

Study Guide: Light and Quantized Energy

(Chemistry Textbook p. 136 – 145)

Standard 8: Understand the electromagnetic spectrum & the mathematical relationships between energy, frequency, and wavelength of light.

Standard 9: Calculate the wavelength, frequency, & energy of light using Planck's constant and the speed of light

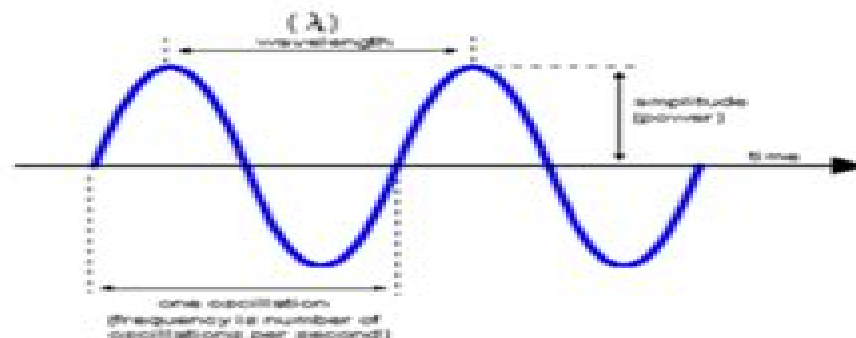
LIGHT AND ATOMIC SPECTRA

Much of what we know about the atom has been learned through experiments with light; thus, you need to know some fundamental concepts of light in order to understand the structure of the atom, especially the placement of the electrons.

The speed of light in a vacuum is the most accurately-known constant in the universe. You should memorize the value for the speed of light because we will be using it extensively.

The speed of light (c) in a vacuum is 3.0×10^8 meters per second.

Light actually has a "dual" nature (or split personality) because there are instances in which it behaves like a wave and other times when it behaves like a particle and sometimes as both. When we consider light as a wave, we must be able to describe its wavelength, its frequency and its velocity.



- (1) **wavelength is represented by the Greek letter lambda (λ)** which looks like an upside down "y". It is the length between corresponding parts of adjacent crests and can be expressed in ANY units of length you choose (feet, inches, meters, kilometers, miles) but normally we choose meters or nanometers as the most common units for wavelength.
- (2) **frequency is represented by the Greek letter nu (ν)** which looks like a "v". Frequency is the number of wave crests which pass a given point in 1 second. Its units are therefore (most commonly) cycles/second or sometimes simply /sec. The unit "Hertz" (abbreviated Hz) is also used as a label for frequency, although this label seems to be gradually going out of existence.

Example 3-8 Does a longer or a shorter wavelength have a greater frequency?

Example 3-9 What mathematical relationship can you draw about wavelength and frequency?

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S Ashworth



Study Guide Light And Quantized Energy:

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warty skin of true toads, however, ... Natural History of the White-Inyo Range Spadefoot Toads (Family Pelobatidae). Great Basin Spadefoot Toad, *Spea* ... A related species in southeastern California, the Couch's Spadefoot Toad (*S. couchii*) ... Couch's spadefoot (*Scaphiopus couchi*) Couch's spadefoot (*Scaphiopus couchi*). Order: Salientia Family: Pelobatidae (spadefoots) Other common name: spadefoot toad. Spanish names: sapo con espuelas ... Spadefoot toad | burrowing, nocturnal, desert 3 days ago — All spadefoot toads are classified in the family Pelobatidae. Spadefoot toads have a broad, horny “spade” projecting from the inside of each Pelobatidae - European Spadefoot Toad Family - Apr 21, 2017 — The family Pelobatidae is the European Spadefoot toads but they aren't just found in Europe, they are also found in Asia and Northern Africa.