

FYI

Planetary Orbits

An **orbit** is the path traveled by an astronomical body around another, such as a planet around the sun. To orbit is to revolve or go around. The word “orbit” is thus both a noun—the path—and a verb—to travel the path.

The orbits of the planets in our solar system have various characteristics:

- The planetary orbits are **ellipses**, or ovals, not circles.
- Most of the planetary orbits, while not circles, are nearly circular. **Eccentricity** (e) is a measure of how much an orbit deviates from roundness. The planet Mercury has the highest eccentricity—the least circular orbit.
- The planets orbit the sun within the almost-flat plane or disk of the solar system. This plane is known as the **ecliptic**. (As viewed from Earth, the ecliptic is the apparent path of the sun over the course of a year relative to the background of stars.) Again, the planet Mercury is least like the others. Its orbit is the most tilted, or inclined, relative to the ecliptic.
- All the planets orbit the sun in the same direction. This direction is counterclockwise, if the solar system is viewed looking down on Earth’s north pole.
- The orbits get farther and farther apart as distance from the sun increases. For example, the distance between the orbits of Mercury and Venus, the two planets closest to the sun, is much smaller than the distance between the orbits of Jupiter and Saturn, which are much farther from the sun.
- The speed of the planets as they orbit gets slower and slower with distance from the sun. For example, Mercury, the planet closest to the sun, is moving faster than Mars, the fourth planet from the sun, and Mars is moving faster than Neptune.
- Because planets orbit the sun at different distances and different speeds, the distance between any two planets is constantly changing.

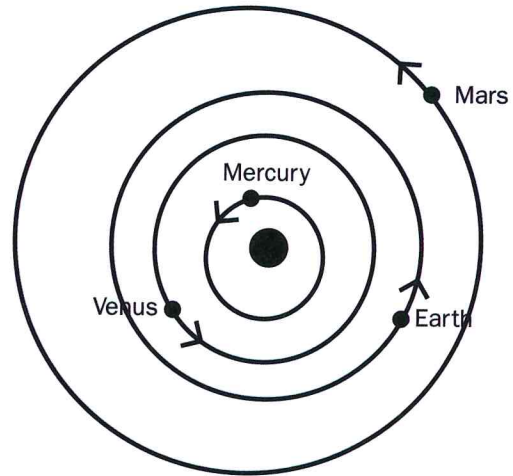


Figure 2-3: Diagram of the orbits of the planets Mercury through Mars, showing that they are very circular. Note the innermost orbit. Mercury’s orbit is less circular than the others. (Sun NOT to scale; it is too large relative to the orbits.)

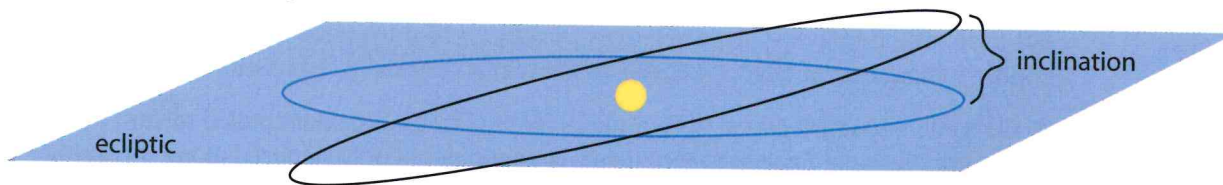


Figure 2-4: Diagram showing what is meant by an orbit that is tilted or inclined relative to the ecliptic. The orbits appear to be very elliptical because they are being viewed from an angle.

Checking In

1. In what ways are the orbits of the planets close to the sun different from orbits of the planets that are farther away?
2. What is the difference between an orbit with a high eccentricity and an orbit with a low eccentricity?