**Prefixes and Units**

In this course, you are expected to know these standard prefixes to various units, and their abbreviations. You’ll especially be seeing a whole lot of nanoseconds (ns) and microns (m).

\*note this

exception

|  |  |  |  |
| --- | --- | --- | --- |
| **Exponent** | **Decimal** | **Prefix** | **Abbreviation** |
| 1015 | 1 000 000 000 000 000 | peta | P |
| 1012 | 1 000 000 000 000 | tera | T |
| 109 | 1 000 000 000 | giga | G |
| 106 | 1 000 000 | mega | M |
| 103 | 1 000 | kilo | k |
| 100 | 1 | (none) |  |
| 10–2 | 0.01 | centi | c |
| 10–3 | 0.001 | milli | m |
| 10–6 | 0.000 001 | micro\* |  |
| 10–9 | 0.000 000 001 | nano | n |
| 10–12 | 0.000 000 000 001 | pico | p |
| 10–15 | 0.000 000 000 000 001 | femto | f |
| 10–18 | 0.000 000 000 000 000 001 | atto | a |

**Exceptions and other units**

**Microns:** The unit of meters (m) should just be called a “micrometer.” In fact, it is usually called a *micron*.

**Angstroms:** Historically, wavelengths of light are often measured in units of  meters, known as *Angstroms* (abbreviation Å), after the Swedish physicist Anders Jonas Ångström. Thus, a typical wavelength for red light would be 650 nm or 6500 Å.

**Light Years:** One light year is the distance that light can travel in one year (in a vacuum), or about meters.

**Parsecs:** Often used by astronomers, one parsec (abbreviation pc) is roughly 3.26 light years, or about meters.[[1]](#footnote-1)

1. Hilariously, the original Star Wars movie in 1977 made a bad blunder involving parsecs when Han Solo claimed that his ship, the Millenium Falcon, “made the Kessel Run in less than 12 parsecs.” This makes no sense, as the parsec is a unit of distance, not time. In Han’s defense, there is *some* etymological connection between parsecs and seconds: astronomers use one *arcminute* to mean of a degree of angle, and one *arcsecond* to mean of an arcminute, or of a degree. The word *parsec* is a shortening of the phrase “parallax of one arcsecond.” The full meaning of that phrase is complicated, but ultimately one parsec is how far you would need to be from our Solar system for the distance between the Earth and the Sun (about 93 million miles) to be separated by exactly one arcsecond in your field of view. (Fun facts, to know and share!) [↑](#footnote-ref-1)