Tuesday, November 25/14
Physics 112/111

1. Lab: The Explosion -> Due: Wednesday, Nov. 26/14

2. Check: Multiple Choice - Momentum and Impulse
   Worksheet - Momentum and Impulse
   } HW

3. ICA - Momentum, Impulse, Impulse-Momentum Theorem
   - Thursday, Nov. 27/14

4. Unit 3 - Work, Energy and Power

Explosion Lab

Observations

1. mass cart =
2.

1.
2.

Analysis.

1. $\vec{v} = \frac{\vec{d}}{t}$ } constant vel.

$\vec{d}, \vec{v_i}, t, \vec{v_f} = ?$

2. $\vec{p} = m\vec{v}$ | $\Delta\vec{p} = m\vec{v_f} - m\vec{v_i}$

3. $\vec{F}t = m\Delta\vec{v}$

$\vec{F}t = m(\vec{v_f} - \vec{v_i})$

$\vec{F} = \frac{m(\vec{v_f} - \vec{v_i})}{t}$

$\vec{F} = \frac{m\vec{v_f}}{t}$

Multiple Choice - Momentum + Impulse

1. D	6. B	11. C	16. C
2. C	7. C	12. D	17. C
3. B	8. A	13. D	18. C
4. A	9. D	14. C	19. D
5. B	10. C	15. B	20. C

See next page for solutions to some of the multiple choice questions. →

$\vec{J} = \vec{F}t = m\Delta\vec{v} = m\vec{v}_f - m\vec{v}_i = \vec{p}_f - \vec{p}_i = \Delta\vec{p}$

**6. $\vec{F}$ ✓ t ✓ $\Delta\vec{p}$ ✓ $m\Delta\vec{v}$ $m(\vec{v}_f - \vec{v}_i)$

* $\vec{F}t = \Delta\vec{p}$

* $\vec{F} = \frac{\Delta\vec{p}}{t}$ time rate of change of $\vec{p}$

*7. $m = 3.0\,kg$, $\vec{v}_f = 0\,m/s$, $\vec{J} = 10\,N\cdot s$

$\vec{J} = m\vec{v}_f - m\vec{v}_i$, $\vec{v}_f = 0$, $\vec{v}_i = \frac{\vec{J}}{m}$

*11. $\vec{F} = 10N$, $t = 5\,s$, $\vec{v}_f = 0$, $m = 2.5\,kg$, $\vec{v}_i = 20\,m/s$, $\vec{J} = ?$

$\vec{J} = \vec{F}t$, $-50\,N\cdot s$

$\vec{J} = m\vec{v}_f - m\vec{v}_i$, $-50\,N\cdot s$

*12. $m = 0.025\,kg$, $\vec{F} = 200N$, $t = 0.1\,s$, $\vec{v}_i = 0\,m/s$, $\vec{v}_f = ?$

$\left[\vec{F}t = m\vec{v}_f - m\vec{v}_i\right]$

* 15. Steel $0.4\,kg$, Wood $0.1\,kg$, $\vec{v}_i = 0\,m/s$, $\vec{a} = -9.8\,m/s^2$

2.m. $1.0\,m$, $\vec{v}_{fs} = \vec{v}_{fw}$, $\vec{p}_f = m\vec{v}_f$

$\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$

*16. $\vec{F}t$, $\vec{F}t$, same 3rd law impulse

$\vec{F} = m\vec{a}$, $\vec{F} = m\vec{g}$

*17. $\vec{v}_i = 5.0\times10^2\,m/s$, $\vec{v}_f = 0\,m/s$, $\vec{J} = 50\,N\cdot s$, $m = ?$

$\vec{J} = m\vec{v}_f - m\vec{v}_i$

18. ESB1, ESB2, $\vec{J}$, $\vec{v}_i$ ✓, $\vec{v}_i$ ✓

tile, $\vec{v}_f$ ✓, m ✓, $\vec{F}t$, $\vec{F}t$

$\vec{J} = \vec{F}t = m(\vec{v}_f - \vec{v}_i)$

Worksheet - Momentum and Impulse - Partial Key

* $\vec{J} = \vec{F}t = m\Delta\vec{v} = m(\vec{v}_f - \vec{v}_i) = m\vec{v}_f - m\vec{v}_i$
$= \vec{p}_f - \vec{p}_i$
$= \Delta\vec{p}$

(change in vel.)

1. $\vec{p} = m\vec{v}$ (a), (d)

2. Vector

3. (a)

Obj. A	Obj. B
$(4kg)(4m/s)$	$(2kg)(4m/s)$
$16\ kg\,m/s$	$8\ kg\,\frac{m}{s}$

4. $\vec{p} = m\vec{v}$
$\vec{p} = (2.0)(-12)$
$\vec{p} = -24\ kg\,\frac{m}{s}$

24 kg m/s, South.

5. impulse $\vec{J} = \Delta\vec{p}$

6. a) $m = 65.8kg$ $\vec{J} = \vec{F}t$
$\vec{F} = -1025\ N$
$t = 0.350s$
$359\ N\,s$, West

b) $m = 0.168kg$ $\vec{J} = m\Delta\vec{v}$
$\vec{F} = +126\ N$
$\Delta\vec{v} = +61.8\ m/s$.
$21.4\ kg\,\frac{m}{s}$, E.