Fall Semester AP Physics
John Dewey High School
Mr. Klimetz

Name _____
Period_____
Date _____

The Force of Static Friction II
Achieving the Force Required to Initiate Translational Motion

A 5.00-kg crate is observed on the back of a flatbed truck traveling at 20.0 m/s as shown in the diagram below. The bed of the truck and the bottom of the crate are comprised of wood. Hence the coefficient of static friction between the crate and the truck bed is 0.42. The truck driver, observing an obstruction on the road ahead, brakes to a speed of 10.0 m/s in 2.50 s. Based upon your understanding of kinematics, dynamics, and systems of concurrent forces, answer the following question. [You must show all work in support of your answer.]

$v_i = 20.0 \text{ m/s}$
$v_f = 10.0 \text{ m/s}$
$t = 2.50 \text{ s}$

$m_{crate} = 5.00 \text{ kg}$

F_N
F_s
$F_{applied}$
F_g

wood
$\mu_s = 0.42$
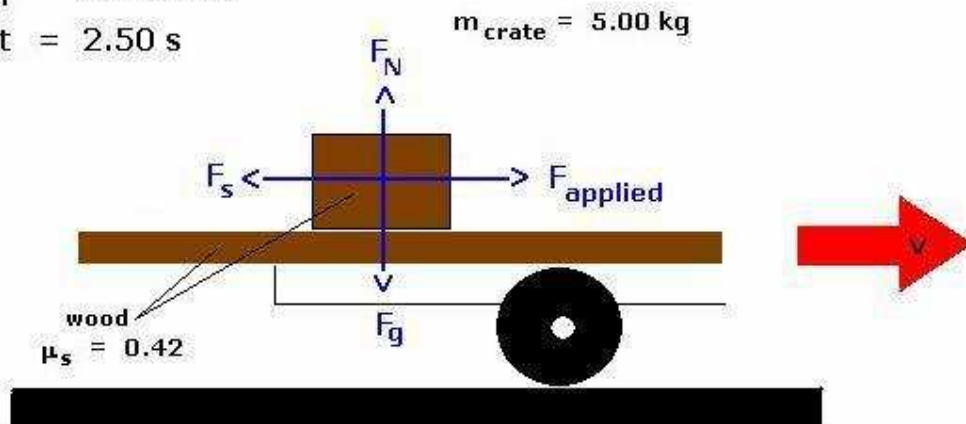
Will the crate slide across the bed of the truck during the reduction in speed or will it remain at rest with respect to the bed of the truck?