How hard can you safely pull this wagon?

Lowe's Canada

Chapter 6 – Dynamics: Motion Along a Line

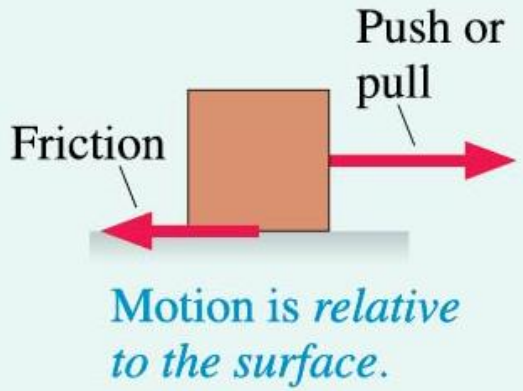
- Mass/Weight/Gravity
- Friction forces
- Drag forces

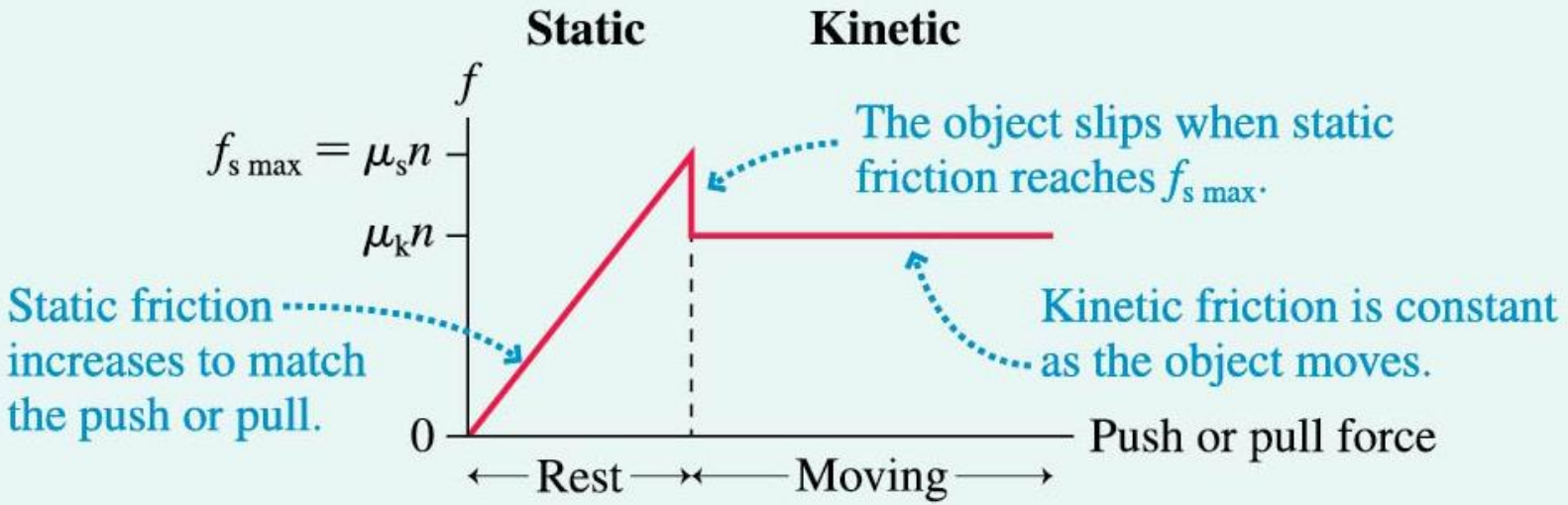
MODEL 6.3

Friction

The friction force is *parallel* to the surface.

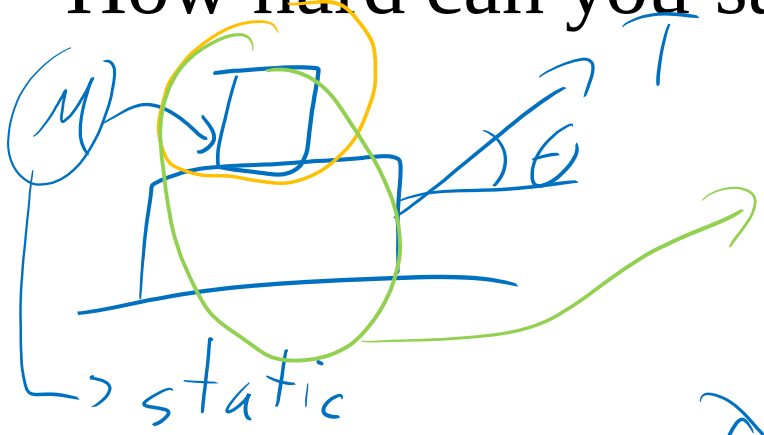
- Static friction: Acts as needed to prevent motion. Can have *any* magnitude up to $f_{s\,max} = \mu_s n$.
- Kinetic friction: Opposes motion with $f_k = \mu_k n$.
- Rolling friction: Opposes motion with $f_r = \mu_r n$.
- Graphically:



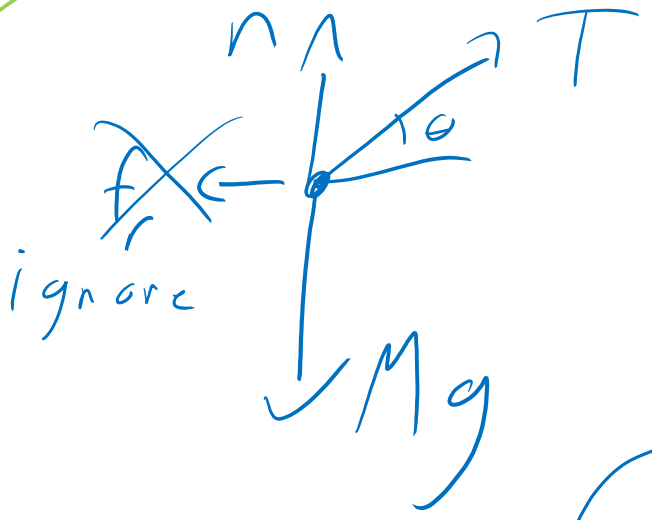


Team Up Questions

How hard can you safely pull a wagon with a child in it?

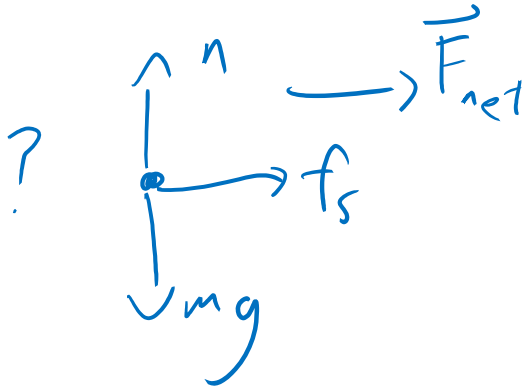


② wagon + child



$T\cos\theta = Mg$

① child



$n - mg = 0$

$f_s \le \mu_s n = \mu_s mg$

$f_s = ma < \mu_s mg$

$a < \mu_s g$

$T = \frac{Ma}{\cos\theta} < \frac{M\mu_s g}{\cos\theta}$

$T\sin\theta \not> Mg$

$<$