

Vocabulary Words:

Radiation: Pure energy, traveling through space at the speed of light. Ranges from radio to X-rays, as you go from longer to shorter wavelengths.

Solar Radiation: Radiation emitted by the sun. Mostly near infrared, visible, and ultraviolet are important for climate. Wavelengths shorter than ultraviolet are mainly important in the upper atmosphere. Also sometimes called shortwave in climatology. $\sim 0.1 \mu\text{m} < \lambda < \sim 4 \mu\text{m}$. Remember; ~ 2 means approximately 2.

Terrestrial Radiation: Radiation emitted by Earth and its atmosphere. Mostly thermal infrared radiation. Also called IR, infrared, or longwave. $\sim 4 \mu\text{m} < \lambda < \sim 200 \mu\text{m}$

Emission: The process whereby radiation originates at an object and moves away. The frequency and intensity of emitted radiation depend on the temperature of the object. Hotter objects give more intense emission at shorter wavelengths, which means more energy per photon. The sun emits solar radiation, Earth emits terrestrial radiation.

Absorption: Radiation stops at an object, conveying its energy to the object. Greenhouse gases absorb (and emit) terrestrial radiation, while allowing solar radiation to be transmitted through the atmosphere.

Reflection: Radiation changes direction back toward where it was coming from without absorption or emission. Clouds and snow reflect large amounts of solar radiation.

Albedo: The fraction of solar radiation that is reflected by a surface. The planetary albedo is the fraction of incoming solar radiation reflected by the atmosphere and surface together.

Transmission: Radiation passes through an area or object, unchanged.

Scattering: Radiation changes direction while encountering objects. Scattering causes a somewhat random change of direction. For random media like clouds, reflected radiation is often a subset of the scattered radiation.

Atom: A fundamental unit of chemistry, a single unit of a chemical element like carbon(C), oxygen(O), or nitrogen(N).

Molecule: Two or more atoms bonded together to form a more complicated chemical element like carbon dioxide(CO₂), water(H₂O), molecular oxygen(O₂), methane(CH₄), . . . etc.

Greek Symbols:

σ : Lower case sigma, the Greek S. Used to represent the Stefan-Boltzmann Constant.

α : lower case alpha, the Greek A. Use to represent the albedo.

λ : lower case lambda, the Greek L. Use to represent wavelength.

μ : lower case mu, a Greek letter, M?. Use to represent micro, meaning one part in ten to the sixth. For example, $1 \mu\text{m} = 1 \times 10^{-6}$ meters.