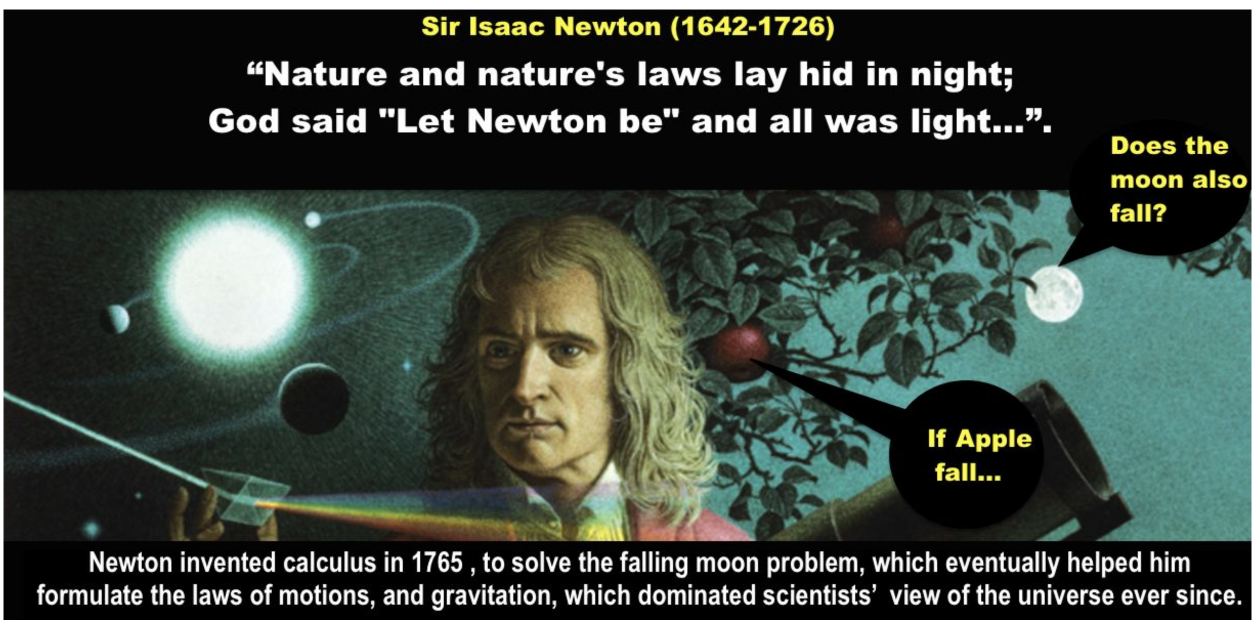
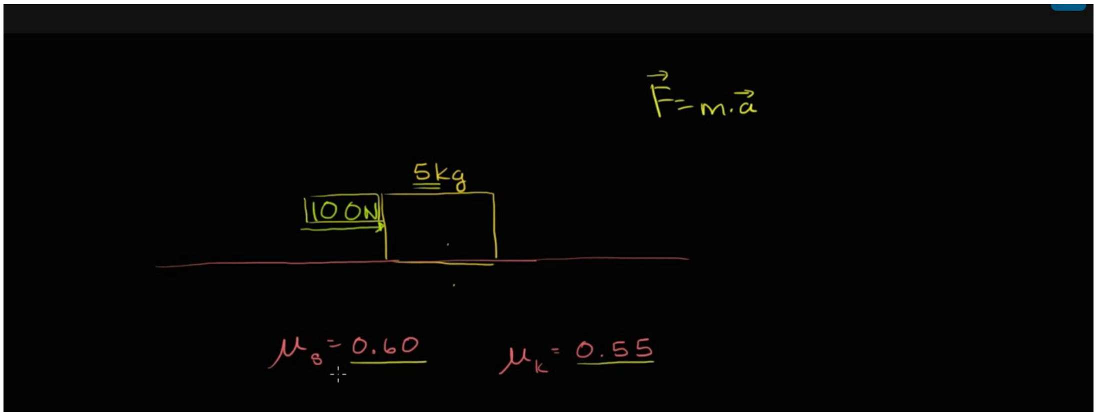
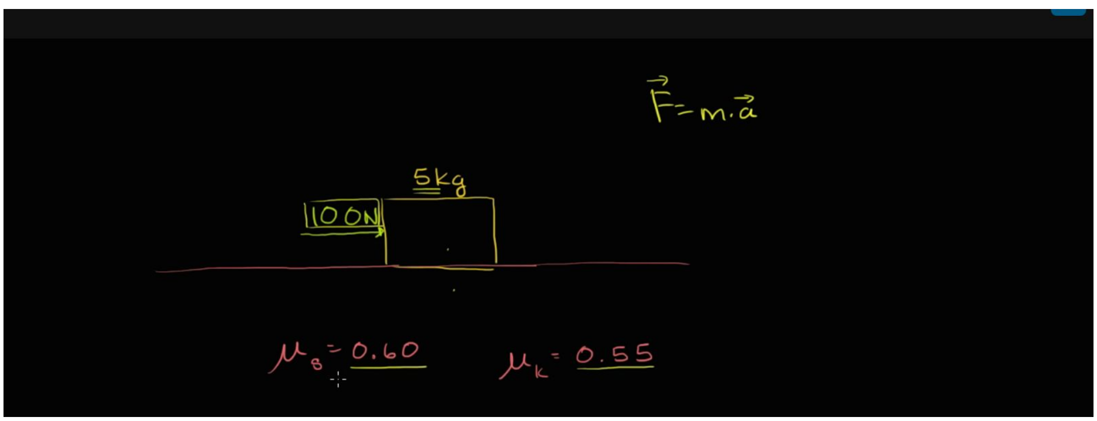
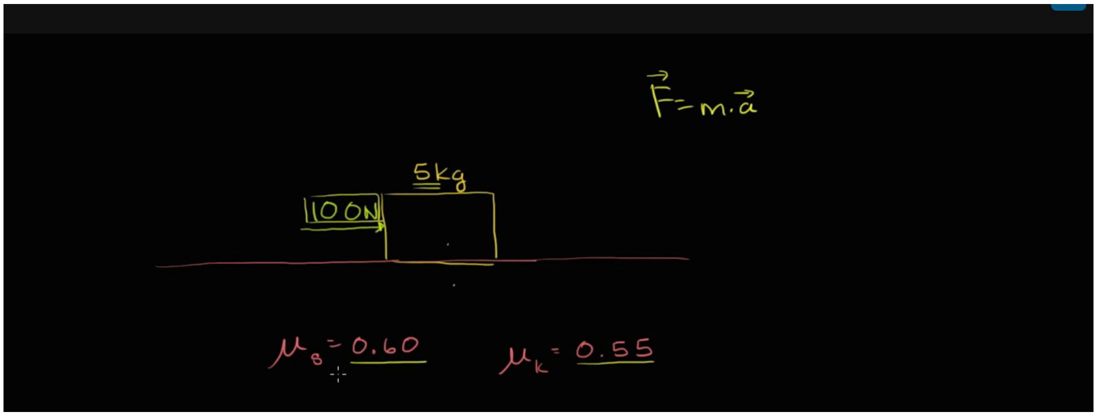
Booklet # 37

