Phases of the Moon

The Moon looks different from one night to the next because it reflects different amounts of sunlight to the Earth. We call these shapes the phases of the Moon.

There are four basic phases:

- **New Moon** – At this time, none of the sunlight can be seen from Earth, so the Moon is invisible. Note 1) During a **total solar eclipse**, the New Moon blocks the Sun. Note 2) In some religions, such as Judaism and Islam, months begin on the “New Moon,” which is actually a day or two later than the astronomical New Moon, when the first sliver of light again is visible.

- **First Quarter**—About a week after New Moon, half of the Moon is visible and looks like the letter “D.” This “Half Moon” occurs about a quarter of the way through the Moon’s cycle.

- **Full Moon**—About two weeks after the New Moon, all of the Moon’s surface is visible, and we can see a “full” Moon.

- **Last or 3rd Quarter**—About a week after the Full Moon, another Half Moon is visible, but looking like a “backwards D.”

- A week or so later, the Moon again reaches the position in which no light shines toward Earth, and the **periodic cycle** begins again.

You can find a complete list of the dates for the phases during the year at [http://aa.usno.navy.mil/data/docs/MoonPhase.php](http://aa.usno.navy.mil/data/docs/MoonPhase.php).

This site is provided by the U.S. Naval Observatory, our Nation’s Official Timekeepers. Notice that the times are given in “Universal Time.” This is a system used globally to avoid confusion about time zones, daylight savings, and am/pm patterns. It is based on the time at the Prime Meridian (0 deg longitude.) This also uses the 24-hour time system. So, for example, 3:21 pm would be indicated as 15:21.

For those of us in the Eastern Time Zone, there is a 5-hour difference. So a time given as 10:45:30 UT would be 5:45:30 am.

This website enables you to find the dates for moon phases for many years past and future. Related links on this site allow you to see what the Moon likes like today, when eclipses will occur, and much more about Moon-Earth-Sun patterns.
Between the four basic phases, the Moon may appear as a **crescent**—less than half, looking somewhat like a letter “C”--or as a **gibbous**—more than half but less than full. When you can see more of the lighted side each night, the Moon is **waxing**. When you see less, it is **waning**.

Complete the diagram below to help you understand how and why this happens. In this diagram, we represent the sunlight as coming from the right, but diagram can be drawn with the Sun to the left, top, or bottom.

For convenience of discussion, we identify each phase by a letter. Use these to answer the questions that follow.
To prepare the diagram, draw arrows between each phase going in a **counterclockwise** direction. Lightly shade in the “dark side of the Moon.” The vertical line in each helps you know which this is. The other line indicates what part of the Moon can be seen from Earth. So a person would only be able to see the lighted area facing Earth.

For each Phase, print the name on the line next to the letter and draw what it would look like in the space to the right. (Use a dashed-line circle for the New Moon, to represent it cannot be seen but exists.)

“A” ________________________________

“B” ________________________________

“C” ________________________________

“D” ________________________________

“E” ________________________________

“F” ________________________________

“G” ________________________________

“H” ________________________________
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1) At what Phase can you see more than half and less than full, with more visible than the day before? Draw this Phase.

2) At what Phase can you see more than half and less than full, with less visible than the day before? Draw this Phase.

3) At what Phase can you see less than half, with more visible than the day before? Draw this Phase.

4) At what Phase can you see less than half, with less visible than the day before? Draw this Phase.

5) About how many days does it take from New Moon to Full Moon?

6) About how many days does it take from one New Moon to the next, or one Full Moon to the next?

7) What term is used for the second Full Moon in a calendar month?

   How common is this?

   When will this next occur?