Flipping Physics Lecture Notes:
Introduction to the Coefficient of Friction

$\boxed{\vec{F}_f = \mu \vec{F}_N}$ The force of friction equals the coefficient of friction times the force normal.

The Coefficient of Friction:

- The symbol is the Greek lowercase letter mu, which is μ.
- $\vec{F}_f = \mu \vec{F}_N \Rightarrow \mu = \frac{\vec{F}_f}{\vec{F}_N} \Rightarrow \frac{N}{N} = 1$
  - μ is dimensionless, it has no units.
- Depends on the materials the two contacting surfaces are made of.

		Coefficient of Friction	
Material 1	Material 2	Static	Kinetic
Aluminum	Steel (mild)	0.61	0.47
Glass	Glass	0.9-1.0	0.4
Glass	Nickel	0.78	0.56
Oak	Oak (parallel grain)	0.62	0.48
Oak	Oak (cross grain)	0.54	0.32
Steel (mild)	Steel (mild)	0.74	0.57
Steel (hard)	Steel (hard)	0.78	0.42

- From The Engineers Handbook[♥]: "Extreme care is needed in using friction coefficients and additional independent references should be used. For any specific application the ideal method of determining the coefficient of friction is by trials."
  - Coefficients of friction are experimentally determined.
  - The only way to know for sure is to perform the experiment.
- $\mu_s > \mu_k$
  - It is harder to get an object moving than it is to keep it moving.
- A typical range of values for μ is 0 – 2.
  - Highest published value I have seen is 4[♣], which is a bit extreme because it is for drag racing tires on dry concrete.

[♥] www.engineershandbook.com/Tables/frictioncoefficients.htm

[♣] hpwizard.com/tire-friction-coefficient.html