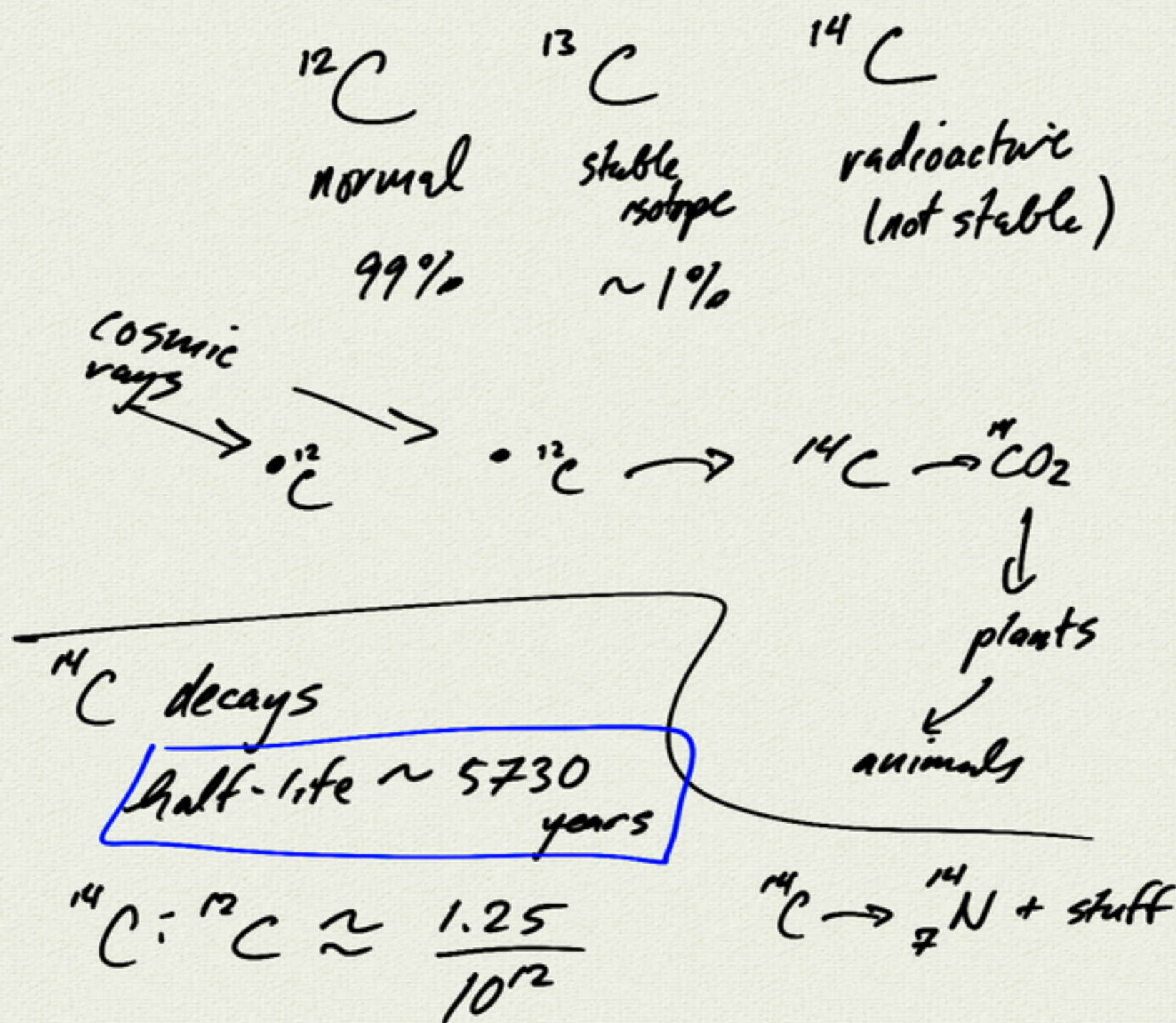


# 7.2 Exp / log

## radiocarbon dating



$$\rightarrow N(t) = N_0 \left(\frac{1}{2}\right)^{t/5730}$$

t	N(t)
0	1000 ← example
5730	500
2 · 5730	250

example: leather armor

74%  $^{14}\text{C}$  remains

$\Rightarrow$  find t when  $N(t) = (.74)N_0$

$$.74 N_0 = N_0 \left(\frac{1}{2}\right)^{t/5730}$$

$$.74 = \left(\frac{1}{2}\right)^{t/5730}$$

$$\ln .74 = \ln \left[ \left(\frac{1}{2}\right)^{t/5730} \right]$$

$$= \frac{t}{5730} \ln \frac{1}{2}$$

$$\Rightarrow t = 5730 \frac{\ln(.74)}{\ln(1/2)}$$

$\log_{1/2}(.74)$   
(base change)

$\approx 2500$  years (calculator)

(actual: 786 - 543 BCE)