Name: _____ Date: _____

Measuring Coefficient of Friction

Friction plays an essential role in the operation of all motor vehicles, both in providing the force necessary to brake and in making turning possible. Since one of the most important outcomes of accident reconstruction is determining the speed of the car, knowing the effects of friction on the motion of the car is absolutely necessary.

In this lab, we will use a drag sled to measure the coefficient of friction (also called "drag factor" in police lingo) of tires with various road conditions.

Hypothesis

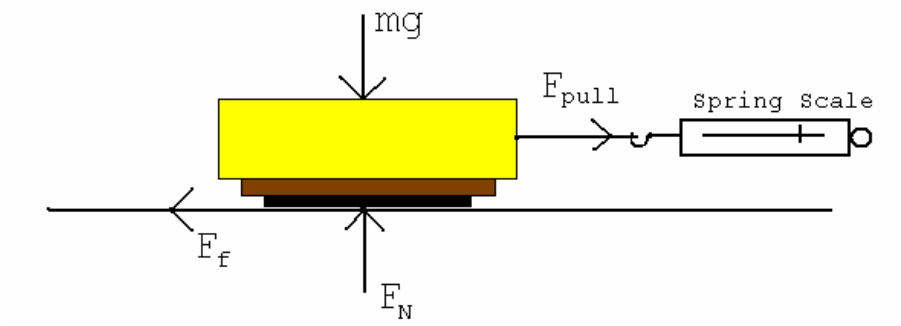
Before you begin making measurements, do you have any predictions about how or if the coefficient of friction between the tires and the road will vary with the conditions?

Procedure

Part 1: Drag Factor

Choose a drag sled to use throughout the experiment (note that each sled features a different grade of tire). At each station, record the road condition and measure the force necessary to pull the cart along the ground at a slow, constant speed (meaning $F_{pull} = F_f$) using the spring scale. Conduct three trials at each station.

The drag sled should be set up as follows:



Be certain to pull as close to parallel to the ground as possible.

Make any other measurement(s) you need to calculate the coefficient of friction for each road condition.

Part 2: Kinetic Friction vs. Static Friction

Choose any two road conditions and carefully measure the maximum frictional force reached on the spring scale **before** the cart begins to move (call this the "starting force"). Again do three trials at each. Use these measurements to compare the *static coefficient of friction* with the *kinetic coefficient of friction* you have already measured.

Data

Part 1: Drag Factor

Tire Type: _____

Road Condition	Friction Force (lbs.)			Average (lbs.)
	Trial #1	Trial #2	Trial #3	

Weight of the Sled: _____ lbs.

Road Condition	Average Frictional Force (lbs)	Coefficient of Friction

Part 2: Kinetic Friction vs. Static Friction Friction

Road Condition	Friction Force (lbs.)			Average (lbs.)
	Trial #1	Trial #2	Trial #3	

Average Starting Force (lbs)	Coefficient of Static Friction	Average Sliding Force (lbs)	Coefficient of Kinetic Friction

Analysis

1.) Which road condition showed the largest coefficient of kinetic friction? Which showed the smallest? Is this what you expected?

2.) Which were larger, the static or kinetic coefficients of friction? Why do you think this is so?