Momentum Test Study Guide 18-19			Name: Key		
	p = mv	$\Delta p = mv_f - mv_i$	$F\Delta t = mv_f - mv_i$	$\mathbf{p_i} = \mathbf{p_f}$	

1) Show mathematically and explain how a 2500 kg truck moving at 15 m/s can have the same momentum as a 10.0 kg tricycle moving at an unknown speed.

 $(2500 \text{ kg})(15 \text{ m/s}) = +37,500 \text{ kgm/s} \qquad (10.0 \text{ kg})(V) = 37,500 \text{ kgm/s}$ + he + recycle would have to travel @ 3750 m/s $= 37,500 \text{ kgm/s} \qquad V = +3,750 \text{ m/s}$

2) What is the purpose of a crash mat placed underneath a climbing wall?

Crash mads increase the time of impact which will decrease the force experienced by the falling climber.

3) A 0.4 kg American football sits at rest at the thirty yard line. A football player kicks the ball, giving it a velocity of +5.5 m/s. What impulse (change in momentum) did the football player provide to the ball? $\Delta P = m V_f - m V_c$ $\Delta P = (-4 kg)(5.5 m/s) - (-4 kg)(0 m/s)$ $\Delta P = + 2 - 2 kg m/s$

4) A 1500 kg truck is moving at +12.5 m/s. To avoid a frog in the road, the driver slams on the brakes for 3.5 seconds, slowing the truck to +2.6 m/s. What force did the brakes apply on the truck? $F = m \sqrt{1500 \text{ kg}} = (1500 \text{ kg}) (2.6 \text{ m/s}) - (1500 \text{ kg}) (12.5 \text{ m/s})$ $F(3.5 \text{ s}) = -14850 \qquad F = -4242 \text{ N}$

applied. Is it possible for box A to experience a larger impulse that box B? Explain your answer using what you know about impulse. Hes, the 5N force could be applied for a longer period of time which would provide a greater impulse than the ION force.

6) Two identical eggs are thrown. One at a brick wall and the other at a sheet.

a. Which egg experiences a greater impulse? The impulse on each is equal. Both

b. Which egg experienced a greater change in momentum? both ended with a momentum so the change was identical.

c. Which egg experienced a greater force? How does the time this force acted compare to the time the other egg felt its force? The egg that hits the brick wall experiences a larger force over a shorter period of time and would therefore break.

7) What are the three types of collisions? Give an example of each.

Separation - Gun firing a built Elastic - Billiard balls bouncing

Inclustic - Two lumps of clay colliding off each other

The lastic - Two lumps of clay colliding of tach offer

8) Why did the bouncy side of the bouncing dart cause the cart to move faster than the non-bouncy side? (use conservation of momentum to explain this)

The bouncing side provides a greater impulse than the non-bouncy side. This means more momentum is being transferred into the cart when the bouncy side.

9) A person stands at rest on rollerblades while holding a heavy rock. The person throws the rock forward with a speed of 5.0 m/s.

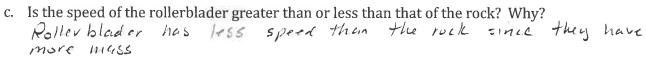
a. What type of collision is this? Separation

b. What direction does the person on the rollerblades move after throwing the rock. Why?

Backwards. Consumption of momentum tells us that Portore = Pafter

Phefore = O, tunen the rock is thrown, it now has a positive momentum

the person would need a negative momentum to keep P = O.



- 10) While standing motionless on his rollerblades, a student, who has a mass of 78 kg, throws a 0.50 kg tennis ball forward. The student moves backwards at -4.3 m/s.
 - a. What type of collision is this? Separation
- b. With what velocity was the tennis ball initially thrown? $(m_1 + m_2) U_i = m_1 V_{1,1} + m_2 V_{2,1}$ (78 kg + .50 kg) $O^{m}/S = (78 kg)(-4.3 m/s) + (.50 kg)(U_4)$ $O = -335.4 + (.50 kg)U_4$ 335.4 = (.50 kg) U_4 = 1071 m/s 11) A 0.25 kg baseball moves at +14.5 m/s towards a stationary catcher, who has a mass of 88 kg.
 - a. What type of collision is this? Inelastic
 - b. Does the velocity of the baseball increase, decrease or stay constant after hitting the catchers mitt? Why? Decreases since some of its momentum is transferred to the catcher's mitt.
- 12) Two dodgeballs (both with a mass of 0.80 kg) collide in midair. Initially, ball A was moving at 26.7 m/s, while ball B was moving at 15.7 m/s in the opposite direction. After they collide, ball A is moving at 1.4 m/s in it original direction.
 - a. What type of collision is this? Flastic

b. What is the velocity of ball B following the collision?

($20 \times 10^{-1} \times 10^{-1}$ (.80kg)(26.7mls) + (.80kg)(-15.7mls) = (.80kg)(1.4mls) + (.80kg)Vf 13) An object experiences a net force of 0 N under what conditions? Can the object be accelerating,

why or why not? It is either @ rest or moving at a constant relocation Since acceleration can only occur if an object is not in equilibrium then it cannot be accelerating when EF= ON.

14) Why/how does the spin cycle of a washing machine remove water from wet clothes? Be sure to use the word inertia in your explanation. The inertia of both the clothes and water would make the travel straight forward. The Fn from
the machine moves both objects in a circle when the water reaches one
of the many holes in the machine, it does not experience the Fn coit continues
15) A force of 5 N is applied to a resting bowling ball and force of 5 N is applied to a resting soccer ball. out of

What would you observe in regards to the motion of the bowling ball and the soccer ball following the collision? Why? The societ ball would accelerate more

F = ma A bowling ball has more mass and therefore less acceleration than the soccer ball.