

Gravity's Curved Paths

Trace how gravitational pulls shape motion in the solar system.

7.9.B “describe how gravity governs motion within Earth's solar system; and”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline every sentence that directly says gravity affects an object's path, direction, speed, or orbit; in the margin, write 1 for Sun-planets, 2 for Earth-Moon, 3 for Jupiter-spacecraft, and 4 for planet-asteroid, repeating a number each time that same interaction appears.

Forces That Shape Orbits

- ① Gravity is a force of attraction between objects with mass. In the solar system, the Sun has far more mass than any planet, so its gravity pulls the planets toward it. A planet also has forward motion. Instead of traveling straight into the Sun, it continually falls toward the Sun while moving forward, making a curved path called an orbit. The Sun's pull changes the planet's direction again and again, holding the planet in its path around the Sun.
- ② Earth's gravity pulls the Moon toward Earth. The Moon has forward motion and sufficient orbital energy to keep moving past Earth rather than dropping straight to its surface. Together, Earth's pull and the Moon's forward motion keep the Moon in orbit. Gravity constantly bends the Moon's path toward Earth. If the Moon's forward speed or orbital energy changed enough, its orbit could change. A lower forward speed would lead to a lower orbit and could eventually make the Moon fall toward Earth.
- ③ Gravity also governs motion when objects pass near planets. A spacecraft approaching Jupiter can have its path bent by Jupiter's gravity. This gravity can change the spacecraft's speed as well as its direction, depending on the approach. A small asteroid passing close to a planet may be pulled into a different orbit around the Sun. Objects with more mass exert stronger gravitational pulls, and gravitational influence is weaker at greater distances. These interactions shape the moving paths of objects throughout the solar system.

2 ANSWER WITH EVIDENCE Use the passage

1 How do the Sun's gravity and a planet's forward motion work together to produce an orbit?

2 Why does the Moon stay in orbit around Earth instead of falling straight to Earth's surface?

3 According to the passage, what two parts of a spacecraft's motion can Jupiter's gravity change?

4 How can a close pass by a planet change an asteroid's motion around the Sun?

3 YOUR TURN Your own words

Write exactly three sentences about a spacecraft orbiting Mars. Explain how Mars's gravity and the spacecraft's forward motion produce an orbit, then explain one result if the spacecraft slows down too much.

PART 1 • READ AND MARK

Underline every sentence that directly says gravity affects an object's path, direction, speed, or orbit; in the margin, write 1 for Sun-planets, 2 for Earth-Moon, 3 for Jupiter-spacecraft, and 4 for planet-asteroid, repeating a number each time that same interaction appears. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How do the Sun's gravity and a planet's forward motion work together to produce an orbit?	The Sun pulls the planet toward itself while the planet moves forward. This makes the planet follow a curved path around the Sun instead of traveling straight into it.
2	Why does the Moon stay in orbit around Earth instead of falling straight to Earth's surface?	Earth's gravity pulls the Moon toward Earth, while the Moon's forward motion and sufficient orbital energy keep it moving past Earth. Together, these produce the Moon's orbit.
3	According to the passage, what two parts of a spacecraft's motion can Jupiter's gravity change?	Jupiter's gravity can change the spacecraft's direction and speed.
4	How can a close pass by a planet change an asteroid's motion around the Sun?	The planet's gravity can pull the asteroid and change its path, placing it in a different orbit around the Sun.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Mars's gravity pulls a spacecraft toward Mars. The spacecraft's forward motion and orbital energy keep it from falling straight down, so it curves around Mars. If it slowed too much, it would move into a lower orbit or fall toward Mars.

Accept accurate explanations that connect a gravitational pull with forward motion and sufficient orbital energy to form an orbit. The final sentence should correctly state that too little forward speed can cause a lower orbit or a fall toward the planet.