

# 8 Friction

Name \_\_\_\_\_

Lab

Inquiry/AP Physics

Today we will be investigating and identifying factors which affect the frictional force between two objects. At your lab station you will find three wooden blocks, a spring scale, a surface board, a mirror, a metal plate and various masses. You will perform this lab **at your lab station**.

Pick an area of the table where you will conduct **all** of the trials. You will be placing various surfaces and objects at **that same exact location** and pulling them in the **same exact way** for each experiment. Start by placing the sandpapered wooden block on the surface board and 500 grams on top of the block. (This is experimental situation **A** in the table.) Slide the hook of the spring scale through the hook on the block and gently pull the block forward using the spring scale. Get the block moving at a reasonable but constant speed. Why should you keep the scale **parallel** with the table top?

Record the maximum scale reading **after** you begin pulling the block but **before** the block moves forward. This data should be recorded in the "Static" column in the table. Also record the maximum scale reading while the block is **moving** at a **constant speed** in the "Kinetic" column in the table. Be sure to make three measurements.

Complete the table. The same person should pull the block in all the trials, and he or she should try to maintain the same velocity when pulling the block. *Be careful to always place the required mass on each block as you experiment with it.*

Do not ever place the sandpaper block on the mirror, nor the mirror block on the metal plate.

Table I

	Block Type	Surface	Mass on Top (g)	Reading 1 (N)		Reading 2 (N)		Reading 3 (N)		Avg. Reading (N)	
				Static	Kinetic	Static	Kinetic	Static	Kinetic	Static	Kinetic
A	sand-paper	surface board	500								
B	mirror	mirror	500								
C	mirror	surface board	500								
D	plain wood	mirror	500								
E	plain wood	metal plate	500								
F	plain wood	surface board	500								
G	plain wood	surface board	750								
H	plain wood	surface board	1000								

THE IDEA

ALL ANSWERS SHOULD BE COMPLETE SENTENCES

- 1. How much of the block's weight is the spring scale supporting when you pull the block horizontally? **Justify your answer.**

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- 2. Before you took the static reading, you were pulling on the block yet it did not move. What is preventing the block from sliding?

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- 3. Before it began to slide, and then later when it was sliding but at a constant speed, how does the amount of tension force in the scale compare to the amount of frictional force? Justify your answer.

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- 4. Given your answers to questions 2 and 3, what then is one factor that directly controls the amount of frictional force?

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- 5. Look at experiments F, G, and H. In general, which are larger - the "Static" or the "Kinetic" values?

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- 6. Still looking at F, G, and H, state what effect weight has on the readings.

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- 7. Look at the average data for experiments A, C, and F. Does the *type of surface on the block* affect the scale readings?

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- 8. Look at the average data for experiments D, E, and F. Does the *surface the block is moving over* affect the scale readings?

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CONCLUSION

- 9. The purpose of this lab was to identify factors which affect the frictional force between two surfaces. In answering questions 4-8, you have noted five such factors. Carefully state, in several complete sentences, the five factors **shown by this experiment** to affect friction.

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