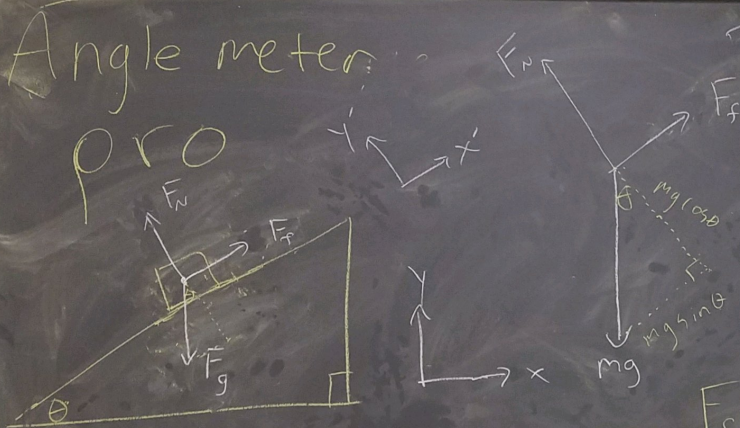


Kinetic friction lab  $x = v_0 t + \frac{1}{2} a t^2 \rightarrow a = \frac{2x}{t^2}$

1. Draw free body diagram
2. Find equation for acceleration of block  $\mu_k$
3. Set the angle of ramp to three different values  $\mu_k$   
Calculate the acceleration by measuring the distance  
the block travels  $\mu_k$  the time it takes  $30^\circ, 35^\circ, 40^\circ$
4. Find  $\mu_k$  for the three trials  $\mu_k$  average them,  
was it less than  $\mu_s$ ?

Angle meter:

pro



Now the block is accelerating

$F_{net} = ma$  Forces NOT in balance

x:  $mg \sin \theta - F_f = ma$

y:  $F_N = mg \cos \theta$

$F_f = \mu_k F_N \rightarrow F_f = \mu_k (mg \cos \theta)$

$F_f = mg \sin \theta - ma$

$F_g = \text{weight} = \text{mass} \times \text{gravity}$   
 $mg$

$g = 9.8 \text{ m/s}^2$

$mg \sin \theta - F_f = ma \rightarrow$   
 $\mu_k (mg \cos \theta) = mg \sin \theta - ma$

$$\mu_k = \tan \theta - \frac{a}{g \cos \theta}$$