**Alpha Particles:** Ionizing, particulate radiation, which can be deadly if ingested or inhaled. They are basically a Helium atom with a +2 charge, can travel only a few centimeters, can be stopped by a sheet of paper, and generally are not considered as dangerous as gamma radiation or Beta particles UNLESS they get inside the body – then they are easily absorbed by the cells and this is a dangerous condition.

**Atom:** The fundamental basic building block of matter made up of three subatomic particles called protons, neutrons, and electrons. The basic unit of a chemical element of the periodic chart.

**Curie:** (Ci) is the unit of measurement of the amount of radioactivity of a substance, named after Marie and Pierre Curie. 1 Ci = 3.7×1010 disintegrations per second (rate of decay)

**Beta Particles:** Ionizing, particulate radiation with almost zero mass (about 8,000 times smaller than Alpha particles) Travels several meters in air and travels at high velocity approaching the speed of light.

**Electron:** a stable subatomic particle with a charge of negative electricity, found in all atoms.

**Gamma Radiation:** is a penetrating, ionizing, electromagnetic radiation arising from the radioactive decay of atomic nuclei, containing the shortest wavelength of the electromagnetic spectrum.

**Half-Life:** the amount of time required for ½ of the original number of radioactive atoms to decay or change into daughter atoms.

**Half-Life Ir 192:** 74 days

**Half-Life Co 60:** 5.3 years

**Half-Life Cs 137:** 30.17 years

**Half- life Calculator**: <https://www.calculator.net/half-life-calculator.html>

**Ion:** an atom or molecule with a net electric charge due to the loss or gain of one or more electrons. A positively or negatively charged atom or molecule.

**Ionization:** The removal of electrons from an atom. The essential characteristic of high-energy radiations when interacting with matter.

**Ionizing Radiation:** a type of radiation that is able to disrupt atoms and molecules on which they pass through, giving rise to ions and free radicals.

**Isotopes:** atoms with same atomic number and chemical properties as element atoms; the nucleus has same number of protons but a different number of neutrons and thus, a different atomic mass and unlike radioisotopes can be relatively stable.

**Daughter isotopes:** In nuclear physics, a decay product (also known as a daughter product, daughter isotope, radio-daughter, or daughter nuclide) is the remaining nuclide left over from radioactive decay.

**Neutron:** a subatomic particle with about the same mass as a proton but without an electric charge. Neutrons are present in all atoms except the Hydrogen atom.

**Nuclear Fission:** The process by which the nucleus of a stable atom splits upon impact of another particle and splits into 2 smaller parts. The resulting atoms are not the same element as the parent atom and are considered unstable and radioactive. This is the process by which Industrial isotopes (Cobalt 60, Iridium 192, Cesium 137) are created.

**Nuclear Fusion:** a nuclear reaction in which atomic nuclei of a lower atomic number fuse to form a heavier nucleus with the release of energy. The sun is an example of this process.

**Particulate (or particle) Radiation:** is the radiation of energy by means of fast-moving subatomic particles. Alpha particles, Beta particles, neutrons, and positrons are examples of particulate radiation.

**Photons:** Discrete particles of light or electromagnetic radiation hypothesized to explain the corpuscular theory of radiant energy.

**Proton:** a subatomic particle present in all atomic nuclei, with a positive electric charge equal in magnitude to that of an electron, but of opposite sign.

**Radiation:** Energy in transit. Either as particles or electromagnetic waves.

**Radioactivity:** The characteristic of various materials to emit ionizing radiation.

**Radioisotope:** an isotope by nature that is always unstable, containing high levels of nuclear energy.

**Roentgen (R) –** is a unit of measurement to the exposure of ionizing radiation, specifically Gamma radiation and X-rays, named after the German physicist.

**milli-Roentgen (mR):** One thousandth of a Roentgen (1/1000)

**SI:** The International System of units of measurement. Includes most of the base units formerly called metric.

**X-ray** – a type of ionizing radiation formed in a Cathode Ray Tube (CRT) when high velocity electrons flow from the cathode to the anode.