

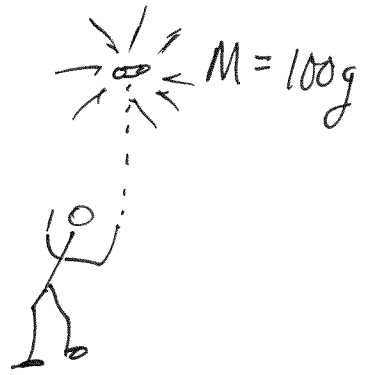
# Chapter 9

# Problem 46

When it reaches

~~the~~ The max height ~~reached by~~  
The fire cracker ~~it~~ explodes.

The initial velocity when it explodes  
is zero.



~~The~~ The two pieces ~~are~~ must  
add up to the original mass.  $20\frac{m}{s} = v_2$   $v_1$   
 $72g = m_2$   $m_1 = \text{~~28g~~}$

$$M = m_1 + m_2 \rightarrow m_1 = M - m_2$$

$$m_1 = 100g - 72g = 28g$$

Using conservation of momentum

$$P_0 = P_f$$

$$0 = m_1 v_1 + m_2 v_2$$

Solving for  $v_1$  gives

$$m_1 v_1 = -m_2 v_2$$

$$v_1 = \frac{-m_2}{m_1} v_2 = -\frac{(72g)}{(28g)} (-20\text{m/s})$$

$$v_2 = 20\text{m/s}$$

to the left  
or  
 $-20\text{m/s}$

$$v_1 = 51.4\text{m/s}$$

to the right