

Forces Up and Down

Read how gravity pulls and other forces can push back.

SC.3.E.5.4 "Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each action that gives an upward force against gravity. Circle the words that tell what gravity does.

Nia's Bouncing Ball

- ① At recess, Nia drops a rubber ball from her hand. It falls to the ground because gravity is a force that pulls objects toward Earth. The ball does not need a push to fall. Gravity acts on Nia, the ball, leaves, and everything else near Earth. It keeps pulling even when she cannot see it.
- ② Nia wants the ball to go upward. She pushes it upward with her hand and tosses it high. Her push is a force that overcomes gravity for a short time. The ball rises while the push gives it upward motion. After it leaves her hand, gravity slows the rising ball. At its highest point, the ball stops for a moment.
- ③ Then the ball begins moving downward. It hits the ground and bounces. The ground pushes upward on the ball during the bounce, overcoming gravity briefly. Each bounce is lower because the ball loses some energy when it hits the ground. Gravity pulls downward during the whole trip.

2 ANSWER WITH EVIDENCE Use the passage

1 Why does the ball fall when Nia drops it?

2 What does Nia do to overcome gravity, and for how long does it work?

3 What does gravity do after the ball leaves Nia's hand?

4 How does the ground overcome gravity during a bounce?

3 YOUR TURN Your own words

Choose an object other than a ball. In three panels, draw it falling, being pushed upward, and falling again. Label gravity and the upward force. Then write two sentences explaining how the upward force overcomes gravity briefly.

---	---	---

PART 1 • READ AND MARK

Underline each action that gives an upward force against gravity. Circle the words that tell what gravity does. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why does the ball fall when Nia drops it?	Gravity pulls the ball toward Earth.
2	What does Nia do to overcome gravity, and for how long does it work?	She pushes and tosses the ball upward. Her push overcomes gravity for a short time.
3	What does gravity do after the ball leaves Nia's hand?	Gravity slows the rising ball. At its highest point, the ball stops briefly and then moves down.
4	How does the ground overcome gravity during a bounce?	The ground pushes upward on the ball during the bounce. This upward push overcomes gravity briefly.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A beanbag falls toward Earth, labeled gravity. Panel 2: My hand throws the beanbag upward, labeled hand push. Panel 3: Gravity pulls the beanbag back down. The hand's upward push overcomes gravity for a short time. Gravity pulls the beanbag down again.

Accept answers that identify gravity as a downward pull toward Earth and identify an upward push as a force that can overcome gravity briefly. For the panels, accept any reasonable object and clearly labeled upward force and gravity.