# The Moon

**By Cindy Grigg**

[1] From the time you were very young, you looked up in the sky and saw the moon. When you were little, you may have thought the moon "followed" you if you were in a car going somewhere. The moon does move, but it doesn't follow cars.

[2] The moon goes around or orbits the Earth, just as Earth orbits the sun. The phases of the moon are caused by the positions of the Earth, sun, and moon. The moon orbits the earth in 27 days, 7 hours, 43 minutes. That's almost four weeks, and we see four main phases of the moon. Each main phase lasts about one week each. In between each of those four main phases, the moon is changing.

[3] You may have heard people refer to the moon as either "waxing" or "waning." Waxing means that it is growing fuller, and waning means that it is moving from full to smaller.

[4] The sun always lights up the side of the moon facing the sun. When the sun and moon are on opposite sides of the earth, the moon appears "full" to us, a bright, round circle. When the moon is between Earth and the sun, it is dark. We call this a "new" moon. In between, the moon's illuminated surface appears to grow (waxes) to full, then decreases (wanes) to the next new moon.

[5] Eight phases in all are named. There's the new moon; then the waxing crescent moon. When we see half the moon lit, we call that the first quarter moon. The lit part looks like the capital letter “D.” The moon is one-quarter of the way through its monthly phases. The next phase is called waxing gibbous; then there's the full moon. After that, the moon is waning, or growing smaller. We see the waning gibbous; then the third quarter (half the moon is lit again, but it's the opposite side, a backwards letter “D”). Then we see the waning crescent; then the new moon.

[6] The moon, Earth's only natural satellite, is over one-fourth the size of Earth. It is Earth's closest neighbor in space, at a distance of 238,857 miles, or 384,403 kilometers.

[7] You may have heard people talk about "the dark side of the moon," but there is no such thing. The sun shines on all sides of the moon as it orbits. However, there is a "far side of the moon" that is never seen from Earth. The moon's rotation period exactly matches its revolution period around the Earth. Since the moon rotates at the same speed as it revolves around the Earth, only one side of the moon is ever seen on Earth.

[8] You can see this effect by using two balls. Hold one of the balls still to represent Earth. Now move the other ball around the Earth without twisting your wrist. You will see that people on the Earth would see all sides of the moon. However, the moon is rotating on its axis. If you slowly spin the moon on its trip around the Earth, you will see that you can time it so only one

side of the moon is ever seen from Earth. That's why people on Earth only see one side of the moon.

9 On July 20, 1969, Neil Armstrong became the first man to walk on the surface of the moon. He was followed by Edwin (Buzz) Aldrin on the Apollo 11 mission. They found there is no atmosphere on the moon. They could only communicate by radio because sound waves can only be heard by traveling through the medium of air. The lunar sky is always black because of the lack of an atmosphere.

10 The astronauts also experienced gravitational differences. The moon's gravity is one-sixth that of the Earth's; a man who weighs180 pounds on Earth weighs only 30 pounds on the moon. You may have seen video of the astronauts on the moon and saw how they bounced. The bouncing was because the force of gravity is so much less on the moon than on Earth. The moon is the only celestial body other than the Earth upon which humans have walked.

11 On Earth we see the effects of the moon's gravitational pull. Tides are the periodic rise and fall of large bodies of water. Tides are caused because the Earth and the moon are attracted to each other, just like magnets are attracted to each other.

12 The gravitational attraction of the moon causes the oceans to bulge out in the direction of the moon. Another bulge occurs on the opposite side, since the Earth is also being pulled toward the moon (and away from the water on the far side.) The moon tries to pull at anything on Earth to bring it closer. Earth is able to hold onto everything except the water. Since the water is always moving, the Earth cannot hold onto it, and the moon is able to pull at it. Since Earth is rotating while this is happening, there are two high tides and two low tides each day. There are about twelve hours and twenty five minutes between the two high tides every day.