**Vocabulary:** **Nuclear Decay**



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* Alpha particle – a positively charged particle that is emitted from the nucleus of a *radioactive* atom.
	+ An alpha particle consists of two protons and two neutrons. It is equivalent to the nucleus of a helium atom.
* Atomic number – the number of protons in the nucleus of an atom.
	+ Elements are distinguished from one another by their atomic numbers.
	+ For example, any atom with two protons is an atom of helium.



* + The symbol for the atomic number is *Z*.
	+ In an element symbol, the atomic number is shown at lower left.
* Beta particle – a negatively charged particle that is emitted from the nucleus of a radioactive atom.
	+ A beta particle consists of one electron.
* Daughter product – an atom that results from the decay of a radioactive atom.
* Gamma ray – the highest energy form of electromagnetic radiation.
	+ Gamma rays have wavelengths less than 10 picometers.
	+ Gamma rays are often emitted during *nuclear decay*.
* Isotope – one of several forms of the same element.
	+ All isotopes of a given element have the same number of protons, but differ in the number of neutrons.
	+ Most isotopes are radioactive. Usually only one or two stable isotopes exist for a given element.
* Mass number – the number of protons plus neutrons in the nucleus of an atom.
	+ For example, the mass number of helium is 4 (2 protons and 2 neutrons).



* + The symbol for the mass number is *A*.
	+ In an element symbol, the mass number is shown at upper left.
* Nuclear decay – the process in which a radioactive atom spontaneously releases particles and/or energy.
	+ There are several types of radioactive decay. The most common are alpha, beta, and gamma decay:
		- In *alpha decay*, an alpha particle (2 protons and 2 neutrons) is emitted.
		- In *beta decay*, a beta particle (1 electron) is emitted.
		- In *gamma decay*, gamma rays are emitted.
* Positron – the positively charged antimatter counterpart of an electron.
	+ If a positron meets an electron, the two particles will annihilate one another in a burst of gamma rays.
* Radioactive – capable of releasing radiation.
	+ In a radioactive atom, the nucleus can spontaneously decay and emit particles and/or energy. These emissions are called radiation.
* Subatomic particle – a unit of matter smaller than an atom.
	+ Subatomic particles include the building blocks of atoms: protons, neutrons, and electrons.
		- Protons and neutrons are composed of smaller subatomic particles called *quarks*.
	+ Other subatomic particles include neutrinos, muons, tau particles, bosons, photons, and many others.