

READING PASSAGES · ANSWER KEY

MERCURY

All 3 reading levels · Sample answers shown — accept reasonable variations

Teacher tip: Answers shown are model responses. Many comprehension questions can be correctly answered in multiple ways — the goal is to check that students can pull key ideas from the text in their own words. For Level 1, accept any answer that shows comprehension; phrasing doesn't need to match.

1 EMERGING — AGES 6–8 · 4 QUESTIONS — Mercury: The Tiny Planet

1. What is special about Mercury's size and place in the solar system?

A: *Mercury is the smallest planet and the closest one to the Sun.*

2. What are craters, and how did Mercury get so many?

A: *Craters are big round holes. Mercury got them when space rocks crashed into it a long time ago.*

3. Why is the sky on Mercury always black?

A: *The sky is always black on Mercury because it has no air.*

4. Does Mercury have any moons?

A: *No, Mercury has no moons.*

2 ON-GRADE — AGES 8–10 · 5 QUESTIONS — Mercury: A World of Extremes

1. How big is Mercury compared to Earth's Moon?

A: *Mercury is only a little bigger than Earth's Moon.*

2. Why is a year on Mercury so short?

A: *A year on Mercury lasts only 88 Earth days because Mercury is so close to the Sun that its orbit is small — it doesn't have far to travel.*

3. Why does Mercury have such extreme hot and cold temperatures?

A: *Mercury has almost no atmosphere, so there's nothing to trap heat. The side facing the Sun gets very hot and the side facing away gets very cold.*

4. What surprising thing have scientists found in Mercury's craters near the poles?

A: *Scientists have found water ice hiding at the bottoms of deep craters near Mercury's poles, where sunlight never reaches.*

5. Name two spacecraft that have visited Mercury.

A: *Mariner 10 (1970s), MESSENGER (2011–2015), and BepiColombo (currently on its way). Accept any two.*

3 ADVANCED — AGES 10–12 · 6 QUESTIONS — Mercury: Secrets of the Smallest Planet

1. Explain how Mercury's spin–orbit resonance can make a single day on Mercury longer than a Mercury year.

A: *Mercury rotates 3 times for every 2 orbits around the Sun. Because of this resonance, the time from one sunrise to the next (a solar day, 176 Earth days) is actually longer than the time it takes to orbit the Sun once (88 Earth days). One solar day on Mercury equals about two Mercury years.*

2. Why has Mercury's surface kept its craters for so long?

A: *Mercury has no weather, no water, and no active geology, so there is nothing to wear craters away. They have stayed almost unchanged for billions of years.*

3. What is an exosphere, and how does Mercury's thin one affect its surface temperatures?

A: *An exosphere is an extremely thin outer layer of gas — far thinner than a real atmosphere. Because it can't trap heat, sunlit surfaces become very hot (430°C) and shadowed surfaces become very cold (−180°C).*

4. Describe Mercury's core and explain why scientists think it is so unusually large.

A: *Mercury's iron core takes up about 75% of its diameter — much larger proportionally than any other rocky planet. Scientists think a massive early collision may have stripped away much of the outer rocky material, leaving the iron-rich core behind.*

5. Why is Mercury's magnetic field surprising?

A: *Most small rocky bodies don't have magnetic fields at all. Mercury's huge iron core generates a weak but measurable one — making it unusual among small worlds.*

6. Name the three space missions that have explored or will explore Mercury, and what each contributes.

A: *Mariner 10 made flybys in 1974–75 (first close-up views). MESSENGER orbited from 2011 to 2015 (first complete map). BepiColombo is set to begin orbiting in 2026 (will study the planet in detail).*