Ramp Lab

Objective: Students will determine the coefficient of static friction of an inclined interface. Students will use this information to determine the max angle (θmax) at which static friction can act on an inclined interface, and determine the dependencies of θmax

Materials:

* Long black board
* Small piece of wood (as close to 3”x3” as you can find)
* 20g mass, 50g mass, 2 x 100g mass, 500g mass, 1kg mass.
* Protractor

Procedure:

1. Mass board
2. Attach protractor to long black board so that it is free to twist and indicate angle of ramp – see diagram to right

θ

1. Place board on ramp and raise ramp until the   
   board starts to slide – record angle (θmax)
2. Repeat step 3 with the following masses on the   
   board:
   1. 20g
   2. 50g
   3. 100g
   4. 150g
   5. 250g
   6. 500g
   7. 750g
   8. 1000g
3. Place a piece of paper between the board and the ramp. Repeat steps 3 & 4 with the new surface.
4. Complete the data table below on a difference piece of paper. You should have one data table for the first μs (wood on wood) and one for the second (wood on paper).

Data table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mass | Measured θmax | FGX | FGY | FN | FFS | μs |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Suggested discussion questions:

Does your θmax change as you increase the mass? Should it? Why or why not?

Does your μs change as you increase the mass? Should it? Why or why not?

What does θmax depend on?

Find the standard deviation of both of your μ­s values