

Chapter 25 Jeopardy Game

	Value	Question	Answer
Nuclear Radiation	200	This is another name for an alpha particle.	He-4
	400	This type of radiation is deflected the most by an electric or magnetic field.	β
	600	This type of radiation is the most penetrating.	γ
	800	This is the charge on a beta particle.	1-
	1000	This is the mass of a positron.	$\frac{1}{2}1840$ amu
Radioactive Decay	200	Decay of this particle reduces a nucleus's atomic number by 2.	α
	400	This ratio, of two subatomic particles, is used to predict the stability of a nucleus.	n/p
	600	This force is responsible for holding the nucleus together.	SNF
	800	This is at the end of every radioactive decay series. Stable	Isotope
	1000	This type of decay would result from having TOO MANY neutrons in an unstable nucleus.	β^-
Transmutation & $\frac{1}{2}$ -Life	200	This is the only way to produce transuranium elements, with atomic number greater than 92. Note: "bombardment" is also an acceptable answer	Induced transmutation
	400	Emission of this nucleon does NOT lead to transmutation.	Neutron
	600	This is the name of the process by which a large nucleus splits into two smaller fragments.	Fission
	800	This is the amount of a 100-g sample that remains after 3 half-lives.	12.5 g
	1000	This is the number of half-lives required for 15/16 of a radioactive sample to decay. [Hint: think about how much <i>remains</i> radioactive.]	4
Nuclear Energy	200	This is the percentage of nuclear power plants based on nuclear fusion world-wide.	0
	400	Of H, Fe and U, the nucleus that has the lowest average mass per nucleon and is most stable.	Fe
	600	This is the process in which the fissioning of one nucleus leads to additional fission reactions.	Chain Reaction
	800	This is the minimum amount of fissionable material needed to sustain a chain reaction.	Critical Mass
	1000	This is converted to energy during all nuclear reactions.	Mass
Exposure & Medicine	200	Of 20%, 80%, and 100%, the percentage that represents the amount of radiation exposure due to natural sources.	80%
	400	Of the following, the one used to measure radiation: PET Scan, Decay Series, Geiger Counter	Geiger Counter
	600	The term for a radioisotope used to follow the progress of a chemical or biological process.	Radiotracer
	800	Of 50-100, 300-400, or 1000-2000 mrem, the approximate average yearly exposure of US residents to radiation.	300-400 mrem
	1000	This is the term for any radiation energetic enough to strip electrons from atoms.	Ionizing Radiation
Potpourri	200	This was the original method that radiation was detected and discovered.	Film
	400	This material was used in the first controlled fission reaction to moderate the neutrons.	Graphite
	600	This isotope is the result of α decay of Rn-222.	Po-218
	800	This is a device used by scientists to monitor their monthly exposure to radiation.	Film Badge
	1000	What is the product of the following nuclear reaction: ${}_{95}^{241}\text{Am} + {}_2^4\text{He} \rightarrow 2({}_0^1\text{n}) + ?$	${}_{97}^{243}\text{Bk}$

Final Jeopardy Category: Half-Life Calculations: If 1.0 mg of a radioactive isotope is left after 4 half-lives have passed, how much of the isotope was originally present?

$$A = A_0 \left(\frac{1}{2}\right)^n \Rightarrow 1.0 \text{ mg} = A_0 \left(\frac{1}{2}\right)^4 \text{ and } A_0 = (1.0 \text{ mg})(2)^4 = 16 \text{ mg}$$