Physics Re-inforced

#4) <u>Constant Speed</u> – also known as

ZERO ACCELERATION

#<u>7) Acceleration</u> – also known as

"change in velocity"

units: (m/s^2) = m/s/s

These are all on the test.

Explain examples with terminal velocity and treadmill

○ Law of conservation of MOMENTUM:

○ For a collision occurring between object 1 and object 2 in an isolated system, the total momentum of the two objects before the collision is equal to the total momentum of the two objects after the collision.

#8 Momentum = Mass X Velocity

The SI unit:

(#8)   Momentum = (kg) x (m/s)

(#10) for Mass = kg

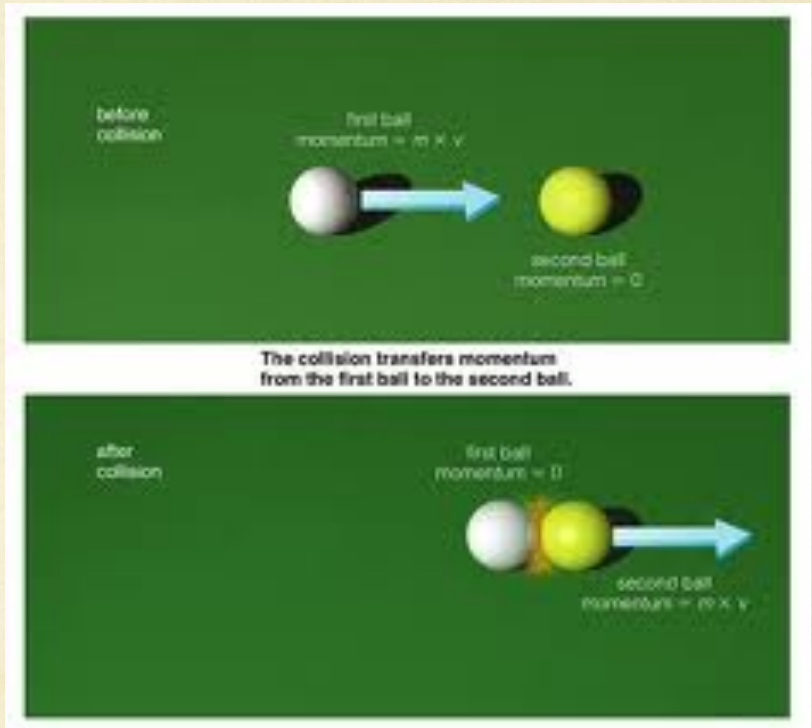(#6) for Velocity =(m/s)+ direction

- Momentum is "conserved", which means it is not lost (it transfers).

- Ex: Newton's Cradle

- Momentum transfers from one object into the other object that it crashes into.

○ [momentum bouncy balls](#)

A bus can have a **large momentum** even if it is moving very slowly, because it has a **large mass.**

velocity

(**mass**)(velocity) = **momentum**

before collision

first ball
momentum = m × v

second ball
momentum = 0

The collision transfers momentum from the first ball to the second ball.

after collision

first ball
momentum = 0

second ball
momentum = m × v

○ <u>ALSO: Stopping distance is affected by momentum</u>

○ The more massive the car, the more distance the car is needed to come to a stop. <u>A big semi will need more distance to come to a stop</u> compared to a regular little car.

○
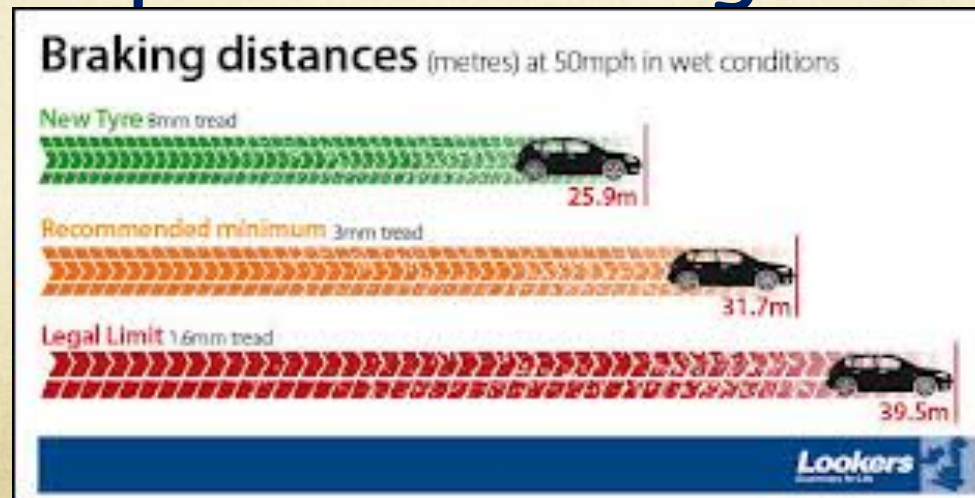
Momentum can be transferred, lost, or gained.

- A snowboarder gets stuck on a flat part of the mountain.

- An ice skater is spinning and tightens her spin and begins to spin faster

- Hitting a cue ball into another pool ball.

- A skateboarder going down hill

- Lost

- Gained

- Transferred

- Gained

- All moving objects have momentum. (all moving things have velocity)

  (0 velocity = 0 momentum)

- When an object speeds up, it gains momentum – because velocity is increasing

Calculate Momentum (M x V)

$$p = m \times v$$
$$= 2000 \times 32$$
$$= 64\,000 \text{ kg m/s}$$

- A 200 lb football player running 5 mph vs

- A 300 lb football player running 2 mph

- What would happen if they were running towards eachother? (who would knock down who)

- 1000 lb-mph

- 600 lb-mph

- The 200 lb player would knock over the 300 lb player

Units :

○ #13: units for ENERGY: J (joules)

○ #10 units for FORCE: N (newton)

○ #8 units for momentum: (g)(m/s) or (kg)(m/s)

○ Can you draw the vector for W? (weight)

Law of conservation of Energy

○ **#15: In physics, the law of conservation of energy states that the <u>total energy of an isolated system remains constant</u>–it is said to be <u>conserved</u> over time. <u>Energy can neither be created nor destroyed; rather, it transforms from one form to another.</u>**