



Radiation Protection

<http://www.epa.gov/radiation/understand/index.html>
Last updated on Wednesday, August 27th, 2008.

You are here: [EPA Home](#) [Radiation Protection](#) [Topics](#) [Understanding Radiation](#) [Radiation & Radioactivity](#)

[Students/Teachers](#) [Librarians](#) [Reporters](#) [General Public](#) [Technical Users](#)

[NEWSROOM](#) [PROGRAMS](#) [TOPICS](#) [REFERENCES](#)

Understanding Radiation: [Radiation and Radioactivity](#) [Health Effects](#) [Radiation Protection Basics](#)

Radiation and Radioactivity

We cannot eliminate radiation from our environment. We can, however, reduce our risks by controlling our exposure to it. Understanding radiation and radioactivity will help you make informed decisions about your exposure.

On this page:

- [What is radiation?](#)
- [What is radioactivity?](#)
- [What is an atom?](#)
- [Why are some atoms radioactive?](#)
- [How are people exposed to radiation?](#)
- [How does exposure to radioactive materials affect people?](#)
- [How can we protect ourselves from harmful exposure to radiation?](#)

What is radiation?

Radiation is energy that travels in the form of waves or high speed particles.

When we hear the word 'radiation,' we generally think of nuclear power plants, nuclear weapons, or radiation treatments for cancer. We would also be correct to add 'microwaves, radar, electrical power lines, cellular phones, and sunshine' to the list. There are many different types of radiation that have a range of energy forming an electromagnetic spectrum. However, when you see the word 'radiation' on this web site, we are referring to the types of radiation used in nuclear power, nuclear weapons, and medicine. These types of radiation have enough energy to break chemical bonds in molecules or remove tightly bound electrons from atoms, thus creating charged molecules or atoms (ions). These types of radiation are referred to as 'ionizing radiation.'

- [Ionizing and Non-Ionizing Radiation](#)
This page explains the differences between these types of radiation.

What is radioactivity?

Radioactivity is the property of some atoms that causes them to spontaneously give off energy as particles or rays. Radioactive atoms emit ionizing radiation when they decay.

Radiation and Radioactivity

- [Main Page](#)
- [What is an Atom?](#)
 - [Atomic Mass Units](#)
 - [Atomic Shorthand](#)
 - [Nuclides & Isotopes](#)
- [Why Are Some Atoms Radioactive?](#)
 - [Ionizing & Non-Ionizing Radiation](#)
 - [Half-Life](#)
 - [Decay Chains](#)
 - [Radioactive Equilibrium](#)
 - [Curies](#)
 - [Alpha Particles](#)
 - [Beta Particles](#)
 - [Gamma Rays](#)
 - [Other Decay Modes](#)

What is an atom?

To be able to understand radiation and radioactivity, you need to understand the language of atomic structure:

- [What is an atom?](#)
 - [Weighing atoms: atomic mass units](#)
 - [Atomic structure: What are the parts of an atom?](#)
 - [Atomic shorthand: representing nuclear properties](#)
 - [What holds the parts of an atom together?](#)
 - [Nuclides & Isotopes](#)
-

Why are some atoms radioactive?

The balance of the forces in the nucleus of an atom determines whether a nucleus is stable or unstable, and is the key to answering these questions:

- [What causes atoms to be radioactive?](#)
 - [Can unstable atoms become stable?](#)
 - [Which nuclides are radioactive ?](#)
 - [How is radioactivity different from radiation?](#)
 - [How long do radionuclides stay radioactive?](#)
 - [Is all ionizing radiation the same?](#)
 - [Alpha Particles](#)
 - [Beta Particles](#)
 - [Gamma Rays](#)
 - [Other Modes of Decay](#)
-

How are people exposed to radiation?

When we hear the words ' radiation exposure,' we generally think of radiation from a source beaming out and striking the exterior of a body. However, radioactive particles can also become lodged inside the body and expose internal organs as the radionuclides decay. As a result, health physicists consider not only the type of radiation emitted from a source but also the routes by which people are likely to come in contact with it. There are three main routes of exposure or [exposure pathways](#):

- [inhalation](#)
 - [ingestion](#)
 - [direct exposure](#)
-

How does exposure to radioactive materials affect people?

Please see: [Health Effects](#)

How can we protect ourselves from harmful exposure to radiation?

Please see: [Radiation Protection Basics](#)

[Understanding Radiation in Your Life, Your World](#)

[Newsroom](#) · [Programs](#) · [Topics](#) · [References](#)