Magnitude brightness chart

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Notice that we used the term "appears" in the definition. It is because magnitude, as we usually mean it, does not tell how bright that object really is. It refers to how bright it seems to be.

Astronomers divide magnitude into two general types: apparent and absolute.

?A unit of distance in astronomy, 1 parsec equals 3.26 light-years or 3.09 x 10?? km (1.92 x 10?? miles).

It"s important to point out that an object"s absolute magnitude is measured without extinction (or dimming) of its light due to absorption by interstellar matter and cosmic dust.

So the apparent magnitude depends on an object"s intrinsic luminosity, its distance, and the extinction reducing its brightness. The absolute magnitude allows us to compare the intrinsic luminosity of objects (in a given range of the spectrum) by hypothetically placing all objects at a standard reference distance from the observer.

Let"s take our Sun and Rigel. The Sun appears way brighter than Rigel in our sky so its apparent magnitude is higher (magnitude -26.8 and 0.18, respectively). However, if we placed both the Sun and Rigel at 10 parsecs away from the Earth, Rigel would impressively outshine the Sun. That"s because the distant star has a higher absolute magnitude: -6.69 vs 4.83 for the Sun.

Here are some more examples:

Apparent magnitude values are expressed as a number without a unit; when you see something like "Antares has a magnitude of 1.09", it means that the apparent magnitude is implied. This can be written more concisely as "Antares (mag 1.09)", "Antares (1.09 m)" or "Antares (m = 1.09)". When referring to magnitude types other than apparent, astronomers specify the type by writing the magnitude type with a phrase or abbreviation letter: "Antares has an absolute magnitude of -5.28" or "Antares (M = -5.28)". They also use the letters in formulas.

By the way, apparent magnitude can be measured both with the naked eye and with a telescope; both in the visual range of the spectrum and in other ranges (photographic, UV, IR). In this case, "apparent" means "observable" and does not refer specifically to the human eye. If we"re only considering what the human eye can see, then we"re measuring visual magnitude. However, many popular science sources use these terms interchangeably.

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In 137 CE, the ancient astronomer Ptolemy classified stars on a six-point scale from one (brightest) to six (faintest, barely visible to the naked eye) and coined the term magnitude. Initially, this system grouped stars into six distinct groups without distinguishing brightness within a group. Today, we use a refined version of this magnitude scale.

Ptolemy"s scale is a system of how relatively bright celestial objects appear to be. Such a system requires a zero point or a reference star. Traditionally, Vega, with an apparent magnitude of 0.0, was taken as this reference star.