



1. Before testing, complete the table below to predict the amount of force needed to move the block on each surface (1 = least amount of force required).

Surface	Predicted Rank (Least Force to Greatest)

2. If a block is pulled across different surfaces, the force required will \_\_\_\_\_ with rougher surfaces and \_\_\_\_\_ with smoother surfaces.
3. After you test each surface, record the data that you collected in the table.

Surface	Trial 1		Trial 2		Trial 3	
	Time in sec.	Force	Time in sec.	Force	Time in sec.	Force



# Frictional Forces

4. Plot a line graph of force over time for one of the surfaces. Sketch the graph at the right. Label and number the axes and identify any peaks and valleys.
5. After you test all of the surfaces, record the average force required by your group to pull the block across each surface in the table below. Next, use the results from all of the lab groups to find the average force required to pull the block. Finally, rank the results based on the amount of force required (1 = least amount of force).



Surface	Average Force	Class Average of Force	Actual Rank (Least to Greatest)

6. Which surface required the highest average force? \_\_\_\_\_  
Least? \_\_\_\_\_
7. Compare the results to your hypothesis. Does the data seem reasonable? Is it what you expected?  
\_\_\_\_\_  
\_\_\_\_\_
8. Look at the table for each surface.
  - a. Was the force constant throughout the collection interval?  
\_\_\_\_\_  
\_\_\_\_\_
  - b. If not, when was the force greatest? Why do you think this is so?  
\_\_\_\_\_  
\_\_\_\_\_
  - c. Explain any peaks or valleys.  
\_\_\_\_\_  
\_\_\_\_\_



## Frictional Forces

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9. \_\_\_\_\_ is a force measured in \_\_\_\_\_ that resists \_\_\_\_\_ of one surface that is in contact with another surface.
10. Friction is caused by \_\_\_\_\_ in the surfaces in contact.
11. The rougher the surface, the \_\_\_\_\_ the frictional forces.
12. The smoother the surface, the \_\_\_\_\_ the frictional forces.
13. Explain what would happen if there were no frictional forces between objects.

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