

CONSTELLATION URSA MINOR, THE LITTLE BEAR

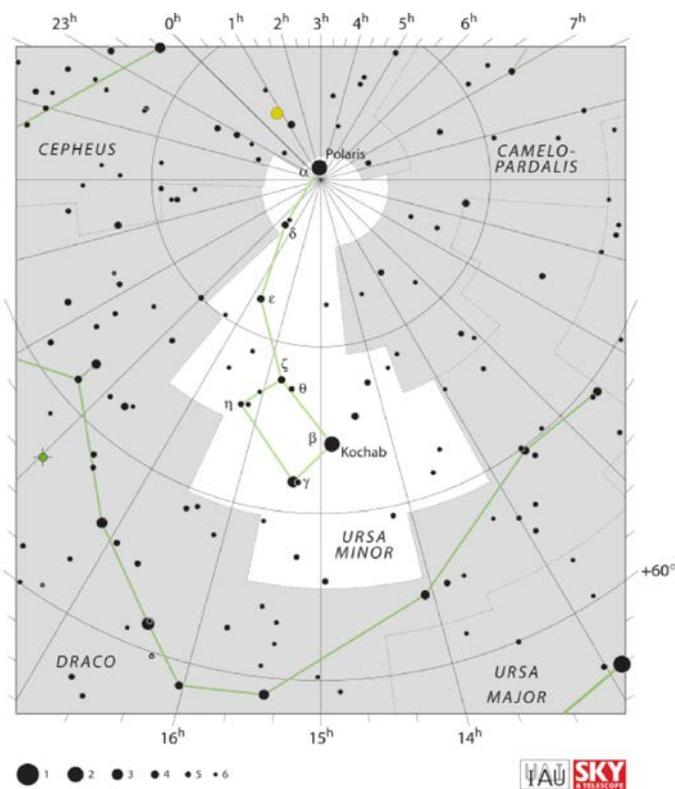
Ursa Minor (Latin: "Smaller She-Bear", to contrast with Ursa Major), also known as the Little Bear, is a constellation in the northern sky. Like the Great Bear, the tail of the Little Bear may also be seen as the handle of a ladle, hence the North American name, Little Dipper. It has seven main stars with four in its bowl, like its partner the Big Dipper.

It was one of the 48 constellations listed by the 2nd-century astronomer **Ptolemy**, and remains one of the 88 modern constellations. Ursa Minor has traditionally been important for navigation, particularly by mariners, because of Polaris (at the end of the tail) being the North Star.

Alpha Ursae Minoris, better known as **Polaris**, is the **brightest star in the constellation**, is a yellow-white supergiant and the brightest Cepheid variable star in the night sky, $+60^\circ$ ranging from an apparent magnitude of 1.97 to 2.00.

Beta Ursae Minoris, also known as Kochab, is an aging star that has swollen and cooled to become an orange giant with an apparent magnitude of 2.08, only slightly fainter than Polaris.

Gamma Ursae Minoris, magnitude 3 and Kochab have been called the "guardians of the pole star". Planets have been detected orbiting four of the stars, including Kochab. The constellation also contains an isolated neutron star—Calvera—and H1504+65, the hottest white dwarf yet discovered, with a surface temperature of 200,000 K.



HISTORY AND MYTHOLOGY

In the Babylonian star catalogues, Ursa Minor was known as the Wagon of Heaven, Damkianna. It appeared on a pair of tablets containing canonical star lists that were compiled around 1000 BC. The possible origin of its name was its appearing to rotate like a wheel around the north celestial pole.

The first mention of Ursa Minor in Greek texts was by philosopher **Thales of Miletus** in the 6th century BC. He pointed out that it was a more accurate guide to finding true north than Ursa Major. This knowledge had reportedly come from the Phoenicians in the eastern Mediterranean, and the constellation bore the term Phoenike. **Homer** had previously only referred to one "bear", raising the question whether Ursa Minor was recognized as a constellation at all.

Ursa Minor and Ursa Major were related by the Greeks to the myth of Callisto and her son Arcas, both placed in the sky by Zeus. In a variant of the story in which Boötes represents Arcas, Ursa Minor represents a dog. This is the older tradition, which explains both the length of the tail and the obsolete alternate name of Cynosura (the dog's tail) for Polaris, the North Star. Cynosura is also described as a nurse of Zeus, honoured by the god with a place in the sky. An alternate myth tells of two bears that saved Zeus from his murderous father Kronos by hiding him on Mount Ida. Because Ursa Minor consists of seven stars, the Latin word for "North" (i.e., where Polaris points) is septentrio, from septem (seven) and triones (oxen), from seven oxen driving a plough, which the seven stars also resemble. This name has also been attached to the main stars of Ursa Major.

