Forms of Energy.

- Kinetic Energy.  
[Energy due to movement]

\[ \text{Work} = \frac{1}{2} m V^2 = \text{K.E.} \]

done

\[ \text{Car} \]
Total energy is conserved. Work can go into dissipative forms of energy like heat.
The potential energy stored in a spring is

\[
P.E. = \frac{1}{2} Kx^2
\]

Force = -Kx
How much more energy does it take to keep a car moving at 40 miles/hr than 10 miles/hr?

a.) 2 times
b.) 4 times
c.) 8 times
d.) 10 times
e.) 16 times
Potential Energy

\[ \frac{1}{2} mgh = P.E. \] Joulles

Spring

\[ P.E. = \frac{1}{2} kx^2 \]

\[ F = -kx \]
Spring

T - Period
A - Amplitude

Simple harmonic Motion.

Frequency - the number of cycles per unit time.

\[ f = \frac{1}{T} \]

Units: Hertz (Hz)
A radio station operates at 100 MHz. What is its period of oscillation?

1. 201 sec
2. 10^{-6} sec
3. 10^{-8} sec
4. 1 sec
5. 10^{-3} sec

\[ f = \frac{1}{T} \]
\[ T = \frac{1}{f} = \frac{1}{100 \times 10^6} \text{ sec} \]
\[ T = \frac{1}{10^8} \text{ sec} = 10^{-8} \text{ sec} \]
Q1
Two lumps of clay (equal M) hit each other at right angles with equal V.

\[ \vec{V}_1 \]
\[ M \]
\[ \vec{V}_2 \]
\[ M \]

The final [speed] will be.

- Just add the speeds: \( V + V = 2V \)
- Just \( V = \text{can't go faster} \)
- ZERO since \( V - V = 0 \)
- Add like vectors \( \vec{V} = \vec{V}_1 + \vec{V}_2 \)
A small ball hits a large ball. The small ball is stopped by the collision. What is the speed of the large ball?

- $V$
- $2V$
- $V/2$
- $V/4$
- $4V$