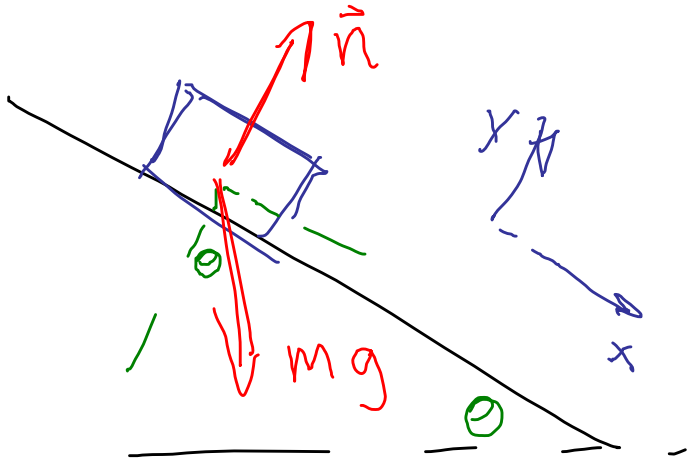
Phys 2110-4 2/13/12

Note Title 2/13/2012



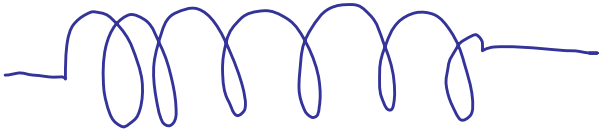
$n = mg\cos\theta$

$F_x = ma_x$

$= mg\sin\theta$

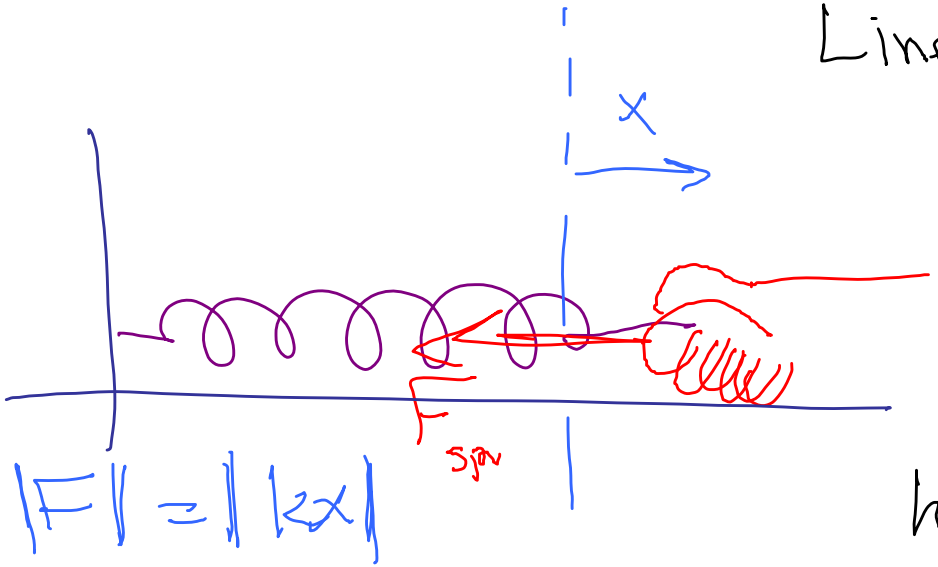
$a_x = g\sin\theta$

Springs (Forces they exert)



Can be stretched or squished.

Linear restoring force.



