The Falling Sheet

Test how a change affects falling speed

5.6 "Design and conduct a test to modify the speed of an object falling due to gravity."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline Mina's prediction, circle what she keeps the same, and number the two paper shapes in the order she drops them. Use your marks to trace how her change affects falling time.

Mina's Paper Drop

1. At the school science fair, Mina wonders whether changing a sheet of paper's shape will change how fast it falls. Gravity pulls both shapes downward, but air pushes against a falling object. A wide, flat sheet meets more air than a tight paper ball. Mina predicts the flat sheet will take longer to reach the floor. She decides to test her idea instead of guessing.

2. Mina uses one sheet of paper for both shapes so its weight stays the same. First, she releases it flat from a mark two meters above the floor. Then she crumples that same sheet into a ball and releases it from the same mark. She does not throw either shape. A partner records each fall in slow motion and checks the time from release until the paper touches the floor.

3. Mina repeats each drop three times. The flat sheet takes 1.4, 1.6, and 1.5 seconds. The paper ball takes 0.7, 0.6, and 0.7 seconds. The ball reaches the floor sooner in every pair of trials. Mina concludes that changing the shape changed the paper's falling speed, likely because the ball met less air resistance. Gravity still pulled the paper downward in both forms.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why does Mina use the same sheet of paper for both shapes?

2. How does timing each fall from release until the paper touches the floor help Mina test her prediction?

3. Which shape fell faster? Use times from the passage to support your answer.

4. Suppose Mina dropped the ball from a lower mark. Why would that make it harder to tell whether shape changed its falling time?

3 YOUR TURN

Your own words

Choose an object other than paper and design a safe test of one change that might make it fall more slowly. State your prediction, what you will keep the same, how you will time at least three falls with and without the change, and what result would support your prediction.

The Falling Sheet

PART 1 · READ AND MARK

Underline Mina's prediction, circle what she keeps the same, and number the two paper shapes in the order she drops them. Use your marks to trace how her change affects falling time. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why does Mina use the same sheet of paper for both shapes?	**It keeps the paper's weight the same, so she can test the effect of changing its shape.**
2	How does timing each fall from release until the paper touches the floor help Mina test her prediction?	**It gives her falling times she can compare to see which shape takes longer.**
3	Which shape fell faster? Use times from the passage to support your answer.	**The paper ball fell faster. Its drops took 0.6 to 0.7 seconds, while the flat sheet's drops took 1.4 to 1.6 seconds.**
4	Suppose Mina dropped the ball from a lower mark. Why would that make it harder to tell whether shape changed its falling time?	**The ball would also fall a shorter distance. Mina could not tell whether its shorter time came from its shape or the lower starting point.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict a toy figure with a small cloth parachute will fall more slowly than the same figure without it. I will attach and remove the parachute while keeping the toy, release height, and no-push release the same. I will record each drop in slow motion and time three drops with and three without the parachute. If the parachute drops take longer each time, the added parachute slowed the fall.

Accept safe tests that change one feature of a nonpaper object, hold other conditions steady, compare at least three timed falls of each version, and name a result that would support the prediction.