Shape and Space

Use measurements to explain how matter behaves

P.5.5A.2 "Collect, analyze, and interpret data from measurements of the physical properties of solids, liquids, and gases (e.g., volume, shape, movement, and spacing of particles)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each shape observation and circle each volume measurement in the table so you can compare the three samples.

Three Samples at a Science Station

1. At a science station, Nia tests a small metal cube, colored water, and air. She finds the cube's volume by measuring how much water it pushes aside in a marked cup. She reads the other volumes on marked syringes. For each sample, she checks its shape and measures its volume before and while pushing on it.

2. Nia moves the cube from a tray into a cup. She pours the colored water from a narrow cup into a wide cup, then puts it in a syringe and caps it. She draws air into another syringe and caps it. The table records each shape after moving and each volume before and during a push.

WHAT NIA OBSERVED AND MEASURED

Sample	Shape after moving	Volume before push	Volume during push
Metal cube	Keeps its shape	8 mL	8 mL
Colored water	Takes container's shape	20 mL	20 mL
Air	Fills available space	20 mL	10 mL

3. A model of matter can help explain these results. Particles in a solid are close and mostly stay in place. Particles in a liquid are close but can slide around one another. Gas particles are farther apart and travel in many directions. Pushing on a gas can bring its particles closer without making the particles smaller.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did the cube and colored water differ in shape after moving? Explain the difference using the particle model.

2. Why did the colored water take a new shape but stay at 20 mL when pushed? Use the table and particle model.

3. How much did the air's volume change during the push? What does this suggest about the space between its particles?

4. Which two samples kept the same volume when pushed? Give both sets of measurements.

3 YOUR TURN

Your own words

Choose a solid or liquid that Nia did not test. Describe how you would check its shape and volume before and after moving it to a new container, then predict your results using the particle model.

ANSWER KEY

Shape and Space

GRADE 5 · P.5.5A.2

PART 1 · READ AND MARK

Underline each shape observation and circle each volume measurement in the table so you can compare the three samples. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did the cube and colored water differ in shape after moving? Explain the difference using the particle model.	**The cube kept its shape because its particles mostly stay in place. The water took its container's shape because its particles can slide around one another.**
2	Why did the colored water take a new shape but stay at 20 mL when pushed? Use the table and particle model.	**Its particles can slide to fit the container, but they are close together. The table shows 20 mL before and during the push.**
3	How much did the air's volume change during the push? What does this suggest about the space between its particles?	**Its volume decreased by 10 mL, from 20 mL to 10 mL. The air particles moved closer together.**
4	Which two samples kept the same volume when pushed? Give both sets of measurements.	**The metal cube stayed at 8 mL, and the colored water stayed at 20 mL.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would test a plastic button. I would note its shape and measure its volume by water displacement. Then I would move it into a cup and repeat both checks. I predict it would keep its shape and displace 3 mL of water both times because its particles stay close and mostly stay in place.

Accept any new solid or liquid with a workable plan to check shape and volume before and after moving it. The prediction should match the particle model and describe volume staying the same.