

**Chapter 22**

Use with Section 1

**ENRICHMENT****• The Solar System****Is there a tenth planet?**

Five of the planets in our solar system were discovered thousands of years ago. The five are Mercury, Mars, Jupiter, Saturn, and Venus. Pluto, Neptune, and Uranus, on the other hand, were discovered within about the last 200 years.

The planet Uranus was discovered in 1781 by Sir William Herschel, an astronomer, when he was surveying the night sky through a telescope.

The discovery of Uranus led to the discovery of Neptune. Once Uranus was discovered, astronomers carefully studied everything about it that they could, including its orbit. They found that Uranus didn't follow the orbit they calculated it should follow. The only logical explanation that could account for the different orbit was that gravity from an unseen planet was exerting force on Uranus's orbit. In 1843, astronomer John C. Adams used mathematics to predict where the unseen planet was located. Urbain Leverrier, another astronomer, made the same prediction in 1846. On the basis of Leverrier's prediction, two astronomers in Germany located Neptune through a telescope.

The ninth planet, Pluto, was discovered in this century. In 1905, astronomer Percival Lowell

determined that something must be causing irregularities in the orbits of both Uranus and Neptune. And he believed that the "something" was a planet. He predicted where this planet would be but was never able to find it. In 1929, astronomer Clyde Tombaugh, with the help of a powerful telescope, photographed the part of the sky where Lowell said the planet would be. He was able to capture a picture of Pluto on film, thus proving its existence. Interestingly, as it turned out, astronomers now think that Pluto is too small to account for the irregularities in the orbits of Uranus and Neptune.

Is there a tenth planet? At one time, some astronomers thought that a planet—which they named Vulcan—lay between Mercury and the sun. However, in 1916, scientists, using Einstein's theory of gravitation, proved that Vulcan could not exist. Some astronomers hypothesize that a tenth planet—Planet X—may exist beyond Neptune. The existence of Planet X would explain the irregularities in Uranus's and Neptune's orbits. Evidence suggests, however, that Planet X probably doesn't exist.

1. Why were five of the planets discovered thousands of years ago? \_\_\_\_\_  
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2. What invention made it possible to discover Uranus? \_\_\_\_\_
3. Why do you think Pluto wasn't discovered before Uranus or Neptune? \_\_\_\_\_  
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4. Why do you think astronomers believe that Pluto is too small to affect Uranus's and Neptune's orbits? \_\_\_\_\_  
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