Name _____ Period _____ Date _____

Sticky Business Lab 5.2

Purpose

To investigate surface friction.

Required Equipment

- Friction Block
- Assorted Spring Scales

Discussion

When the surfaces of two objects are in contact, molecules on the surface of one object are attracted to the molecules of the other. Ridges and valleys of one surface settle into the valleys and ridges of the other surface. When one surface slides over another, a slip-and-stick sequence occurs as molecules cling and break away from each other.

Part A: The Coefficient of Static Friction

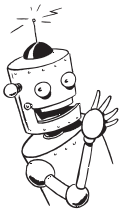
1. Obtain a block and a scale from your instructor.
2. Record the mass of the block in **Data Table A**.
3. Place the block on the first surface and attach the spring scale.
4. Keeping the spring scale parallel to the surface, pull with the scale until the block begins to move. Note and record in **Data Table A** the maximum reading on the scale just before the block begins to move.

Data Table A: Static Friction

Surface Material	Total Mass (kg)	Normal Force (N)	Starting Force Just to Get Going (N)	Coefficient of Static Friction (N/N)
Desktop				
Floor				

5. Calculate the normal force and the coefficient of static friction using the formulas bellow.

$$N = mg \qquad \mu = \frac{f_f}{N}$$



Part B: The Coefficient of Sliding Friction

6. Repeat the same steps as in part A but this time pull with the scale so that the block moves at a constant speed (no acceleration). Note and record in **Data Table B** the reading on the scale as you pull with constant speed.

Data Table B: Sliding Friction

Surface Material	Total Mass (kg)	Normal Force (N)	Drag Force Constant Velocity (N)	Coefficient of Sliding Friction (N/N)
Desktop				
Floor				

7. Calculate the normal force and the coefficient of static friction using the formulas bellow.

$$N = mg \qquad \mu = \frac{f_f}{N}$$

Part C: Normal Force

8. In this part of the lab you will pull your block on your desktop. Keeping the spring scale parallel to the surface, pull the block and record the maximum starting force and the drag force in **Data Table C**.

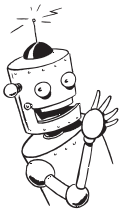
9. Repeat the experiment but add mass to the top of the block as instructed.

Data Table C: Desktop

Amount of Mass Added	Total Mass (kg)	Normal Force (N)	Starting Force Just to Get Going (N)	Drag Force Constant Velocity (N)	Coefficient of Sliding Friction (N/N)	Coefficient of Static Friction (N/N)

10. Calculate the normal force and the coefficient of static friction using the formulas bellow.

$$N = mg \qquad \mu = \frac{f_f}{N}$$



Part D: Surface Area

11. In this part of the lab you will pull your block on your desktop. Keeping the spring scale parallel to the surface, pull the block and record the maximum starting force and the drag force in **Data Table D**.

12. Repeat the experiment but change the area contact by placing the block on a different side.

Data Table D: Desktop

Configuration	Surface Area of Block (cm^2)	Normal Force (N)	Starting Force Just to Get Going (N)	Drag Force Constant Velocity (N)	Coefficient of Sliding Friction (N/N)	Coefficient of Static Friction (N/N)
1						
2						

13. Calculate the area of contact for the block in its two different positions and record in **Data Table D** using the formula bellow.

Surface Area = Length x Width

14. Calculate the normal force and the coefficient of static friction using the formulas bellow.

$$N = mg \qquad \mu = \frac{f_f}{N}$$

Analysis

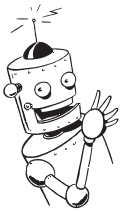
15. Explain how do the coefficients of static and sliding friction compare to each other.

16. As the normal force increases explain how are the coefficients of static and sliding friction are effected?

17. As the normal force increases explain how is the force of friction effected?

18. Explain how the coefficients of static and sliding friction are effected by surface area.

19. As the surface area increases explain how the force of friction is effected.



Name _____ Period _____ Date _____

Sticky Business

Lab 5.2