

Astronomy Ranking Task: Nuclear Physics

Exercise #3

Description: The following table has some information for five pairs of parent-daughter isotopes (labeled A through E) and their radioactive decay data.

ranking letter	initial mass of parent isotope	mass of parent isotope remaining	current fraction of parent isotope	current fraction of daughter isotope	half-life (days)	elapsed time (days)	number of half-lives
A	40 g			75%		4	
B	100 g	12.5 g			5		
C		125 g	12.5%			24	
D	20 g		50%		12		
E		50 g		0%	4		

A. Ranking instructions: Rank the initial masses of parent isotope.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Carefully explain your reasoning for ranking this way:

B. Ranking instructions: Rank the masses of parent isotope remaining.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Carefully explain your reasoning for ranking this way:

C. Ranking instructions: Rank the current fractions of parent isotope.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Carefully explain your reasoning for ranking this way:

D. Ranking instructions: Rank the current fractions of daughter isotope.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Carefully explain your reasoning for ranking this way:

E. Ranking instructions: Rank the current masses of daughter isotope.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Or, there is not enough information to determine this. _____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

F. Ranking instructions: Rank the lengths of a half-life of the parent-daughter pairs.

Ranking Order: Longest 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Shortest

Carefully explain your reasoning for ranking this way:

G. Ranking instructions: Rank the ages of the parent-daughter pairs.

Ranking Order: Oldest 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Youngest

Or, each parent-daughter pair is the same age. _____ (indicate with a check mark)

Or, there is not enough information to determine this. _____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

H. Ranking instructions: Rank the number of half-lives the parent-daughter pairs have experienced.

Ranking Order: Least 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ Most

Or, each parent-daughter pair has experienced the same number of half-lives. _____ (indicate with a check mark)

Or, there is not enough information to determine this. _____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:
