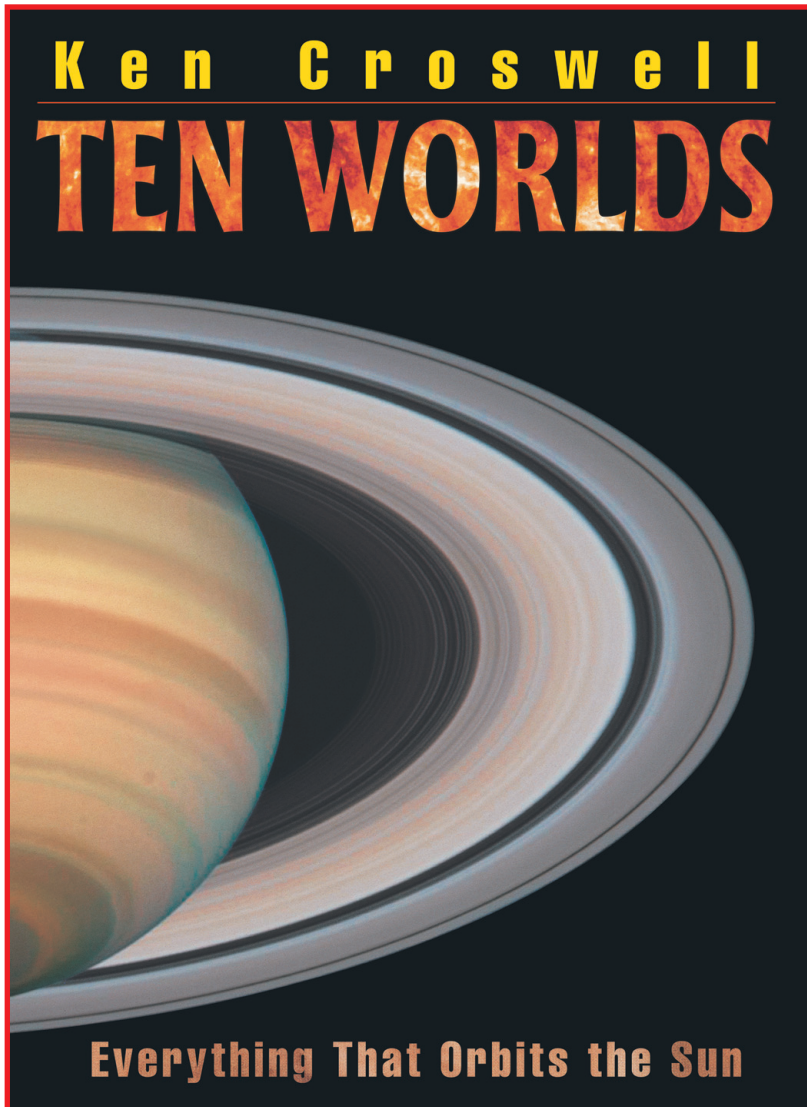


IS PLUTO A PLANET?



56 pages
Full-color photographs
Ages 6 and up
ISBN-10: 1-59078-531-2
ISBN-13: 978-1-59078-531-7
\$19.95

Boyd's Mills Press
A Highlights Company
815 Church Street
Honesdale, Pennsylvania 18431
Toll free: 877-512-8366
Cover design © 2006 by Boyd's Mills Press

For decades, some astronomers have argued that Pluto should not be classified as a planet. Today, this issue divides astronomers.

Why does it matter? After all, whether astronomers declare Pluto to be a planet or a peanut, it will continue to exist, orbiting the Sun every 248 years. But the word “planet” carries a special meaning. Every well-educated adult—and child—should know all the Sun’s planets. Everyone knows Mars and Saturn, for example, because both are planets. Few people have heard of Ceres or Vesta, because these objects are merely asteroids, not planets. If Pluto loses its planetary status, then it will no longer be on the list of celestial objects that well-educated people should know.

On August 24, 2006, a few hundred astronomers at the International Astronomical Union voted that Pluto is not a planet. But a week later, hundreds of other astronomers signed a petition saying they would not recognize that vote.

So the big argument about Pluto continues. Despite the confusion, teachers and their students have the chance to discuss and debate the issue.

Here are some basic facts about Pluto, all taken from the new book *Ten Worlds* by Harvard-trained astronomer Ken Croswell. *Ten Worlds* is the most up-to-date book on the solar system. It has full chapters on both Pluto (pages 42–43) and Eris (pages 44–45); Eris is the newfound world that is bigger than Pluto and three times farther away. Page 45 of *Ten Worlds* discusses the controversy over the planethood of Pluto and Eris.

As students discuss both sides of the dispute, presented here, they will enjoy learning more about the solar system, especially about Pluto—which has long fascinated children—and its twin Eris.

NO

Pluto is not a planet, because it is too small. At one time, astronomers thought Pluto was bigger than Mercury. Now we know Pluto is only half the diameter of Mercury. That's too small for Pluto to be a planet.

YES

Pluto is a planet. It is the tenth-largest object that goes around the Sun. Although it is smaller than Mercury, Pluto is two and a half times the diameter of Ceres, the largest asteroid. That's large enough for Pluto to be a planet.

FACTS

From pages 52–53 of Ten Worlds

Diameter of Mercury: 3,032 miles.

Diameter of Pluto: 1,430 miles.

Diameter of Ceres: 590 miles.