$$F_{spr,x} = -kx$$

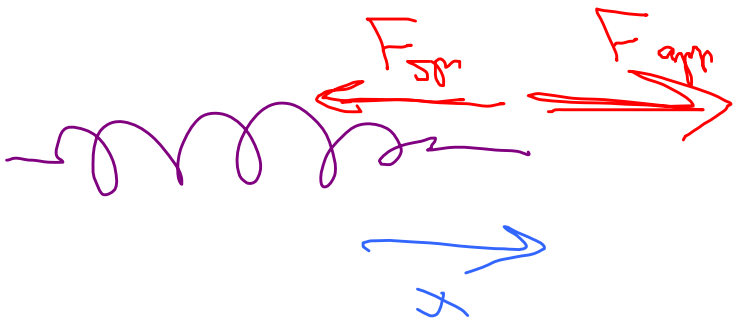
N, m

k = spring constant
force constant

Ideal spring

$[k] = \frac{N}{m} = kg/s^2$

4.36 A 35-N force is applied to a spring w/ spring constant $k = 220\ N/m$. How much does spring stretch?

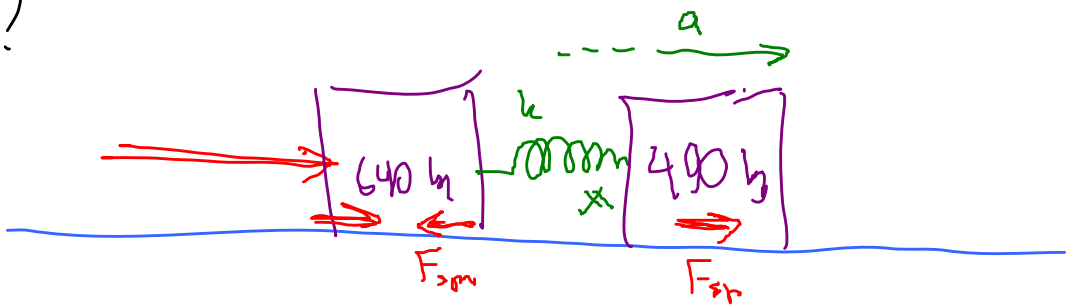


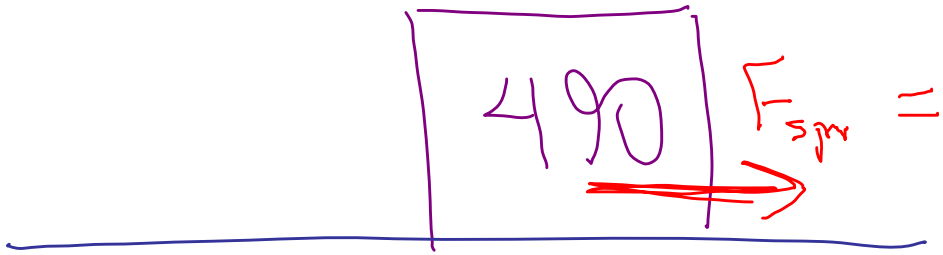
$$|F| = |kx|$$

$$35\,N = 220\,\frac{N}{m}\,X$$

$$X = \frac{35\,N}{220\,\frac{N}{m}}$$

4.53 Two large crates w/ masses 640 kg and 490 kg are connected by spring $k = 8.1 \frac{kN}{m}$ prop'd along fricless surface by horiz force applied to more massive crate. If spring compresses by 5.1 cm. what's the applied force?