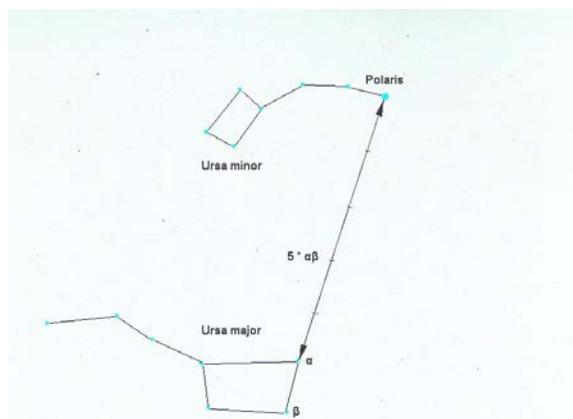
Ursa Minor has traditionally been important for navigation, particularly by mariners, because of Polaris being the North Star. Polaris is currently less than one degree away from the north celestial pole (hence the alternative name Pole Star) so its position in the sky is largely unaffected by the rotation of the Earth. From any point in the Northern Hemisphere the direction to Polaris is always north and its angular altitude is roughly equal to the latitude. At far northern latitudes the Pole Star is too high in the sky to be of use in navigation.



Ursa Minor, with Draco looping around it, depicted in Urania's Mirror, published in London c.1825

CHARACTERISTICS

Ursa Minor is bordered by Camelopardalis to the west, Draco to the west, and Cepheus to the east. Covering 256 square degrees, it ranks 56th of the 88 constellations in size. Ursa Minor is colloquially known in the US as the Little Dipper because its seven brightest stars seem to form the shape of a dipper (ladle or scoop). The star at the end of the dipper handle is Polaris. **Polaris can also be found by following a line through the two stars - Alpha and Beta Ursae Majoris - that form the end of the 'bowl' of the Big Dipper, for 30 degrees (three upright fists at arms' length) across the night sky.**



The four stars constituting the bowl of the Little Dipper are of second, third, fourth, and fifth magnitudes, and provide an easy guide to determining what magnitude stars are visible (also a feature of the Southern Cross) useful for city dwellers or testing one's eyesight.

The three-letter abbreviation for the constellation, as adopted by the IAU (International Astronomical Union) in 1922, is "UMi". The official constellation boundaries, as set by **Eugène Delporte** in 1930, are defined by a polygon of 22 segments. In the equatorial coordinate system, the right ascension coordinates of these borders lie between 08h 41.4m and 22h 54.0m, while the declination coordinates range from the north celestial pole south to 65.40°. Its position in the far northern celestial hemisphere means that the whole constellation is only visible to observers in the northern hemisphere.

FEATURES

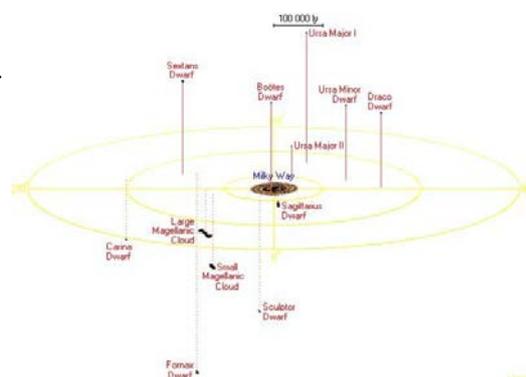
The German cartographer **Johann Bayer** used the Greek letters alpha to theta to label the most prominent stars in the constellation, while his countryman **Johann Elert Bode** subsequently added iota to phi. Only lambda and pi remain in use, likely because of their proximity to the north celestial pole. **Within the constellation's borders, there are 39 stars brighter than or equal to apparent magnitude 6.5.**

Marking the Little Bear's tail are Polaris, or *Alpha Ursae Minoris* (the brightest star in the constellation) and *Delta* and *Epsilon Ursae Minoris*. Delta, just 3.5 degrees from the north celestial pole, is a white main-sequence star of spectral type A1V with an apparent magnitude of 4.35, located 172 light-years from Earth. Bearing the proper name of Yildun, it has around 2.8 times the diameter and 47 times the luminosity of the Sun.

Taken from the villain in *The Magnificent Seven*, Calvera is the nickname given to an X-ray source known as 1RXS J141256.0+792204 in the ROSAT All-Sky Survey Bright Source Catalogue (RASS/BSC). It has been identified as an isolated neutron star, one of the closest of its kind to Earth.

DEEP-SKY OBJECTS

Ursa Minor is rather devoid of deep-sky objects. The Ursa Minor Dwarf, a dwarf spheroidal galaxy, was discovered by **Albert George Wilson** of the Lowell Observatory in the Palomar Sky Survey in 1955. It belongs to the Milky Way Satellite Group, with its centre around 225000 light-years distant from Earth. In 1999, **Kenneth Mighell** and **Christopher Burke** used the Hubble Space Telescope to confirm that the galaxy was probably as old as the Milky Way itself.



NGC 6217 is a barred spiral galaxy located some 67 million light-years away, which can be located with a 10 cm (4 in) or larger telescope as an 11th magnitude object about 2.5° east-northeast of *Zeta Ursae Minoris*.

It has been characterized as a starburst galaxy, which means it is undergoing a high rate of star formation compared to a typical galaxy. →

NGC 6251 is an active supergiant elliptical radio galaxy more than 340 million light-years away from Earth. It has a Seyfert 2 active galactic nucleus, and is one of the most extreme examples of a Seyfert galaxy. This galaxy may be associated with gamma-ray source 3EG J1621+8203, which has high-energy gamma-ray emission. It is also noted for its one-sided radio jet—one of the brightest known—discovered in 1977.

METEOR SHOWERS

The Ursids, a prominent meteor shower that occurs in Ursa Minor, peaks between December 18 and 25. Its parent body is the comet 8P/Tuttle.

