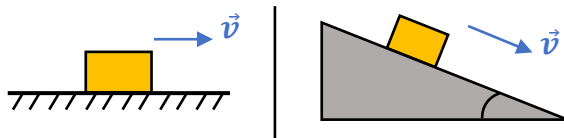


CONCEPT: KINETIC FRICTION

- Kinetic friction (____) is a resisting force that occurs when rough surfaces _____ against each other.
 - f_k tries to _____ all motion between the surfaces, so its direction is always _____ of $\vec{v}$.

$$f_k = \underline{\hspace{2cm}}$$



- μ_k = _____ of kinetic friction: measure of roughness between 2 surfaces, unitless # between ____ & _____,

Perfectly smooth surfaces: μ_k is [**ZERO** | **LOW** | **HIGH**]

Ice rubbing on ice: μ_k is [**ZERO** | **LOW** | **HIGH**]

Cinderblock on cinderblock: μ_k is [**ZERO** | **LOW** | **HIGH**]

EXAMPLE: A 10-kg box moves on a flat surface at 2 m/s. The coefficient of kinetic friction between the box and the surface is 0.4. Calculate **(a)** the kinetic friction force acting on the box and **(b)** the acceleration of the box.

FORCES

- 1) Draw FBD
- 2) Write $\Sigma F = ma$
- 3) Solve

PROBLEM: Pushing a 10-kg toolbox across the floor, you find that the box moves at a constant speed when you push horizontally with a force of 39 N. What is the coefficient of kinetic friction between the floor and the toolbox?

- A) 0.2
- B) 0.4
- C) 2.5

FORCES
1) Draw FBD
2) Write $\Sigma F = ma$
3) Solve

PROBLEM: You push on a 3-kg box to give it an initial speed of 5 m/s across a floor. If $\mu_k = 0.3$, how far does the box travel before coming to a stop?

- A) 8.6 m
- B) 2.9 m
- C) 7.7 m
- D) 4.3 m

FORCES
1) Draw FBD
2) Write $\Sigma F = ma$
3) Solve

EXAMPLE: A 20-kg box moving along the floor has a downward force of 30N acting on it. How hard must you push the box horizontally to keep the box moving at a constant 2m/s if the coefficient of kinetic friction μ_k is 0.3?

- A) 67.8 N
- B) 58.8 N
- C) 49.8 N
- D) 30 N

FORCES
1) Draw FBD
2) Write $\Sigma F = ma$
3) Solve

- Never assume that $N = mg$, therefore $f_k = \mu(mg)$! Remember to always calculate N using $\Sigma F = ma$.