$F_{spr} = kx = \left(8.1 \frac{kN}{m}\right)(5.1 \times 10^{-2} m)$

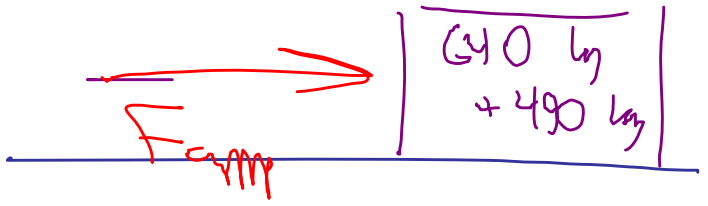
$= 413 N$

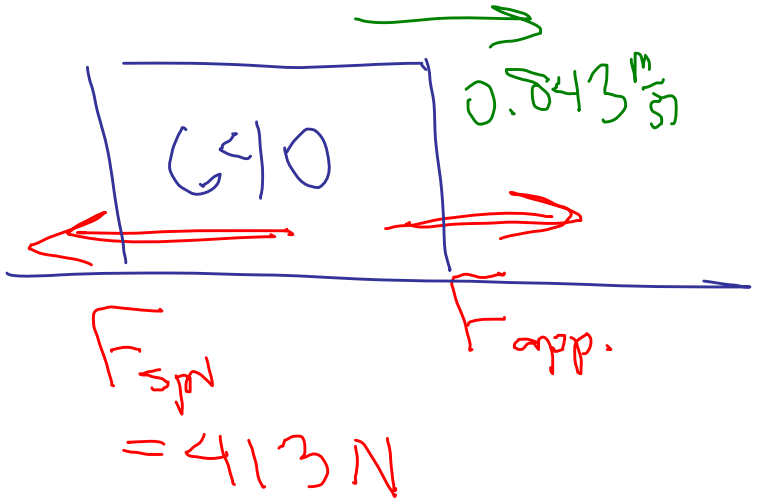
$a = \frac{F_{spr}}{490 kg} = 0.843 \frac{m}{s^2}$

$0.843 \frac{m}{s^2}$

This is accel of both blocks

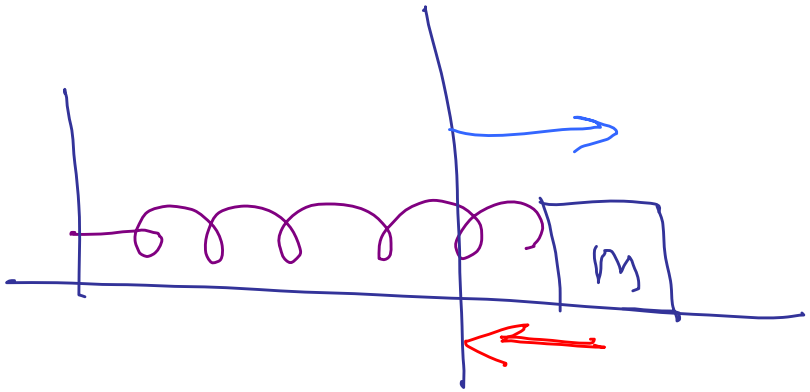
$F_{app} = M_{tot} a = 950 N$

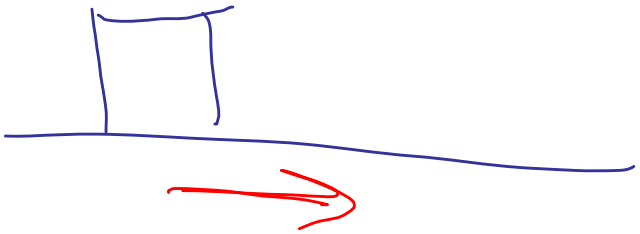


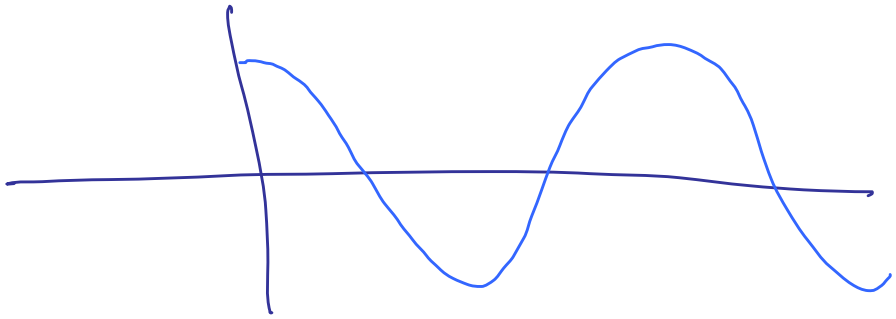


$$F_{app} - 413\,N = (640\,kg)(0.843)$$

$$= 950\,N$$







Oscillatory
(SHM)