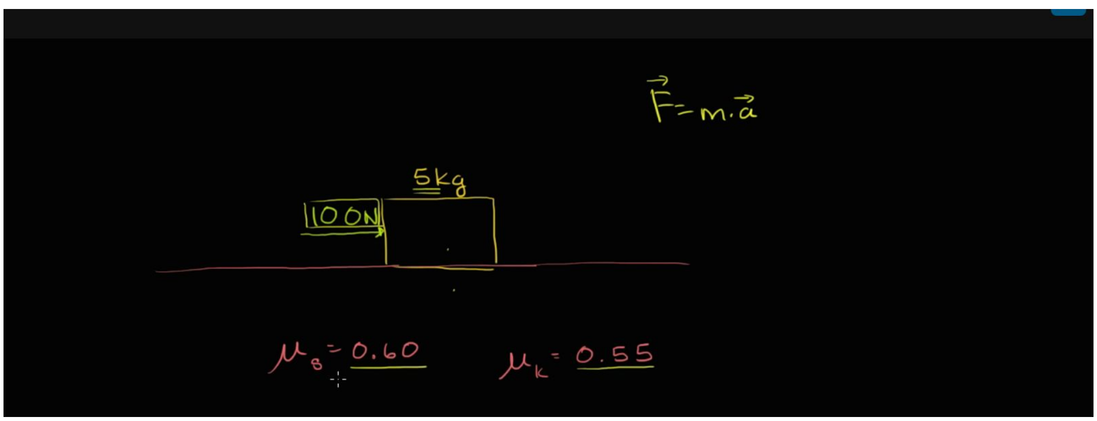
Name		Period		Date	Nov 18, 2015 (Wednesday)
Unit # 2		Topic: inclined plane			
Items		Points		Your score	
Do-now		25%			
Note taking		25%			
Assessment		25%			
Homework		25%			
		You have earned			



1	Find the acceleration of the object below.
	

	How much force you have to apply to make the box (which is at rest) moving?
	

	How much force you have to apply to make the box (which is in motion) to keep moving?
	

