

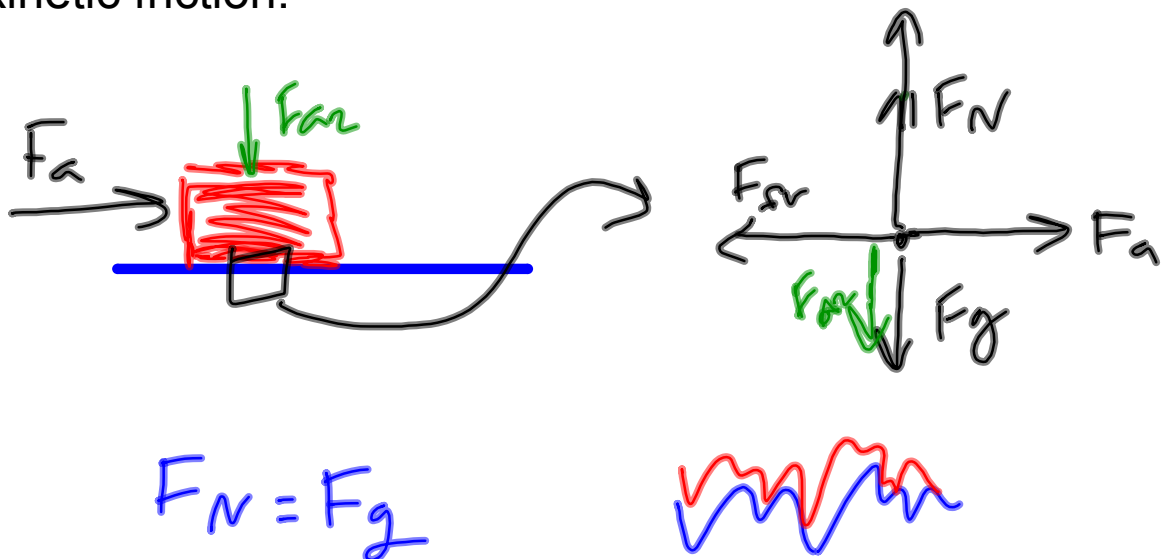
What happens at the transition between not moving and moving?

Friction Rules

Static Friction: applies as much force as it must in order for acceleration to be zero.

Kinetic Friction: it is constant and it points against the direction that the object moves.

The maximum static friction is larger than the constant kinetic friction.

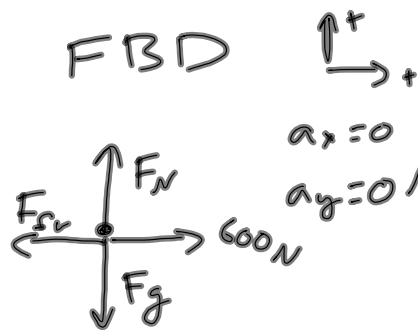


Kinetic Friction:

$$F_{frk} = \mu_k F_N$$

$\mu = \mu_k =$ coefficient of friction — a number that depends on the types of surfaces

Example: I push a 100kg fridge across the floor at a constant velocity. I push with a force of 600N. what is μ_k



$$a_y = 0 = \frac{\sum F_y}{m}$$

$$0 = \sum F_y$$

$$0 = F_N - F_g$$

$$F_N = F_g$$

$$a_x = 0 = \frac{\sum F_x}{m}$$

$$\sum F_x = 0$$

$$F_a - F_{fr} = 0$$

$$F_a = F_{fr}$$

$$F_a = \mu F_N$$

$$F_a = \mu F_g$$

$$F_a = \mu \cdot m \cdot g$$

$$F_{frk} = \mu_k F_N$$

$$\mu_k = \frac{F_a}{m \cdot g}$$

$$\mu_k = \frac{600N}{(100)(10)}$$

$$\mu = 0.6$$

No Units!

$$\frac{600N}{(100 \cancel{kg})(10 \cancel{N/kg})}$$

$$\left[\frac{N}{N} \right] = [1]$$

□ .

Static



Friction

$$F_{frs} = \mu_s F_N$$

The maximum static friction must be surpassed in order for an object to begin to move.