Dissolving Detective

Find what makes a sugar cube dissolve faster.

P.5.5B.3 "Investigate how different variables (e.g., temperature change, stirring, particle size, or surface area) affect the rate at which a solute will dissolve."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the one thing Maya changes in each test, and circle what she keeps the same. Use your marks to decide which changes speed up dissolving.

Maya's Three Cup Tests

1. At the science table, Maya wondered why a sugar cube seemed to vanish slowly in her drink. She put one sugar cube into each of two cups with the same amount of room-temperature water. She crushed one cube before dropping it in. Neither cup was stirred. The crushed sugar dissolved first because its smaller pieces exposed more surface to the water.

2. Next, Maya tested stirring. She added one whole sugar cube to each of two new cups. Both cups held the same amount of room-temperature water. She stirred one cup with a spoon and left the other cup still. The stirred cube dissolved first. Moving water carried dissolved sugar away from the cube, so fresh water could touch it.

3. For her last test, Maya used two new, whole sugar cubes and equal amounts of water. One cup had warm water, and the other had cool water. She did not stir either cup. The cube in warm water dissolved first. Maya changed only one thing in each test. If she changed both heat and stirring at once, she could not tell which change caused a faster result.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why did the crushed sugar dissolve before the whole cube?

2. How did stirring change the result of Maya's second test? Explain why.

3. Which cube dissolved first in the last test, and what was different between the cups?

4. Suppose Maya stirred the warm cup but not the cool cup. Why would that make the last test less useful?

3 YOUR TURN

Your own words

Design a fair test with salt and water using one change from Maya's tests. Describe what you would change, what you would keep the same, how you would measure dissolving time, and which cup you predict would finish first.

ANSWER KEY

Dissolving Detective

GRADE 5 · P.5.5B.3

PART 1 · READ AND MARK

Underline the one thing Maya changes in each test, and circle what she keeps the same. Use your marks to decide which changes speed up dissolving. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why did the crushed sugar dissolve before the whole cube?	**Crushing the cube exposed more sugar surface to the water.**
2	How did stirring change the result of Maya's second test? Explain why.	**The stirred cube dissolved first because moving water carried dissolved sugar away and let fresh water touch the cube.**
3	Which cube dissolved first in the last test, and what was different between the cups?	**The cube in warm water dissolved first. The water temperature was different.**
4	Suppose Maya stirred the warm cup but not the cool cup. Why would that make the last test less useful?	**She could not tell whether temperature or stirring caused the faster dissolving.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would put one teaspoon of salt into each of two cups with the same amount of water. I would stir one cup and leave the other still, keeping both cups at the same temperature. I would time how long the salt takes to disappear in each cup. I predict the stirred cup will finish first.

Accept a test that changes only temperature, stirring, or particle size while keeping the other conditions the same. The prediction should match the change the student chose.