ ms}^{-2}$$