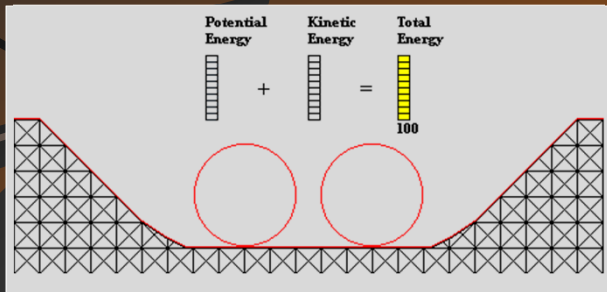


PHYS 210 - General Physics I

- Conservation of linear momentum
- Collisions & explosions
- Energy!



Conservation of Linear Momentum

For a system of particles, if there are no external forces,

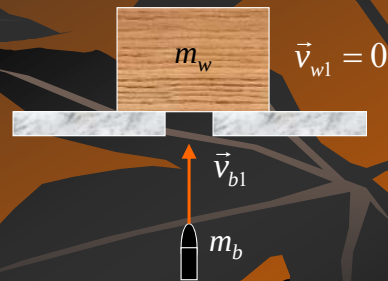
$$\vec{P} = \text{constant}$$

or

$$\vec{P}_i = \vec{P}_f$$

Example

- A 10 g bullet moving upwards at 1,000 m/s strikes and passes through the center of mass of a 5.0 kg wooden block which is initially at rest. The collision is perfectly inelastic; the bullet lodges in the block. To what maximum height does the block then rise above its initial position?



P9.56

Explosion!

- An atom of ^{214}Po decays into an alpha particle (^4He) and a lighter nucleus. The α -particle has a speed of 1.92×10^7 m/s. Assuming the Po nucleus was originally at rest, what is the recoil speed of the resulting nucleus (what is the resulting nucleus? HINT: nucleon number is a conserved quantity)?

^{214}Po is responsible for the majority of lung cancer deaths from radon



Periodic Table of the Elements																		© www.elementsdatabase.com			
1 H																			2 He		
3 Li	4 Be	■ hydrogen ■ poor metals ■ alkali earth metals ■ noble gases ■ transition metals ■ rare earth metals										5 B	6 C	7 N	8 O	9 F	10 Ne				
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar				
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn				
87 Fr	88 Ra	89 Ac	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Unn												

Explosion!

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P9.56

Explosion!

- An atom of ^{214}Po decays into an alpha particle (^4He) and a lighter nucleus. The α -particle has a speed of 1.92×10^7 m/s. Assuming the Po nucleus was originally at rest, what is the recoil speed of the Pb nucleus?

^{214}Po is responsible for the majority of lung cancer deaths from radon



Awaken Evince Heed!