

Paths Through Space

Read how matter, motion, gravity, and evidence organize the solar system.

6.2 "The student will investigate and understand that the solar system is organized and the various bodies in the solar system interact. Key ideas include matter is distributed throughout the solar system..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline one detail that shows matter is found in space, circle the three consecutive sentences in paragraph 2 that explain how an orbit happens, and number the four named scientists in the order they are introduced.

A Solar System in Motion

- ① Space between planets may look empty, but it contains matter. Matter includes tiny dust grains, gases, rocky pieces called meteoroids, and charged particles from the Sun. Larger objects also hold matter: the Sun, planets, dwarf planets, moons, asteroids, and comets. Most of the solar system's mass is in the Sun. Some objects travel around the Sun, while many moons travel around planets. These bodies are not placed randomly. Their paths and locations result from motion and gravity.
- ② Planets differ greatly in size and in their distance from the Sun. Mercury is the closest planet, and Neptune is the farthest. A planet's distance helps determine how long one trip around the Sun takes. Earth completes an orbit in one year, but Neptune needs about 165 Earth years. Gravity is the pull between objects with mass. The Sun's gravity pulls each planet inward as its forward motion carries it onward. Together, these motions make a curved orbital path instead of a straight escape or a fall into the Sun.
- ③ People's ideas about the solar system changed as evidence improved. Ancient observers recorded repeating movements of bright objects in the sky. Later, Nicolaus Copernicus proposed that Earth and other planets orbit the Sun. Galileo Galilei used a telescope to observe moons circling Jupiter, evidence that not everything circles Earth. Johannes Kepler used careful observations to describe planets moving in oval-shaped paths. Isaac Newton explained that gravity could cause this motion. Today, spacecraft, telescopes, and computer models provide new measurements, so scientists continue testing and refining explanations.

2 ANSWER WITH EVIDENCE Use the passage

1 Name two kinds of matter found in the space between planets.

2 How does a planet's distance from the Sun relate to the time needed to complete an orbit? Use Earth and Neptune as evidence.

3 Explain how the Sun's gravity and a planet's forward motion work together to make an orbit.

4 What did Galileo observe, and why was that observation important to ideas about the solar system?

3 YOUR TURN Your own words

Write exactly three sentences for a younger student. Explain why a planet does not travel straight away from the Sun or fall directly into it, include one kind of matter in the solar system, and name one tool scientists use to gather new evidence.

PART 1 • READ AND MARK

Underline one detail that shows matter is found in space, circle the three consecutive sentences in paragraph 2 that explain how an orbit happens, and number the four named scientists in the order they are introduced. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Name two kinds of matter found in the space between planets.	Any two: dust grains, gases, meteoroids, or charged particles from the Sun.
2	How does a planet's distance from the Sun relate to the time needed to complete an orbit? Use Earth and Neptune as evidence.	A planet farther from the Sun takes longer to orbit. Earth takes one year, while faraway Neptune takes about 165 Earth years.
3	Explain how the Sun's gravity and a planet's forward motion work together to make an orbit.	The Sun's gravity pulls the planet inward while its forward motion carries it onward. Together they create a curved path around the Sun.
4	What did Galileo observe, and why was that observation important to ideas about the solar system?	Galileo observed moons circling Jupiter. This was evidence that not everything circles Earth.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A planet stays in a curved orbit because its forward motion and the Sun's gravity act together. Dust is matter that can be found in the solar system. Scientists use spacecraft to collect new measurements and test their explanations.

Accept scientifically accurate wording that connects inward gravitational pull with forward motion. For the open response, check for exactly three sentences, all three required ideas, and a valid modern tool such as a spacecraft, telescope, or computer model.