	FIND Net force you need to apply to make it moving from the REST? Find the acceleration using Newton's second law
	

<table>
<tr><td></td><td>FIND Net force you need to apply to keep it moving while it's already MOVING?
Find the acceleration using Newton's second law</td></tr>
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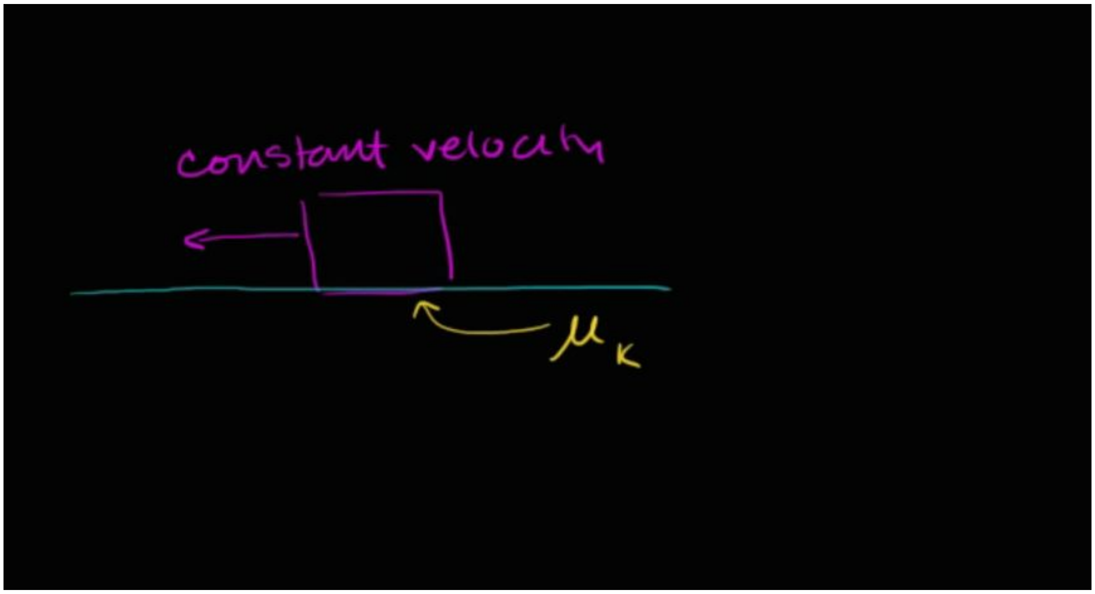

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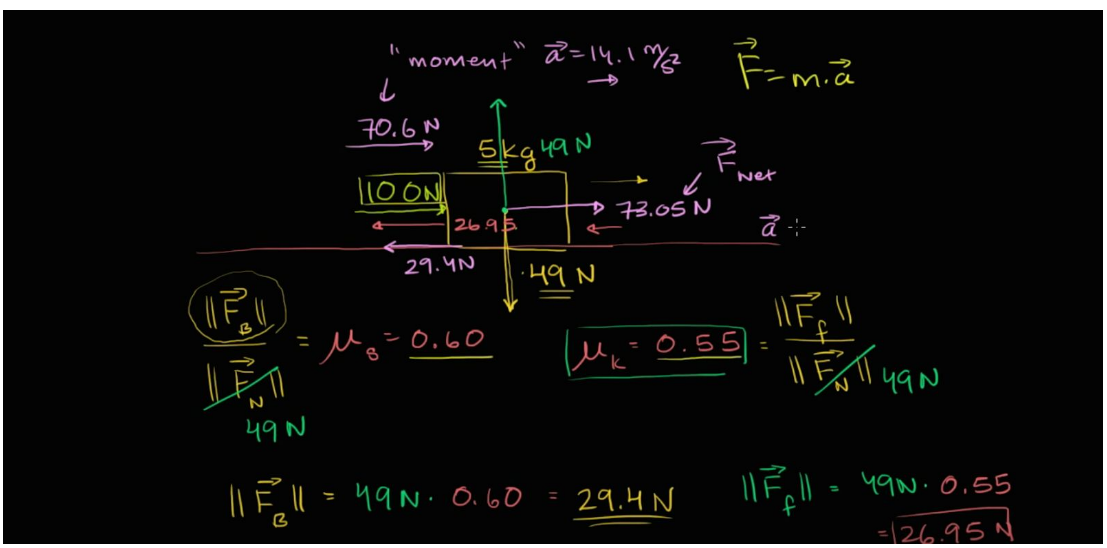

