

## Warm-up

First, scramble the names of the planets on slips of paper and paste them around the room. Then, ask students to work with a classmate to walk around the room, unscrambling the names of the planets. Finally, they'll write them in order in their notebooks.

## Teaching Tip

## For Exercise 3

After completing Exercise 3, tell students to work in small groups. First, hand each group 12 squares of paper, preferably a darker color, so the lettering won't be visible on the other side. Then, tell students to write the words and definitions on the paper squares. Afterward, have them shuffle and place them face down on the table before them. Finally, students take turns flipping over two cards, checking for pairs. The student with the most pairs at the end of the game wins.

## Differentiation Strategy

## For Exercise 2

Go to the Differentiation Strategies Bank and adapt this exercise using Strategy 6.

## Flexi Exercises

(To adjust to students' needs, you can either use or not the activities below)

Exercise 1



## Science

## How do the planets move?

01 Draw a circle and an ellipsis. With a classmate, discuss the differences.

Answers will vary.

02 Read "Which planet are you on?" Write "T" if the statements are true and "F" if they are false.

1. The planets move in circular orbits around the Sun. F
2. The planets maintain a steady speed as they orbit the Sun. F
3. The planets that are closer to the Sun have a shorter orbit than the planets that are further from it. T
4. Planets that are closer to the Sun experience a stronger gravitational pull. T

03 Read the text again. Match the words with their definition.

1. trajectories	<input checked="" type="checkbox"/> a. relating to the circular movement of an object around another one
2. orbital	<input checked="" type="checkbox"/> b. a curve describing something's path
3. elliptical	<input checked="" type="checkbox"/> c. to move rapidly
4. zoom	<input checked="" type="checkbox"/> d. a shape like that of a flattened circle
5. conversely	<input checked="" type="checkbox"/> e. forward movement with little speed
6. slower-paced	<input checked="" type="checkbox"/> f. opposite to

## Which planet are you on?

We already know that the Sun's gravitational pull keeps the planets from hurtling out into space, yet their path is not so straightforward. Firstly, the planets make an elliptical path, not a circular one, as German astronomer Johannes Kepler initially suggested in the first law of planetary motion, published in 1609. The law states that our star is at one of the foci of the planets' elliptical orbits, meaning that at some point in their trajectories, these heavenly bodies are closer to the Sun than at others.

These peculiar orbit patterns mean that the planets move at different velocities depending on their relative position to the Sun. As they move further from our star, they experience less gravitational pull and thus, are more **slow-paced**. Conversely, moving closer to it, they speed up, **zooming** about in their orbits.

The time a planet takes to rotate around the Sun is due to two factors stemming from each planet's position relative to our star. Firstly, the further away a planet is from the Sun, the longer its **orbital** path, while the converse is true for planets nearer to the Sun. Additionally, the more distant a planet is, the lower the gravitational pull it feels, so the slower it goes compared to closer planets. Therefore, although it takes us 365 days to orbit our star, Mercury, the closest to the Sun, takes 88 Earth days, and the most distant planet, Neptune, completes its yearly journey in over 60 thousand.



04 Using the words in bold from the text, compare the elements below with a classmate.

- the distance between the Sun and a planet depending on its point in orbit
- the speed of the orbit of different planets around the Sun
- the distance travelled by different planets around the Sun

## Language Structures and Functions Tip

## For Exercise 5

After completing Exercise 5, invite students to see if they can substitute the underlined phrases. Some examples include:

1. *Having outlined* could be used instead of “having written.”
2. *Observing the night sky* could be used instead of “Making observations.”
3. *Spending lots of time* could be used instead of “living.”
4. *Thought of as* could be used instead of “considered.”
5. *Having taken notes* could be used instead of “having watched.”
6. *Attempting to visualize* could be used instead of “trying to understand.”

Finally, ask volunteers to share their substitutions with the rest of the class.

## Teaching Tip

## For Exercise 7

After completing the blanks, tell students to discuss whether the statements refer to past or present actions. Then, encourage students to write three sentences that are true for themselves using the key words from the answers. For example, *having lived in my apartment for several years, I know most of my neighbors*. Finally, if time allows and you deem necessary, review the grammar point in more detail.

## Differentiation Strategy

## For Exercise 6

Go to the Differentiation Strategies Bank and adapt this exercise using Strategy 2e.

## Wrap-up

After completing Exercise 8, ask students to reflect on how the visual representation improved their understanding of the movement of celestial bodies. Then, encourage students to write a paragraph summarizing their knowledge of the movement, using the target language. Finally, ask volunteers to share their paragraphs with the rest of the class.

## Flexi Exercises

(To adjust to students’ needs, you can either use or not the activities below)

## Exercise 5

## 05 Decide if the underlined section describes the past “PA” or present “PR.”

1. Having written the first law of planetary motion, Kepler wrote two more.

PA

2. Making observations with a telescope, Joanne discovered a new moon.

PA

3. Living next to the observatory, he gets to attend most exhibitions for free.

PR

4. Originally considered a planet, Pluto was reduced to dwarf planet status in 2006.

PA

5. Having watched all of Sagan’s documentaries, she felt better informed.

PA

6. Trying to understand the planet’s trajectories better, she’s drawing them out.

PR

## 06 Write a summary in the organizer below describing the effect of gravity on the planets’ movement in space. Answers will vary.

© UNOI

## 07 Complete the sentences with the correct form of the word in parentheses.

1. Having lived in a big city for 10 years, Sarah was surprised by how many stars she could see in the countryside when she moved there. (live)

2. Considered an outcast in his time, Galileo is now taken as a genius. (consider)

3. Written for the big screen, the documentary about space seems less impressive on a phone. (write)

4. After volunteering at the planetarium for many years, Jane picked up several facts about space. (volunteer)

5. Orbiting the Sun, the Earth maintains a safe temperature. (orbit)

6. Having studied Kepler’s laws for years, Alex understood a lot about the movement of the planets. (study)

## 08 Act out the movements of the planets as they orbit the Sun. In the organizer below, decide who will perform what role.

Answers will vary.

Sun	
Earth	
Mars	
Mercury	
Jupiter	
Neptune	
Venus	
Saturn	
Uranus	