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**Friction Lab**

**Materials:**

* Spring Scale
* Block
* Meter stick
* Timers

**Part 1: Surface Area**

Using the meter stick measure out 0.5 meters on the table. Place a photogate timer at the start and finish lines. Attach the spring scale to the block and pull it at a constant force across the table, allowing the block to move through both timers. Then, repeat the procedure with the block on the smaller side. Record all data below and calculate the force of friction and the coefficient of friction on the block.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SA (cm2) | t1 (s) | v1 (m/s) | t2 (s) | v2 (m/s) | a (m/s2) | f (N) | µ |
| 16 | 0.2891 | 0.2214 | 0.1128 | 0.5674 | 0.2729 | .3679 | 0.3183 |
| 9.6 | 0.2918 | 0.2193 | 0.1416 | 0.4520 | 0.1562 | .3815 | 0.3300 |

**Calculations:**

F = 0.4 N m = .118 kg x = 0.5 m L = 0.064 m W = 2.5(wide), 1.5(thin)

**Analysis:**

What is the effect of surface area on the force due to friction and the coefficient of friction on the block?

As surface area increases, force of friction decreases, while the coefficient of friction increases.

**Part 2: Weight**

Repeat the procedure from part 1, but this time instead of changing the surface area, now change the mass of the block.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m (Kg) | W (N) | t1 (s) | v1 (m/s) | t2 (s) | v2 (m/s) | a (m/s2) | f (N) | µ |
| 0.270 | 2.646 | 0.5093 | .1257 | 0.1991 | .3214 | 0.0876 | 0.7263 | 3.6429 |
| 0.215 | 2.107 | 0.3297 | .1941 | 0.1228 | .5212 | 0.2340 | 0.6997 | 3.0113 |
| 0.165 | 1.617 | 0.1237 | .5174 | 0.0498 | 1.285 | 1.3830 | 0.5218 | 3.0989 |

**Calculations:**

F = 0.75 N x = 0.5 m L = 0.064 m

**Analysis:**

What is the effect of weight on the force due to friction and the coefficient of friction acting on the block?

As the block’s weight increases, force due to friction and coefficient of friction increase.