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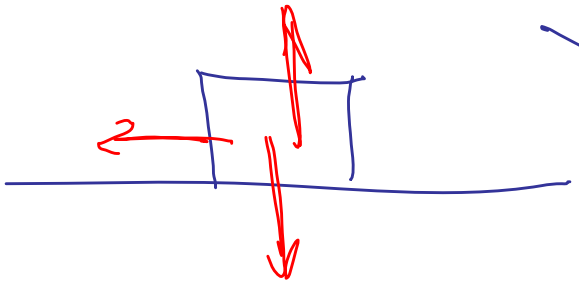
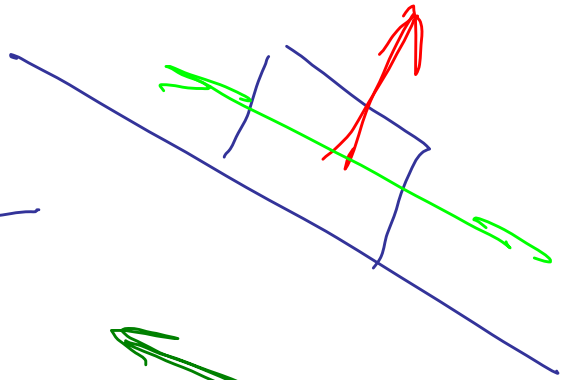
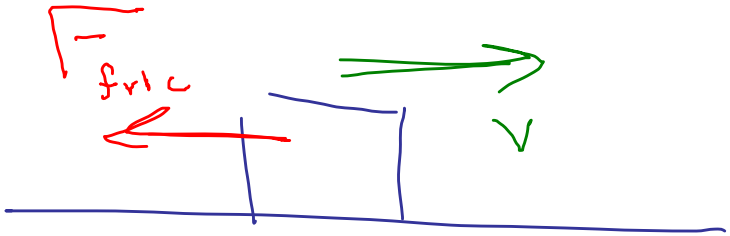
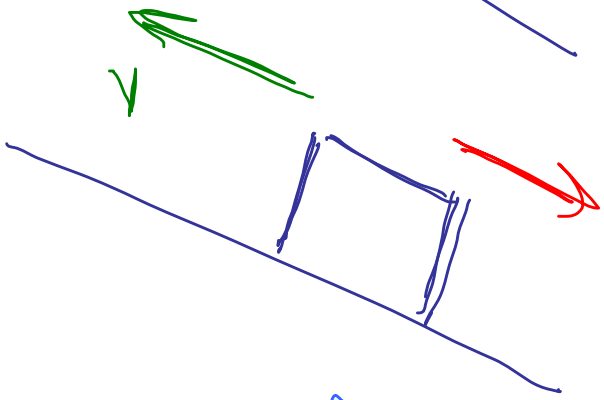
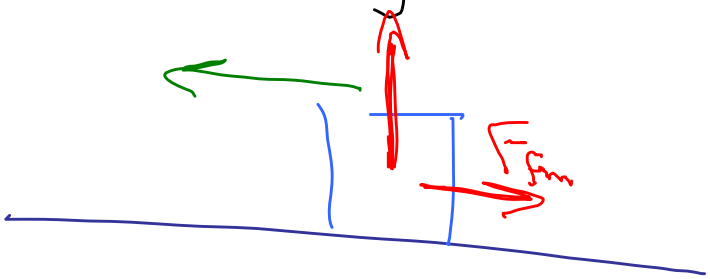




