Zodiac constellations 1 – Constellations

Constellations divide the sky, as seen from Earth, into different areas. In Latin, 'constellation' means 'set of stars'. This label describes groups of stars which form imaginary outlines, often representations of mythological characters, animals, gods or inanimate objects on the celestial sphere. The word came into use in English in the 14th century. However, their origins go back to prehistory.

Orion constellation – mythological hunter

Different cultures and nations described and adopted their own constellations, although there is evidence of communication and influence across large distance, even in ancient times. For example, parallels to Babylonian star catalogues suggest that the Chinese system, which dates to the 5th century BCE, did not evolve independently.

The 88 constellations formally recognised today are based on classical and western groupings. Constellations have not remained constant over time, and the shape and size of several changed before the International Astronomical Union (IAU) formally agreed the present constellations, in 1928. Of the 88 modern constellations, 36 lie mainly in northern skies and other 52 in southern skies. The origins of these differ. Northern constellations, and those south of the celestial equator which are visible from the northern hemisphere, generally arose from antiquity and have names based on classical Greek legends. More southerly constellations are modern, a consequence of European exploration from the 15th - 18th centuries.
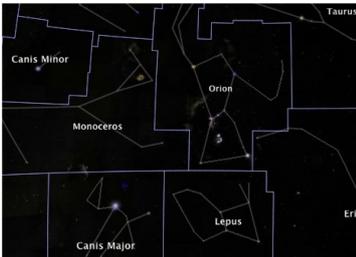
In the past, the boundaries of constellations, particularly recently discovered southern groupings were arbitrary and not always clear. Different groupings and names were proposed by different observers even when catalogues were built on earlier observations and descriptions.

There were attempts to define the membership of constellations. For example, in his 1603 catalogue, *Uranometria*, Johann Bayer assigned stars to individual constellations, labelling them with Greek and Latin letters. These Bayer designations are still in use eg alpha Orionis. However, it was only in 1875 that the American astronomer Benjamin Gould proposed the establishment of contiguous boundaries for constellations. In 1922, another American astronomer, Henry Norris Russell, produced a general list of 88 constellations, but it was only when the IAU became involved that clear, contiguous borders between the constellations were achieved.

The boundaries agreed for each modern constellation are contiguous, with no gaps between them, and cover the whole celestial sphere. The boundaries are drawn along horizontal and vertical lines relating to right ascension (longitude) and declination (latitude). The constellations are not unchanging. Since stars have their own motions, over time, all constellations change very slowly.

The 48 'traditional' constellations, which from the core of the modern 88 constellations, are considered to be Greek, dating from the 4th century BCE. Drawn and described in documents like Ptolemy's *Almagest,* many were, however, borrowed from or based on

constellations identified by earlier civilisations. Earliest evidence of human identification date to around 3,000 BCE in Mesopotamian inscribed stones and clay writing tablets. Some of these are also found in the oldest Babylonian catalogues of stars and constellations, dating back to around 1,000 BCE.

Pleaides cluster – asterism

Other star patterns or groups are called asterisms eg Pleiades, Northern Triangle.

Some of these within one constellation, others cross boundaries, while others include stars from more than two constellations. Members of these groupings appear near each other from Earth. In reality, however, members often are at different distances. A sub-group of the ancient Pleiades constellations belong to the zodiac. This series focuses on these constellations.

Sources: Ridpath, I (Ed) 2012 Oxford dictionary or astronomy Oxford, OUP, Ridpath, I (Ed) 2006 Astronomy London, Dorling Kindersley, curious.astro.cornell.edu, en.wikipedia.org,