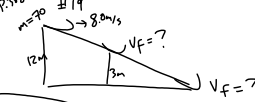


$P_{19}$   
 $m=70$  #19  
 $v \rightarrow 8.0 \text{ m/s}$   
  
 $v_f = ?$   
 $v_f = 1220 \text{ J} = \text{loss}$   
 $TE_{\text{top}} = TE_{\text{3m}}$   
 $ME_{\text{top}} = ME_{\text{3m}} + \text{heat}$   
 $mgh + \frac{1}{2}mv^2 = mgh + \frac{1}{2}mv^2 + 1220 \text{ J}$   
 $(70)(9.8)(12) + \frac{1}{2}(70)(8^2) = (70)(9.8)(3) + \frac{1}{2}(70)v^2 + 1220$   
 $(70)(9.8)(9) + \frac{1}{2}(70)8^2 - 1220 = 35v^2$   
 $6130.35 + 2240 - 1220 = 35v^2$   
 $\sqrt{\frac{7200.35}{35}} = \sqrt{\frac{35v^2}{35}}$   
 $14.3 \text{ m/s} = v$   
 b) If 1220 J were not lost  
 how much would  $v$  increase?  
 $1220 = \frac{1}{2}mv^2$   
 $v = \sqrt{\frac{2(1220)}{70}}$   
 $v = 5.9 \text{ m/s}$

May 16-11:51 AM