



recap

Texture	more roughness - more friction
Pressure between the surfaces	more pressure - more friction
Type of Materials	

Approximate Coefficients of Friction		
	Kinetic	Static
Rubber on concrete (dry)	0.68	0.90
Rubber on concrete (wet)	0.58	
Rubber on asphalt (dry)	0.67	0.85
Rubber on asphalt (wet)	0.53	
Rubber on ice	0.15	
Waxed ski on snow	0.05	0.14
Wood on wood	0.30	0.42
Steel on steel	0.57	0.74
Copper on steel	0.36	0.53
Teflon on Teflon	0.04	

Forces of Friction		
Coefficients of Friction	Static	Kinetic
	μ_s	μ_k
Steel on steel	0.74	0.57
Aluminum on steel	0.61	0.47
Copper on steel	0.53	0.36
Rubber on concrete	1.0	0.8
Wood on wood	0.25-0.5	0.2
Glass on glass	0.94	0.4
Waxed wood on wet snow	0.14	0.1
Waxed wood on dry snow	-----	0.04
Metal on metal (lubricated)	0.15	0.06
Ice on ice	0.1	0.03
Teflon on Teflon	0.04	0.04

Science is Fun

$$F_f = \mu N$$

F_f - Force of Friction
 N - The Normal Force on a level surface it is the weight
 μ - mu - greek letter
 Coefficient of Friction
 ↳ variable

wooden desk on a wooden floor 50 lb

μ_s μ_k
 .42 .30

To break it loose:

$$F_f = \mu N$$

$$= (.42) 50 \text{ lb}$$

$$= \underline{21 \text{ lb}}$$

To slide it:

$$F_f = \mu N$$

$$= .3(50)$$

$$= 15 \text{ lb}$$

Ways to reduce Friction

1. Smooth the surfaces
2. Decrease the pressure between the surfaces
3. Change the materials in contact to ones with less Friction.

wood floor
instead of wood on wood we have teflon on wood