Unit 3: Facts About the Planets
Student Information

The position of the planets in the solar system causes them to have unique physical features. The first four planets in the solar system, Mercury, Venus, Earth, and Mars, are referred to as the **inner belt**, or **terrestrial**, planets. The inner belt of planets is separated from the outer belt of planets by the asteroid belt.

The **outer belt** includes the **Jovian** planets: Jupiter, Saturn, Uranus, and Neptune. They are different from the terrestrial planets in that they have no solid surface. These large gas giants are surrounded by gaseous clouds that get thicker closer to the center of the planet.

![Asteroid Belt and Heliosphere](image)

### Inner Planets (Terrestrial Planets)

**MERCURY**
- First planet in the solar system
- **Special Fact:** Mercury rotates very slowly. It takes almost 59 Earth-days to rotate once.
- **Diameter:** 3,031 miles (4,878 km)
- **Average distance from the sun:** 36 million miles (58 million km)
- **Rotation:** 58.7 Earth-days
- **Orbit of the sun:** 88 Earth-days
- **Moons:** None

![Mercury](image)

**VENUS**
- Second planet in the solar system
- **Special Fact:** Venus has a thick atmosphere with crushing pressure. The clouds are made up of tiny droplets of acid.
- **Diameter:** 7,521 miles (12,104 km)
- **Average distance from the sun:** 67.2 million miles (108.2 million km)
- **Rotation:** 243 Earth-days
- **Orbit of the sun:** 224.7 Earth-days
- **Moons:** None

![Venus](image)
EARTH
Third planet in the solar system

Special Fact: Earth is the only planet covered in water. Water makes life on this planet possible. Earth is tilted on its axis 23.5 degrees and therefore has seasons.

Diameter: 7,926 miles (12,756 km)
Average distance from the sun: 93 million miles (150 million km)
Rotation: 23 hours, 56 minutes
Orbit of the sun: 365.25 days
Moons: 1

MARS
Fourth planet in the solar system

Special Fact: Mars is tilted on its axis 24 degrees, similar to Earth, and therefore has seasons.

Diameter: 4,220 miles (6,974 km)
Average distance from the sun: 142 million miles (228 million km)
Rotation: 24 hours, 37 minutes
Orbit of the sun: 687 Earth-days
Moons: 2 (Phobos and Deimos)

Outer Planets (Jovian Planets)

JUPITER
Fifth planet in the solar system

Special Fact: Jupiter is the largest planet. It is large enough to contain 1,000 bodies the size of Earth.

Diameter: 88,400 miles (142,000 km)
Average distance from the sun: 484 million miles (630 million km)
Rotation: 9 hours, 50 minutes (Jupiter rotates faster than any other planet)
Orbit of the sun: 11.9 Earth-years
Moons: 62 known; Four of Jupiter’s Moons can be observed with binoculars. They are referred to as the Galilean moons and are Io, Europa, Ganymede, and Callisto.
Rings: 3
SATURN
Sixth planet in the solar system
Special Fact: Saturn is known as the ringed planet. Scientists now know that Jupiter, Uranus, and Neptune also have rings.
Diameter: 74,600 miles (120,000 km)
Average distance from the sun: 887 million miles (1,430 million km)
Rotation: 10 hours, 39 minutes
Orbit of the sun: 29.5 Earth-years
Moons: 60 known
Rings: Thousands

URANUS
Seventh planet in the solar system
Special Fact: Uranus rotates on an axis that is almost tilted on its side. Sometimes its poles point directly at the sun.
Diameter: 31,700 miles (51,100 km)
Average distance from the sun: 1,784 million miles (2,871 million km)
Rotation: 17 hours, 14 minutes
Orbit of the sun: 84 Earth-years
Moons: 27 known
Rings: 13

NEPTUNE
Eighth planet in the solar system
Special Fact: Neptune rotates on a nearly upright axis.
Diameter: 30,800 miles (49,500 km)
Average distance from the sun: 2,794 million miles (4,498 million km)
Rotation: 16 hours, 7 minutes
Orbit of the sun: 163.7 Earth-years
Moons: 13 known
Rings: 9

PLUTO (dwarf planet)
Ninth planet in the solar system
Special Fact: Pluto was once considered the most distant planet of our solar system. In 2006, because of its small size and eccentric orbit, the International Astronomical Union (IAU) formally reclassified it as a dwarf planet.
Diameter: 1,484 (2,390 km)
Average distance from the sun: 3,700 million miles (5,900 million km)
Rotation: 6 days, 9 hours, 36 minutes
Orbit of the sun: 248 Earth-years
Moons: 3 known
Sizes and Distances in Our Solar System

At 750 miles per hour, a plane can fly from coast to coast in about four hours. Not bad! It would take that same plane fourteen years to fly the 93,000,000 miles (149,600,000 km) from Earth to the sun (certainly running out of peanuts and soda pop in the process). Besides, it’s difficult to deal with millions of anything! For distances within and beyond our solar system, two other units of measure are useful: the astronomical unit (AU) and the light-year.

One AU is the distance from Earth to the sun. Thus, our planetary neighbor Mars is 1.52 AU from the sun, while distant Pluto is 39.4 AU from the sun. (You could fly there in just 552 years on your favorite air carrier.) The distance of the various planets from the sun (and other statistics) are given in the “Planetary Fast Facts” table below.

A light-year is the distance light travels in one year, zipping along at 186,000 miles (300,000 kilometers) per second.

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<td>Planet</td>
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* Masses are given in fractions or multiples of Earth’s mass, which is $6 \times 10^{21}$ metric tons.

Sun statistics: The sun rotates in 25 days (at the equator); its diameter is 1,390,000 km; and its mass is 333,000 times that of Earth. It has a temperature of 15 million°C at the core, but only 5,500°C at the surface.

To get a picture in your mind of the relative distances of the planets from the sun, let's think football fields, which are a hundred yards long. One AU is going to equal 2.54 yards (100 divided by 39.44 AU, the distance to Pluto). Assume that the sun burns at one goal line. Mercury will orbit less than half a yard from the sun; Venus will be about three-fourths of a yard away. Earth, of course, is on the two-and-a-half yard line. Jupiter lies just over the 13-yard mark (2.54 yards/AU x 5.2 AU).

1. Using the table above, calculate how many yards down the field each of these planets will be found. Saturn __________, Uranus __________, Neptune __________

2. Jupiter’s diameter is 142,984 km (see the table above). Let that diameter equal 90 mm and, on your own paper, draw all nine planets in the solar system to the same scale. (Hint: Divide 142,984 by 90 to find out how many kilometers are represented by each millimeter.)
Quick Check

Matching

1. Neptune  a. first planet in the solar system
2. Mercury  b. tilted on its axis 24 degrees
3. Saturn  c. largest planet
4. Jupiter  d. planet with the most rings
5. Mars  e. has 13 known moons

Fill in the Blanks

6. The outer belt includes the ________________ planets.
7. The inner belt of planets is separated from the outer belt of planets by the ________________ ________________.
8. Venus has a thick atmosphere with crushing ________________.
9. The first four planets in the solar system are referred to as the ________________ ________________, or ________________, planets.
10. Four of ________________ moons can be observed with binoculars. They are referred to as the ________________ moons.

Multiple Choice

11. It takes almost 59 Earth-days for this planet to rotate once on its axis.

12. Which of the following is not a terrestrial planet?

13. Sometimes this planet's poles point directly at the sun.

14. The clouds of this planet are made up of tiny droplets of acid.