READING PASSAGES · ANSWER KEY

NEPTUNE

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 — Neptune: The Deep Blue Planet

1. Why can't you see Neptune just by looking at the sky?

A: *Neptune is the farthest planet from the Sun, so it is too far away to see without a telescope.*

2. What colour is Neptune?

A: *Neptune is deep blue.*

3. What is unusual about Neptune's weather?

A: *Neptune has the fastest winds of any planet — much faster than the worst storm on Earth.*

4. What is special about Neptune's moon Triton?

A: *Triton is the only big moon that goes around its planet the wrong way.*

2 ON-GRADE — AGES 8–10 · 5 QUESTIONS — Neptune: The Far-Away Giant

1. Why can't we see Neptune without a telescope?

A: *Neptune is the farthest known planet from the Sun — so far that it is too dim to see without a telescope.*

2. What gives Neptune its deep blue colour?

A: *Methane in Neptune's upper atmosphere makes it appear deep blue.*

3. What was the Great Dark Spot, and what happened to it?

A: *The Great Dark Spot was a huge storm photographed by Voyager 2 in 1989. It has since faded, and other storms have appeared in its place.*

4. What is unusual about Neptune's moon Triton?

A: *Triton orbits Neptune in the opposite direction to the planet's rotation. This suggests Triton may once have been a separate world that Neptune captured with its gravity.*

5. How was Neptune first discovered? Why is that special?

A: *Neptune was discovered in 1846 by mathematicians who calculated where it should be — before any astronomer actually saw it. That is special because the planet was predicted by maths first, then found.*

3 ADVANCED — AGES 10–12 · 6 QUESTIONS — Neptune: Predicted by Mathematics

1. Why has Neptune only completed one full orbit since its discovery?

A: *Neptune was discovered in 1846 and takes about 165 Earth years to complete one orbit. So it didn't finish its first full orbit since discovery until 2011.*

2. How is Neptune similar to Uranus, and how is it different in colour?

A: *Both Neptune and Uranus are ice giants — made mostly of icy slush of water, methane, and ammonia around a rocky core. Neptune is a deeper, more vivid blue (azure), possibly because its atmosphere has fewer haze particles than Uranus's.*

3. Why are Neptune's powerful winds surprising, and what may help explain them?

A: *Neptune is so far from the Sun that it gets only about 1/900th of the sunlight Earth gets — yet it has the fastest winds in the solar system. One explanation is that Neptune produces its own internal heat (about 2.6 times the energy it gets from the Sun), which may help drive the powerful weather.*

4. Tell the story of how Neptune was discovered. Why is the discovery considered a triumph of mathematics?

A: *Astronomers noticed wobbles in Uranus's orbit that suggested another planet's gravity was pulling on it. Urbain Le Verrier calculated where this planet should be. Johann Galle pointed his telescope at the exact spot and found Neptune within hours. It is a triumph because the planet was predicted by mathematics before anyone saw it.*

5. What is unusual about Triton's orbit, and what does it suggest about Triton's history?

A: *Triton orbits Neptune in retrograde — opposite to Neptune's spin. This suggests Triton formed elsewhere in the outer solar system and was later captured by Neptune's gravity.*

6. What might happen to Triton in the distant future?

A: *Triton is slowly spiralling inward toward Neptune. Eventually it will be torn apart by Neptune's gravity, and may form a ring system around the planet.*