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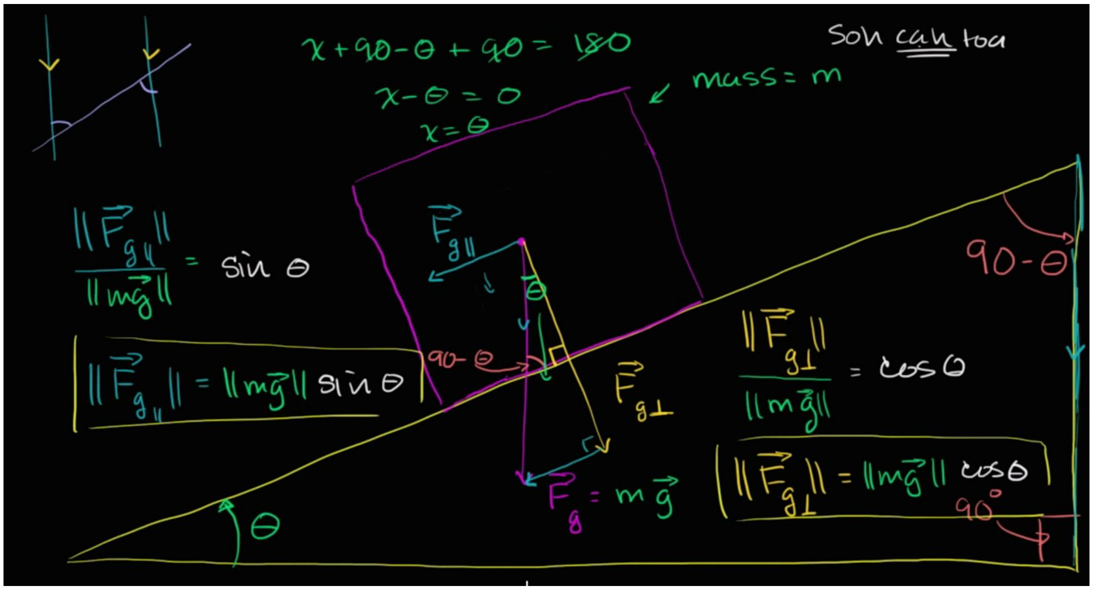
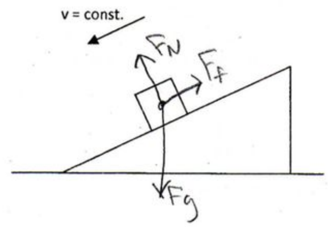
	Write the equations for inclined plane
	

Dynamics in action

Inclined Force

1. A 3.0 kilogram block is sliding down a 25° incline at a constant speed.



   a. Sketch the three primary vectors (weight, normal force, and friction force) acting on the block.

   [Sketch]

   b. Determine the weight of the block.

   $F_g = m \cdot g = 3kg \cdot 9.81 m/s^2$

   $F_g = 29.4 N$

   [29.4N]

   c. Determine the magnitude of the normal force acting on the block.

   $F_N = F_{g\perp} = F_g \cos\theta$

   $F_N = 29.4N \cdot \cos 25°$

   $F_N = 26.6N$

   [26.6N]

   d. Calculate the friction force acting on the block.

   $F_f = F_{g\parallel} = F_g \sin\theta$

   $F_f = 12.4 N$

   [12.4N]

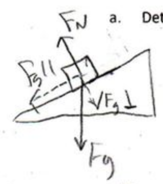
   e. Determine the coefficient of friction between the block and the incline.

   $F_f = \mu F_N$

   $\mu = \frac{F_f}{F_N} = \frac{12.4N}{26.6N} = 0.47$

   [0.47]

2. A 50 newton block is placed on a frictionless 20° incline.



   a. Determine the net force acting on the block.

   $F_{net} = F_{g\parallel}$

   $F_{g\parallel} = F_g \sin\theta = 50N \cdot \sin 20$

   $F_{net} = F_{g\parallel} = 17 N$

   [17N]

   b. Calculate the block's rate of acceleration down the plane.

   $a = \frac{F_{net}}{m}$

   $g = \frac{F_g}{m}$ $m = \frac{F_g}{g} = \frac{50N}{9.81 m/s^2}$

   $m = 5.1 kg$

   $a = \frac{17N}{5.1kg}$

   $a = 3.3 m/s^2$

   [3.3 m/s²]

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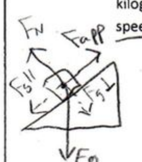
3. Calculate the amount of force needed to move a 2.5 kilogram object up a 30° frictionless incline at a constant speed.



   $F_g = m \cdot g = 2.5kg \cdot 9.81 m/s^2$

   $F_g = 24.5 N$

   $F_{g\parallel} = F_g \sin 30° = 12.3 N$

   $F_{app} = F_{g\parallel} = 12.3N$

   [12.3 N]

	Assessment
	Find the net force of the object below when it starts moving.