

eMPower™ **ME**

STUDENT  
SAMPLE ITEM BOOKLET

Reading

Grade 7



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# Sample Items

## Directions

Read the passage. Then answer the questions that follow.

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### Should Pluto Be a Planet?

#### New Finds Drive Debate

*by Victoria Jaggard*

- 1 Officially, Pluto is still not a planet. But five years after the ruling that demoted the icy object to dwarf planet, people continue struggling with the definition, and the debate over what exactly should be called a planet remains as contentious as any political divide. “Maybe it’s just an argument over semantics, but we ought to be worried about semantics. We learned that lesson when the definition was changed,” said Marc Kuchner, a planetary scientist at NASA’s Goddard Space Flight Center in Maryland.
- 2 “After the ruling, astronomers everywhere were besieged by complaints from everyone big and small. A planet is a very personal thing—we think of the Earth, the moon, and the other planets as part of our home, and maybe that’s why we got so upset about Pluto.”
- 3 Since the 2006 ruling, astronomers have also made a number of scientific advances that further cloud the issue, from discoveries of planets that don’t orbit stars to new models of how our own solar system may have rearranged itself since birth.
- 4 This time next year<sup>1</sup> the International Astronomical Union (IAU)—the organization that originally called for a vote on a planet definition—will hold its general assembly in Beijing, China, and many in the field wonder whether the time is right to revisit the decision.

#### Birth of the Dwarf Planet

- 5 The issue of whether Pluto should be a planet first arose in the 1970s, when scientists were able to refine their estimates for the mass and size of the distant body. With each new measurement, Pluto got lighter and tinier, until astronomers realized that the object is in fact smaller than Earth’s moon and has a very low density.
- 6 Adding to the oddities, in 1978 scientists announced they’d found a moon of Pluto—but one that’s almost half its size, making it the largest moon in relation to its parent body.
- 7 Over the decades scientists continued to find similarly large objects in Pluto’s neighborhood, a region of the solar system beyond the orbit of Neptune called the Kuiper belt.
- 8 The biggest challenge for Pluto came in 2005, when Caltech astronomer Mike Brown announced that he’d found a Kuiper belt object more massive than Pluto—a potential tenth planet provisionally called 2003 UB313.
- 9 The discovery prompted the IAU to convene a committee to decide on an official definition of a planet.
- 10 “It was a bureaucratic problem, as it had to do with naming rights for these kinds of things,” said Owen Gingerich, the Harvard-Smithsonian astronomer who chaired the committee. After all, if 2003 UB313 really was a new planet, it would need a proper name on which everyone could agree.

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<sup>1</sup>2012

- 11 In drafting a definition, “there were two possible routes to take—one that would deal with the physical nature of these objects, and another that would address dynamically where they fit into the structure of the solar system, with respect to their orbits and so on.”
- 12 The committee initially proposed that there be two categories of planets: the classical planets and the group of planet-like bodies beyond Neptune, to be called plutons, “as a way of tipping our hat to Pluto,” Gingerich said.
- 13 The planet-like object Ceres would have to be in a separate class, because it resides in the main asteroid belt, between the orbits of Mars and Jupiter. So the committee suggested it be called a dwarf planet.
- 14 The draft definition was put to a vote in 2006 at the IAU general assembly in Prague, the Czech Republic. What emerged from the session is that, to be a planet, an object must:
- be in orbit around the sun,
  - have sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape,
  - have cleared the neighborhood around its orbit.
- 15 Instead of plutons, the IAU members present voted that Pluto, Ceres, and 2003 UB313—now known as Eris—would all be called dwarf planets, and that this term is not for a subclass of planets but is for a unique category of solar system objects.

### Exoplanets Complicate Matters

- 16 At the time of the ruling, the IAU noted that the new definition does not apply to anything outside the solar system, leaving it unclear how the organization defines the planetary objects found orbiting other stars.
- 17 Since 2006 there’s been an explosion in the number of these extrasolar planets, or exoplanets, known to exist, with the current count at more than 400 and rising. Many are bigger than the gas giant Jupiter, but astronomers have found an increasing number of worlds close to Earth’s mass, some of which may be habitable.
- 18 And in the past few years astronomers have even found rocky planets akin to Earth’s mass that don’t orbit stars at all.
- 19 By the current IAU definition, none of these objects are official planets, because they violate the first rule about orbiting the Sun.
- 20 “I was disappointed when I learned that exoplanets were not included in the definition,” said NASA’s Kuchner.
- 21 But for now, he said, the issue is a moot point, because the definition of a planet was necessary mostly to sort out objects that are much smaller than anything we’ve seen outside our solar system.
- 22 The second part of the definition, that planets must be massive enough to be nearly round, helped draw a line between bodies such as Pluto and large asteroids such as 433 Eros, a 21-mile-long (34-kilometer-long) space rock shaped somewhat like a peanut.
- 23 “For now we’re good at finding exoplanets that are several times bigger than Earth. The smallest planets we’ve seen around other stars are much bigger than the bodies for which element two of the definition matters,” Kuchner said. “And besides, we usually can’t see their shapes to tell if they are round or not.”
- 24 “We’re also good at seeing big clouds of small particles of dust. . . . But in between dust grains up to a millimeter in size and the smallest planets we can see, we’re blind.”

- 25 According to Kuchner, “the revolution that happened in 2006 was about how dwarf planets are not planets. Instead this is another kind of object in the solar system that we have to be aware of.”
- 26 He likens the situation to a child adjusting to a new sibling: “You don’t know how you’re supposed to feel about it at first. I’d like us all to think about the dwarf planets out there as new siblings that we have to get to know and learn to love.”

Jaggard, Victoria. “Should Pluto Be a Planet? New Finds Drive Debate.” *National Geographic News* (August 24, 2011).

1. In paragraph 2, why does the author state, “A planet is a very personal thing”?
- A to describe the current excitement about space exploration
  - B to indicate that people feel an emotional connection to the planets
  - C to motivate readers to pay more attention to news about space
  - D to suggest that the use of the term “planet” is really up to each person
2. In paragraph 12, what is the meaning of the phrase “tipping our hat”?
- A admiring
  - B categorizing
  - C defining
  - D honoring
3. Why does the author **most likely** discuss exoplanets in the selection?
- A to make the argument that exoplanets should be considered planets
  - B to demonstrate the reason why the definition of a planet became necessary
  - C to explain that exoplanets do not receive enough study because they are not planets
  - D to show an example of how the definition of a planet may need to change in the future

4. How does the last paragraph **mainly** contribute to the development of the passage?
- A It includes a brief but appealing call for action.
  - B It summarizes the main points about Pluto presented in the passage.
  - C It encourages people to accept changes based on scientific discoveries.
  - D It argues for reversing the decision about Pluto so it is called a planet again.

*This question has two parts. Be sure to answer both parts of the question.*

5. Which of the following sentences states a central idea of the passage?
- A The definition of a planet should not have been changed.
  - B Exoplanets should have been included in the definition of planets.
  - C New discoveries make grouping planetary objects more complicated.
  - D Scientists need to agree about how to interpret the evidence they discover.

Which choice provides the **best** evidence for the answer to the previous question?

- A “We learned that lesson when the definition was changed,” said Marc Kuchner, a planetary scientist.”
  - B “Astronomers have also made a number of scientific advances that further cloud the issue.”
  - C “I was disappointed when I learned that exoplanets were not included in the definition.”
  - D “The revolution that happened in 2006 was about how dwarf planets are not planets.”
6. According to the passage, explain why the discovery of a potential tenth planet finally caused the International Astronomical Union to write down a definition for the word “planet”?