NO

Pluto is too small to be a planet. It is smaller than seven moons, including our own Moon, so Pluto is not a planet.

YES

Pluto is big enough to be a planet. Our solar system has more than 160 moons, and Pluto is larger than all but seven of them. Furthermore, Mercury is smaller than two moons and nearly as small as a third moon—yet Mercury is a planet. So is Pluto.

FACTS

From page 52 of Ten Worlds

Diameter of Ganymede (Jupiter's biggest moon): 3,272 miles (bigger than Mercury).

Diameter of Titan (Saturn's biggest moon): 3,200 miles (bigger than Mercury).

Diameter of Callisto (Jupiter's second biggest moon): 2,994 miles (nearly as big as Mercury).

Diameter of Earth's Moon: 2,159 miles (bigger than Pluto).

NO

Pluto is just an ice ball. It is not a planet.

YES

Pluto is not an ice ball. It's twice as dense as water. It's therefore made mostly of rock, not ice.

FACTS

From pages 52–53 of Ten Worlds

Density of Pluto: 2.0 times the density of water.

Pluto is denser than Jupiter, Saturn, Uranus, and Neptune; and less dense than Mercury, Venus, Earth, and Mars.

NO

Pluto has a very elliptical, or oval-shaped, orbit around the Sun. In other words, its orbit is not a circle. At times Pluto is closer to the Sun than Neptune is. So Pluto is not a planet.

YES

Mercury also has a very elliptical (oval-shaped) orbit around the Sun. Mercury's orbital eccentricity—a measure of how elliptical an orbit is—is nearly as great as Pluto's. Yet Mercury is a planet. So is Pluto.

FACTS

From page 52 of Ten Worlds

Mercury's orbital eccentricity: 0.21.

Pluto's orbital eccentricity: 0.25.

NO

Newly discovered Eris is larger than Pluto, which proves Pluto is not a planet.

YES

Eris is indeed larger than Pluto, so we should call Eris a planet, too. It's the first new planet found orbiting the Sun in 75 years.

FACTS

From pages 52–53 of Ten Worlds

Diameter of Pluto: 1,430 miles.

Diameter of Eris: 1,500 miles.

NO

When Pluto was discovered, it was thought to be alone. Now we know Pluto is part of the Edgeworth-Kuiper belt, a swarm of small bodies beyond Neptune's orbit. So Pluto is not a planet.

YES

Yes, Pluto belongs to the Edgeworth-Kuiper belt, but Pluto is an abnormally large member of the Edgeworth-Kuiper belt. That's why 62 years elapsed from Pluto's discovery in 1930 to the discovery of the next Edgeworth-Kuiper belt object in 1992. Furthermore, only one known object in the Edgeworth-Kuiper belt—Eris, discovered in 2005—is bigger than Pluto. Pluto is larger than 99.9 percent of all known objects in the Edgeworth-Kuiper belt. So Pluto is a planet.

FACTS

From Ten Worlds

Page 44 discusses the Edgeworth-Kuiper belt and quotes Kenneth Edgeworth's 1943 prediction: "the outer region of the solar system, beyond the orbits of the planets, is occupied by a very large number of comparatively small bodies."

YES

Like most planets, Pluto has moons going around it. In fact, Pluto has three moons—and someday astronomers may discover more. So Pluto is a planet.

NO

The presence of moons around Pluto doesn't prove anything. Mercury and Venus have no moons, yet they are planets; asteroid Ida has a moon, yet it's not a planet. Neither is Pluto.

FACTS

From Ten Worlds

Page 23 shows a color photograph of asteroid Ida and its moon, which is only one mile across. Pages 52–53 give the number of moons going around each planet, including Pluto and Eris.

YES

Like most planets, Pluto has an atmosphere. In fact, Pluto's air is mostly nitrogen, the same gas that makes up most of Earth's atmosphere. So Pluto is a planet.

NO

The presence of air around Pluto doesn't prove anything. Mercury has almost no air, yet it is a planet; and Titan has air that is thicker than the Earth's air, yet Titan is not a planet—it's a moon of Saturn.

FACTS

From Ten Worlds

Page 43 describes the discovery of Pluto's atmosphere. Pages 30–31 discuss Saturn's moon Titan; pages 34–35 show the best color images of Titan and its surface.

SUMMARY: IS PLUTO A PLANET?

NO

In 1930, when Pluto was discovered, it was thought to be larger than we now know it is. In fact, for a long time, astronomers thought Pluto was bigger than Mercury and smaller than Mars. In the 1970s, astronomers learned that Pluto is smaller than Mercury. In the 1990s, they realized that it belongs to a swarm of objects beyond Neptune's orbit called the Edgeworth-Kuiper belt. Let's correct the mistake we made in 1930. Let's say that Pluto is not a planet and that the solar system has only eight planets, those from Mercury to Neptune. There's nothing wrong with this; it just shows how our knowledge has improved in the light of new discoveries.

YES

Pluto is the tenth-largest object that goes around the Sun. It is so large that if it had the same orbit around the Sun as Mars, it would be one of the brightest objects in the sky: at its closest to Earth, Pluto would outshine every star at night. Thus, Pluto is a large and important world orbiting the Sun and should remain classified as a planet. In 2005, astronomers discovered Eris, which is slightly bigger than Pluto and three times farther from the Sun. So Eris should also be called a planet. This means the solar system now has ten known planets. There's nothing wrong with this; it just shows how our knowledge has improved in the light of new discoveries.