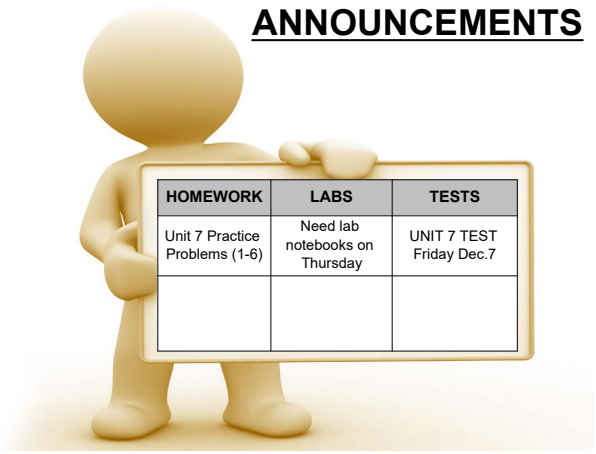
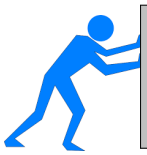
ANNOUNCEMENTS



HOMEWORK	LABS	TESTS
Unit 7 Practice Problems (1-6)	Need lab notebooks on Thursday	UNIT 7 TEST Friday Dec.7

7.2 FRICTIONAL FORCES

LEARNING TARGETS



7.2	I can define, analyze, and solve dynamic problems involving friction forces.

FRICTION

Key Concepts

- A frictional force acts when two surfaces touch.
- The frictional force is proportional to the force pushing the surfaces together. Normal
- The kinetic friction force is equal to the coefficient of kinetic friction times the normal force.

$f = \mu N$ $F_{f,\,\text{kinetic}} = \mu_k F_N$

- The static friction force is less than or equal to the coefficient of static friction times the normal force.

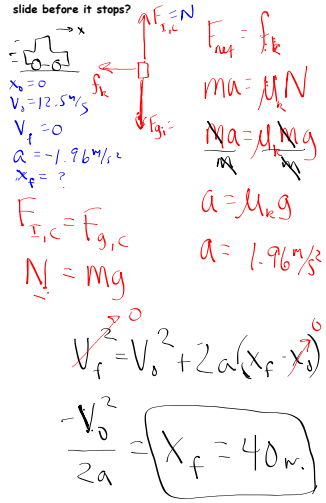
$F_{f,\,\text{static}} \leq \mu_k F_N$

Stopping Force

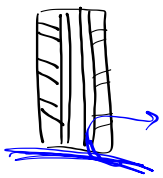
3. A Mini and a Hummer have the exact same initial velocity, the exact same braking system, and the exact same kind of tires. Both vehicles slam on the brakes on the same road. Which will stop first? Explain.

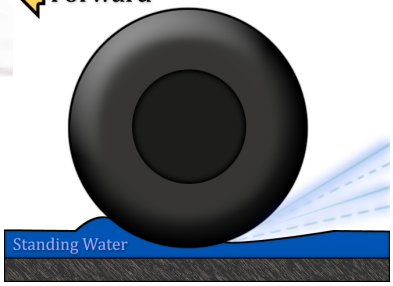
Coming to Rest

A car traveling 12.5 m/s slides on a sheet of ice and comes to rest. If the coefficient of friction between the tires and the ice is 0.20, how far will the car slide before it stops?



Hydroplaning





ABS allows the wheels of a vehicle to continue rotating while braking. This improves vehicle control and prevents wheel lock.

ABS often results in increased braking distances on slippery surfaces.

Friction On An Incline

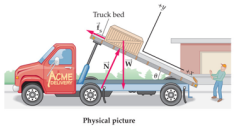
How do we solve problems involving friction on an incline plane?

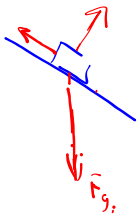
SLIGHTLY TILTED

A flatbed truck slowly tilts its bed upward to dispose of a 95.0-kg crate. For small angles of tilt the crate stays put, but when the tilt angle exceeds 23.2°, the crate begins to slide.

4. Draw a free-body diagram for the crate.

5. What is the coefficient of static friction between the bed of the truck and the crate?





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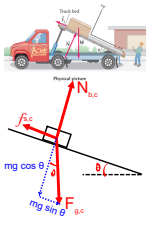

$mg\sin\theta = f_{s,c}$

$mg\sin\theta = \mu_s N$

$\frac{mg\sin\theta}{mg\cos\theta} = \frac{\mu_s mg\cos\theta}{mg\cos\theta}$

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \mu_s = 0.43$

PRACTICE

UNIT 7 PROBLEMS (7-9)