

Select Readings, Second Edition

Intermediate, Chapter 13 Test

Read the passage and answer the questions that follow.

Return of the Hayabusa

In June of 2010, the unmanned Japanese spacecraft Hayabusa returned to Earth, crashing into the Australian outback¹ after a seven-year journey. The Hayabusa spacecraft had spent three weeks orbiting an asteroid² called Itokawa in 2005 and attempted to pick up small pieces of dust from its surface.

Scientists on Earth, wanting to know if the mission was a success, had to wait. They needed to do an extended analysis of the samples brought back by the spacecraft to make sure they were actually from Itokawa.

Finally, in November after its return, the announcement came. Scientists confirmed that the particles³ found inside the Hayabusa craft were indeed from the asteroid Itokawa. A statement from Japan's space agency said that microscopic analysis of 1,500 grains collected from the craft's sample container proved they were of extraterrestrial⁴ origin. It is the first time samples from an asteroid have been returned to Earth.

"It's a world first, and a remarkable accomplishment that [Hayabusa] brought home material from a celestial body⁵ other than the moon," Japan's science and technology minister, Yoshiaki Takagi, told a news conference in Tokyo to announce the findings.

The Hayabusa's achievement is especially remarkable considering how far it traveled—Itokawa is 300 million km from Earth, twice the distance of our planet to the sun. The \$200 million mission did encounter many technical problems. The Hayabusa suffered a series of equipment failures, and ground control⁶ feared the 510-kg craft had been lost when it was out of contact for seven weeks, a fault that added three years to the flight.

One problem threatened to ruin the mission entirely. A machine used to fire a pellet⁷ into the surface of the asteroid failed just as the spacecraft approached the asteroid's surface. However, close examination of the container revealed that the Hayabusa had in fact been successful—it contained around 1,500 samples of space dust—most no more than the width of a human hair.

Concerned that the specimens might have been dust from Earth that were collected upon the spacecraft's return, the Japan Aerospace Exploration Agency conducted numerous tests on the dust, eventually confirming that around 1,500 of the specimens are extraterrestrial and come from Itokawa.

The Hayabusa particles represent only the fourth set of extraterrestrial materials brought to our planet by spacecraft. Other materials include moon rocks, comet dust, and particles in the "solar

¹ **outback** a wide, open part of Australia without many people

² **asteroid** a large rock that orbits the sun

³ **particles** small pieces

⁴ **extraterrestrial** not from Earth

⁵ **celestial body** object in space

⁶ **ground control** the team that controls a spacecraft from the ground

⁷ **fire a pellet** shoot a small object

wind.” The Japanese scientists hope that their research will provide new information about the birth of the solar system, more than 4.5 billion years ago.

1. The reading is primarily about _____.
 - A. the successful return of a spacecraft with particles from an asteroid
 - B. the discovery of a new asteroid by a Japanese spacecraft
 - C. the first Japanese spacecraft to return to Earth
 - D. plans to send a Japanese spacecraft to collect dust from an asteroid
2. Scientists needed to examine the particles collected by Hayabusa to make sure _____.
 - A. they were microscopic
 - B. they were in the sample container
 - C. they were actually from the asteroid
 - D. they had not escaped from the spacecraft
3. The results of the Hayabusa mission were announced in _____.
 - A. 2003
 - B. 2005
 - C. June 2010
 - D. November 2010
4. The distance from Earth to the asteroid Itokawa is _____.
 - A. 200 million kilometers
 - B. 300 million kilometers
 - C. 510 million kilometers
 - D. half as far as the sun
5. All of the following were part of the technical problem experienced by Hayabusa except _____.
 - A. it traveled too far out of its orbit
 - B. it was out of contact for seven weeks
 - C. it suffered several equipment failures
 - D. ground control couldn't contact it for three months
6. In paragraph 6, the word “ruin” is closest in meaning to _____.
 - A. avoid
 - B. prevent
 - C. restore
 - D. destroy
7. In paragraph 7, the word “specimens” is closest in meaning to _____.
 - A. samples
 - B. hairs
 - C. examinations
 - D. asteroids
8. The Hayabusa particles represent only the _____ set of space materials brought to Earth.
 - A. first
 - B. second
 - C. third
 - D. fourth
9. Scientists examining the Hayabusa particles hope they will tell them more about _____.
 - A. if there is life on asteroids
 - B. the beginning of life on Earth

- C. the birth of the solar system
- D. materials more than 4.5 billion years old

10. The overall tone of this reading is _____.
- A. entertaining
 - B. light and silly
 - C. light and informative
 - D. scientific and technical