

Experiment #1 : To explore frictional force

Name :

Grade : 9

Date :

Objectives

To verify that frictional force depends on mass of the objects

To verify that frictional force depends on the surface

Materials :

spring scale – 1

Block of wood – 1

Weights – 1

Meter Scale - 1

Theory :

Friction is a force that always acts to stop things from sliding. Last week you slid various objects down the halls of Loomis as you were learning about graphing motion. You found that when you gave a puck a big shove, starting it with a rather high speed, it nevertheless always slowed down and stopped because of friction. Today we will investigate this force some more.

Procedure :

1. Use your spring scale to find the mass (in grams) of your block of wood and write it here:
Mass of the wooden block = kg
2. Now use the spring scale to pull the block of wood with a slow constant velocity across the table. find the force the spring pulls with. Write the reading in the table 1 given.
3. Put more weights on top of the wooden block and repeat the above experiment.
4. Now how big is the size (in Newtons) of the force of friction acting on the block?
5. Find the relationship between the force of friction and the total mass of the thing you are pulling
6. Repeat the above experiment, but this time watch the spring scale very carefully as you slowly increase the force while the block is initially at rest. Compare the size of the force of friction just before the block starts to slide to the size of the force of friction when the block is sliding with constant velocity.
7. Finally, repeat the above experiment on another surface (for example the floor or a wooden lab bench). Does the amount of friction depend on the nature of the surfaces involved? Discuss as a class

Table 1

How does frictional force depends on mass of the object?

Take, $g = 10 \text{ m/s}^2$

Serial No.	Mass attached to spring ,M (kg)	Normal Force, $N = Mg$	Frictional force, F_f	Coefficient of friction, $\mu = \frac{F_f}{N}$
1				
2				
3				
4				

Table 2

How does frictional force depends on the type of surface?

Serial No.	Type of Surface	Frictional force, F_f (N)
1		
2		
3		
4		

Conclusion

1. If mass of the object increases, frictional force will be

- (a) frictional force increases
- (b) frictional force decreases
- (c) frictional force no effect on roughness of surface

2. Which surface has more frictional force ?

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3. If the surface is rough frictional force will

- (d) increase
- (e) decrease
- (f) have no effect on roughness of surface