

## Moons MOOC

### *Mythbusting Moons*

#### **NARRATOR:**

Mythbusting Moons, one, satellites are artificial. No, we began launching artificial satellites into orbit around the Earth in 1957. But satellite describes anything that orbits something else.

Technically, the planets, comets, asteroids, and so on are all satellites of the Sun.

But we tend to reserve the term for objects going around things that go around the Sun. The Moon is the Earth's only natural satellite. Most other planets have more than one natural satellite, and so do many other small objects.

Two, capital letters don't matter. Wrong, the Earth's satellite is called the Moon. That's its name. The Moon is the Earth's only moon. Most other planets have more than one moon, each with their own name.

Three, only planets have moons. No, things smaller than planets can have moons too. Even asteroids only a few kilometres across can have a smaller asteroid orbiting them. Pluto is no longer regarded as a planet. It's too small. But it has five moons. Several other icy bodies similar to Pluto are also known to have moons.

Four, can moons have moons? Well, maybe, but so far no one has found an example. Five, the Moon has a dark side. Depends what you mean. Like every object in the Solar System, only one side of it can be illuminated by the Sun at once. So half is sunlit and half is in darkness.

However, the moon rotates on its axis so that all sides of it see the Sun eventually. There is no permanent dark side in terms of sunlight. But there is one side that is permanently turned away from the Earth so that we can never see it.

Six, the Moon is bigger when it is low in the sky. Well, it looks bigger, but if you measure it, it is exactly the same size as when you see it higher in the sky. This is an optical illusion known as the Moon illusion. The explanation is probably that when it is high, there is nothing nearby to relate it to. But when it is low, distant trees or buildings lend a sense of scale.

Seven, supermoons are special. No, at least once a year, you'll find some nonsense on the internet claiming that a supermoon is about to happen and that it will look really big. The fact is that the Moon's orbit about the Earth is not quite circular. Its distance varies from about 363,000 kilometres to about 405,000 kilometres. And the so-called supermoon is when the closest point happens to coincide with full Moon.

You're kidding yourself, though, if just by looking at it you'll notice it's bigger than usual. The actual difference in size about 14% bigger than when the Moon is furthest away. And you won't detect this without precise measurement. The Moon is at its closest once per orbit. But nobody makes a fuss when, say, the crescent Moon is fractionally bigger than other crescent Moons of the year.

Eight, supermoons cause natural disasters. When the Moon is at its closest and the Earth, Moon, and Sun are aligned-- this can happen either at full Moon or new Moon-- the combined tidal forces is only 18% stronger than for the average full Moon or new Moon tide. Low-pressure weather can cause a much higher tide than you would get mainly because of a supermoon. But there is no established correlation with natural disasters.

Nine, without the Moon, there would be no tides in the sea. Wrong, the Sun also exerts a tidal force on the Earth's oceans. The Sun contains much more mass than the Moon, but it is also much further away so that the Sun's total force is about 46% of the Moon's tidal force. Without the Moon, the Earth's oceans would experience twice daily tides a bit less than 1/2 the size of the actual tides.

10, without the Moon, there would be no advanced life on the Earth. This one is tricky. Without the Moon, there would still be tides. And if tides helped life migrate from the oceans onto the land, that would still have happened.

However, some scientists calculate that having such a large satellite as the Moon has kept the Earth's spin axis relatively stable over geological time so that extremes of climate here have been much less than those suffered by Mars. If that's important for life, then we should be grateful to the Moon for our very existence.