PS21-1

(14) $^{41}_{20}Ca + ^{0}_{-1}e \rightarrow ^{41}_{19}K$

$^{41}_{19}K \rightarrow ^{0}_{+1}e + ^{41}_{18}Ar$

"capture" reactant side $\rightarrow$ "decay" product side

Apr 13-7:28 AM

(22) ^{210}Pb $t_{1/2} = 22.3$ yrs $\rightarrow$ ^{206}Hg

$A_0 = 7.5$ g

$t = 17.5$ yrs

— g A_t

$t_{1/2} = \frac{0.693}{k}$

Start 7.5 g Pb

now have 4.35 g Pb

* 3.15 g Pb $\rightarrow$ Hg

3.15 g Pb $\left(\frac{206\ Hg}{210\ Pb}\right) = 3.09$ g Hg

$k = \frac{0.693}{t_{1/2}} = \frac{0.693}{22.3} = 0.0311\ yr^{-1} = k$

$\ln A_t = -kt + \ln A_0$

$\ln A_t = (-0.0311)(17.5) + \ln(7.5)$

*g Pb

g Pb

$A_t = 4.35$ g Pb have now.

Apr 13-8:00 AM

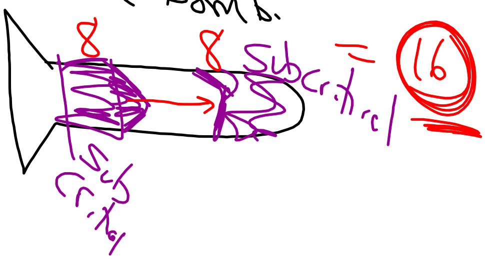
Fission → Produces ENERGY

Chain rxn → product is also a reactant

(8g) **Subcritical mass** → Not enough to react
SAFE!

(10g) **Critical mass** - minimum mass needed to keep a chain rxn going

SUPA
Super critical mass - causes a Nuclear EXPLOSION
Atomic Bomb.
¡Go Boom!



Critical = 10

Apr 13-8:20 AM

FUSION

less mass → greater mass

Needs heat (LOTS!) to produce energy.

SUN

$^{2}_{1}H + ^{2}_{1}H \rightarrow ^{4}_{2}He$

Lowest T = 40,000,000 K

Cold Fusion - 3,000,000 K

Apr 13-8:57 AM

Radiation

Time, Distance, Shielding.

RAD - Radiation Absorbed Dose

RBE - Relative Biological Effectiveness

REM = RAD * RBE

Roentgen Equivalent for Man

Apr 13-9:02 AM