(how much radioactivity)
- amt. of radiation given off → 1 Curie = 3.7×10^{10} decays/second.
  1 becquerel = 1 decay/sec.
- amt. of radiation absorbed by person.
  - Sievert → amt. of rad. energy absorbed per kg.
  - Sv = 1 equivalent J/kg.
- Sources of Radiation
  - earth's atmosphere saves us a little bit. The further up in elevation you live, the more radiation you can be exposed to.

- Half Life
  - time it takes for 1/2 cmpd to decay.
  - 1/2 life is independent of the total # (or conc.) —
    # nuclei that decays is proportional to # nuclei you have
  - 1/2 life is good description of radioactive sample b/c its independent of amt. of sample.
  - rate of decay of nuclear cmpd. follows first order kinetics
    - rate of change is proportional the amt. of cmpd.
      - leads to exponential decay.
      - rate of radiation emitted decays.

more Po you have, the more Po decays

  - 1/2 life = amt. time it takes for 1/2 of orig. sample to decay.
    - indication of stability; more stable means takes longer to decay.

Lecture 3-20.

- radioactive decay just happens when element is unstable. It continues to decay until it becomes to some stable product.
- shorter 1/2 life means less stable.
- Effects of decay are different; rate of decay.
  - alpha particles have big nuclei so easy to block.
- excite nucleus, excted state is a lot higher in energy so when goes to low ground state, it releases a lot of high energy → gamma rays.

- gamma rays, or radiation in general is bad because it ionizes molec.
  - high energy that you dump in and ionizes molec.

(radon gas)

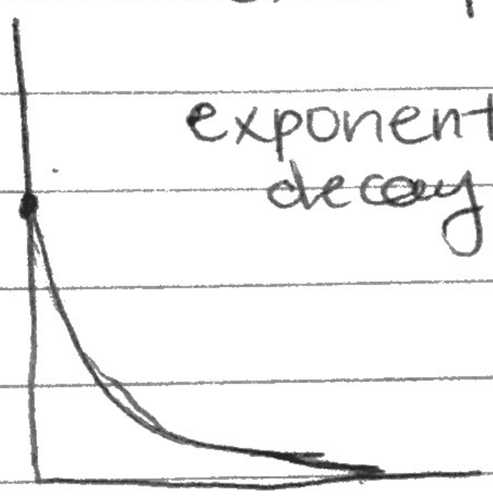
- if ingest alpha particles, radiation ~~does~~ does inc. within body
- always get gamma with any radiation.

* **ACTIVITY - NUCLEAR RATE OF DECAY**

① Balance equation for Po-210:

$^{210}_{84}Po \longrightarrow ^{206}_{82}Pb + ^{4}_{2}He$ * releases alpha particle

* Table, Graph.



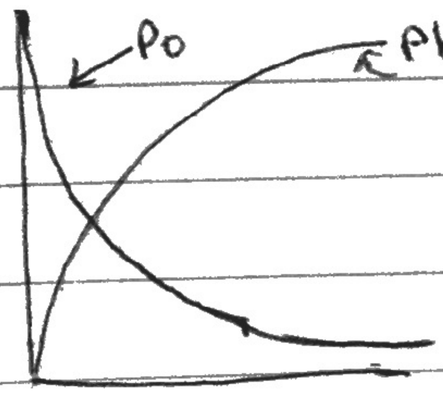
exponential decay.

REACTION RATE

- rate = amt. of change per unit time.
- rate = $\frac{\Delta Po}{\Delta t}$ this is slope of line.

graph shows rate of chang
is change constant? NO
starts off fast and then slo
down.

rate is changing b/c starting # is changing when have a lot, decay is fast.



amt. of Po that goes away is amt. of Pb that appears.

$-\frac{\Delta Po}{\Delta t} = \frac{\Delta Pb}{\Delta t}$ conc of one dec. and another inc.

One Po makes one Pb, so simple relationship.

↳ mathematical relationship:

$\frac{\Delta \alpha}{\Delta t} = \frac{\Delta Pb}{\Delta t} = -\frac{\Delta Po}{\Delta t}$ formation of alpha particles and formation of Pb is same.

$\frac{\Delta Po}{\Delta t} \propto Po$ Po↓ · Pb↑ at↑

$\frac{\Delta Po}{\Delta t} = k \times Po^{1}$

FIRST ORDER KINETICS
because raised to power of 1, rate depends on amt. of stuff