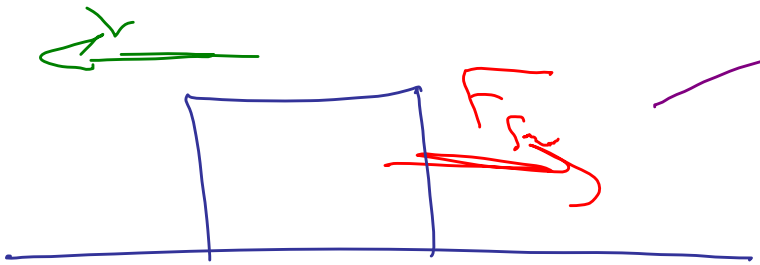




Sliding friction



Formula for force of friction

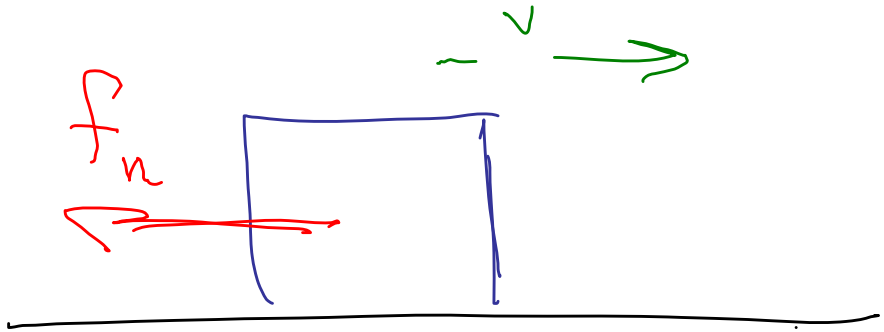


normal force

velocity

kinds of materials

How force of fric depends on normal force.



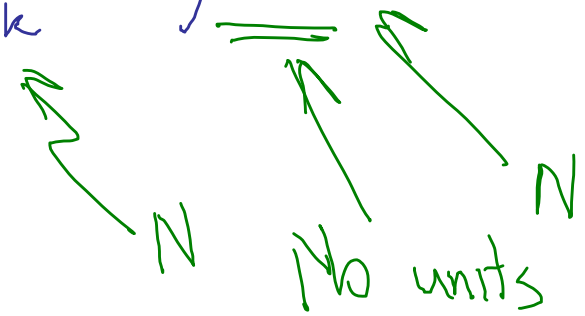
Object is in motion.

kinetic friction

$f_k = \mu_k n$

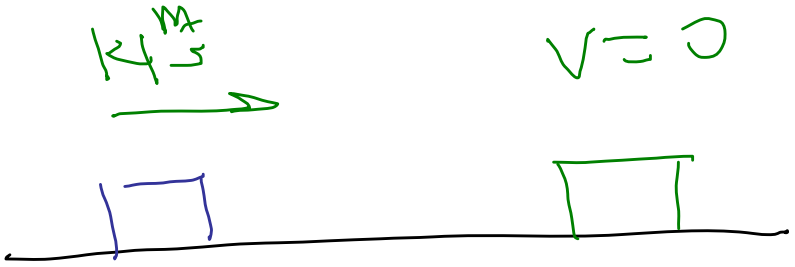
coefficient of kinetic friction.

$f_k = \mu_k n$



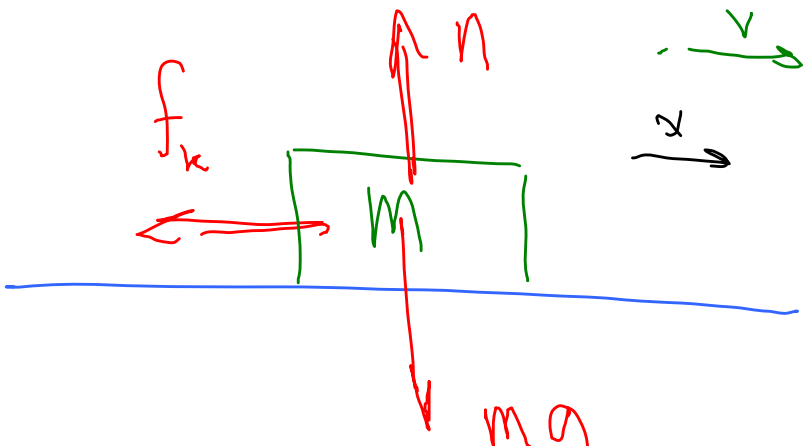
$\mu_k \approx 0.1 - 0.5$

5.29 A hockey puck is given initial speed 14 $\frac{m}{s}$. If it comes to rest in 56 s, what's the coefficient of kinetic friction?



$$a_x = \frac{\Delta v}{\Delta t} = \frac{-14\ \frac{m}{s}}{56\ s}$$

$$= -1.75\ \frac{m}{s^2}$$



$$n = mg$$

$$\mu_k = 0.179$$

$$f_k = \mu_k n = \mu_k m g$$

$$F_{net} = -f_k = -\mu_k m g = ma$$

→ Solve μ