



Teacher's Science Background

CONSTELLATION
Q&As

1. What are constellations?

Constellations are “pictures” in the sky that ancient astronomers perceived by imagining lines or relations between stars that appear grouped. A simple, geometric star pattern lies at the heart of each constellation. Constellations depict people, inanimate objects, real animals (birds, insects, and land and water creatures), and mythological animals (serpents, dragons, and flying horses).

Generally, there is little similarity between the geometric star pattern on which the constellation is based and the fully detailed drawing of the constellation. For example, the winter constellation, Orion, the Hunter, with four bright stars at the corners of a trapezoid and three stars in a row near the center, doesn’t look much like a person.

Creating the constellations helped people remember the positions of the stars. Knowing the positions of the stars helped farmers keep track of the seasons and travelers keep track of where they were.

2. Are all the stars from a constellation in the same area of the sky?

Chance alignments of stars have created the patterns we see in the sky. Stars that appear to be next to each other may actually be very far from each other, and at very different distances from Earth. Stars that appear to be of the same brightness may also lie at vastly different distances from Earth. In that case, the star farther away is truly much brighter than the one nearer to Earth.

3. What are constellation myths?

Constellation myths are ancient stories about the gods, heroes, and mythological creatures (serpents, dragons, and flying horses) featured in the constellations. The Greeks and Romans created the stories for the constellations

in the Northern Hemisphere, and for a few in the Southern Hemisphere that they could sometimes see, close to the horizon.

Other societies had their own mythologies for the stars. The stories were part of their religions, helping them to explain everyday events, such as the seasons. These stories usually have a hero, who was given an honorary place in the sky, as either a reward or a tribute.

Most of the constellations in the Southern Hemisphere are more modern and were identified and named in the seventeenth century, when European explorers first sailed the southern seas. They are not usually associated with myths.

4. How many constellations are there?

The entire sky (Northern and Southern hemispheres) has been divided into 88 regions, each containing a constellation.

5. Who created the constellations?

Many of our modern constellations come from the ancient Greeks. The Greeks, however, did not invent them. Many people speculate that the ancient Babylonians and Sumerians are the actual inventors of many of the constellations. These cultures passed the tradition on to the ancient Egyptians and Greeks.

Much of what we know about Greek astronomy comes from Latin translations of the Arabic translations of the original Greek work. For example, the title of Ptolemy's text, *The Almagest*, is not the original Greek title, but an Arabic translation. Ptolemy named stars based on their positions in the constellations, such as "mouth of the southern fish," a star in the constel-

lation of Pisces. But the Arabs named stars for people, and added those Arabic star names to the constellations. So, for example, they gave the name “Fomalhaut” to that same star, in Pisces. This is why we have Arabic names for stars in Greek constellations that bear Latin names.

6. Why did the ancients need the constellations?

Ancient farmers living near the Equator, where the seasons don’t vary much, may have used the stars to tell them when to plant and harvest their crops. Since some constellations are only visible at certain times of the year, noticing their appearance can reveal what month it is. Some historians think the constellation myths were invented to help the farmers remember the constellations.

Throughout history, the stars have also been used for navigation, either across a desert, or a body of water. Travelers have historically relied on the North Star, Polaris, to mark their way. Polaris is the last star at the end of the handle of the asterism* of the Little Dipper, in the constellation of the Little Bear. Due to Earth’s rotation, the stars appear to move across the night sky. But Polaris is located above the axis on which the Earth rotates, so it doesn’t change position appreciably with time.

7. How do we use the constellations?

Constellations give modern-day sky watchers a means of keeping track of the many bright stars in the sky. By looking for groups of stars in a particular pattern, professional and amateur astronomers can locate specific stars within the group. For example, many people can pick out the trapezoidal winter star pattern known as Orion. Once they have found Orion, they can find Betelgeuse (the star in the upper left “corner” of the trapezoid formed by the bright stars) and Rigel (the star in the lower right “corner” of the same trap-

ezoid), two of the brightest stars in this region of the sky. Constellations are also used to locate other objects, such as galaxies and nebulae (areas where gas and dust are clustered).

8. Do other cultures also have constellations?

Many different cultures, including the Greeks, Mayans, Indians, Native Americans, and Celts created their own names for various groups of stars, along with different mythological stories about them. These star groups, as well as their names and stories, rarely correspond to those of other cultures.

There is one pattern in the northern sky that many cultures have recognized. It is the asterism* called, in the U.S., the Big Dipper. In southern France, it is called a “saucepan” and in Britain, a “plough.” The Mayans called it Seven Macaw, a parrot, but the Hindus saw seven wise men. The Micmac Indians of Maritime Canada, and other North American Indians saw a bear (the part we see as the bowl of the dipper), with hunters tracking it (the handle). The runaway slaves called it the “drinking gourd” and followed it north to freedom. Therefore, the Big Dipper became a symbol of freedom. It is unusual for so many cultures to pick out the same set of stars. Perhaps it is because all seven stars are very bright.

*The term “asterism” is used here to indicate a subset of the stars in a constellation that make a separate, recognized pattern of their own. The Little Dipper is such a group of stars, found within the Little Bear, one of the 88 constellations. The stars making up the Big Dipper are another “asterism,” falling within the constellation of the Great Bear.