

PHY I – F=ma and Friction
 Lab – Calculate the Coefficient of Friction

Name: _____
 Date: _____

Background: Friction is a force that opposes motion any time two objects are in contact. The coefficient of friction is the ratio between the normal force, in this case the object's weight, and the force required to pull an object at a constant velocity.

Objective: calculate the kinetic (sliding) coefficient of friction (μ_k) for different surfaces.

Materials: Wood block, masses, friction board, LabQuest and force sensor or spring scales

Hypothesis: Which surface will require the most force to pull a block of wood across? (2pts)

cardboard cork rubber sandpaper

Procedure:

Each group member is responsible for a different mass

Circle the mass you will use the in trials: 100g 200g 500g 1000g

Measure the force required to pull the block and mass across the various surfaces.

key: pulling slowly with a constant force – therefore constant velocity

Data:

Type of surface - wood block sliding across...	F_f – equal to measurement from sensor	F_N - equal to the weight or F_g - $F=ma$ where a is due to gravity 9.8 m/s^2	Calculate the coefficient $\mu_k = \frac{F_f}{F_N}$
cardboard	N	N	
cork	N	N	
rubber	N	N	
sandpaper	N	N	

Analysis:

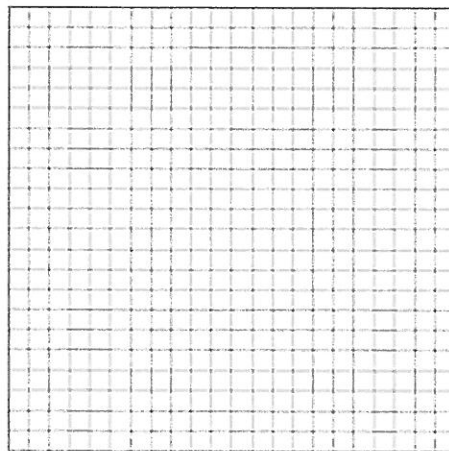
Perform the necessary calculations for μ_k based on the formulas provided in the data table above. Remember to convert grams to kilograms for calculating forces in Newtons. (100g = 0.10kg)
 (4pts)

Conclusions:

1. Does your data support your prediction? Cite evidence to support your statement. (4pts)

2. Compare your results with others. Did changing the weight change the coefficient? Explain. (4pts)

3. Create two line graphs and summarize in words the relationship between the coefficient (x) and the force required to pull (y) (3pts)



relationship between the weight (x) on a given surface and the coefficient (y)(3pts)

