Name:

Group Members' Names:

Mu of the Shoe Lab Report

Your goal: To investigate factors that affect the Force of friction between a shoe and the table/floor and a rug.

Details

You will investigate the force needed in **two** different circumstances:

- 1. The force needed to make the shoe start moving
- 2. The force needed to pull a shoe across the floor at a constant velocity

You will also investigate how changing the mass of the shoe (by putting different masses inside the shoe) changes this force

Materials: Shoe, Rug, Force meters, Masses

1. Diagram:

a. Draw a Free Body Diagram for the shoe as you were sliding it across the floor in your experiment.

b. Explain how you determined the size and direction of each of your drawn forces in your FBD above.

- 2. Procedure: Write or draw a procedure for your experiment. Consider:

 - a. What you are changing? b. How you are changing it?
 - c. What you are measuring?
 - d. How you will measure it?
 - e. How will your direct measurements be used to determine other valuable unknowns?

3. Reason for Method: Explain how this set-up will help you determine the relationship between F_f and F_N in 1-3 sentences.

4. Data:

a. Completed table with appropriate labels and units for ...

i. "Starting" the shoe's motion

	F _g (N)	F _N (N)	F _{applied} (N)	F _f
Shoe				
Shoe with weight				
Shoe with weight				
Shoe with weight				

	F _g (N)	F _N (N)	F _{applied} (N)	F _f		
Shoe						
Shoe with weight						
Shoe with weight						
Shoe with weight						

"Keeping" the shoe moving ii.

b. How were Normal Force and Friction calculated (since those are not values that were DIRECTLY measured)?

5. Analysis:

- a. A graph (attach graph paper) of F_f vs. F_N with appropriate labels and units for...
 - "Starting" friction "Moving" friction i.
 - ii.
- b. A calculation of the two slopes of your F_f vs. F_N graphs

c. An explanation of what those slopes represent

6. EXTRA CREDIT: Repeat steps 4 and 5 for the same shoe pulled across the rug. Complete these steps on separate paper.

7. Conclusion:

a. How do the results of your experiment reveal how friction depends on Normal Force? (Describe a mathematical relationship)

b. Explain the difference between static and kinetic friction. What did your experiment reveal about these two different types of friction?

c. Extra Credit: How do the results of your experiment reveal how friction depends on material?