Ruler Sound Lab

Read how one change at a time helps test sound.

P.4.6C.1 "Plan and conduct scientific investigations to test how different variables affect the properties of sound (i.e., pitch and volume)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what Nia changed in each test, circle two details she kept the same, and number the two sentences that tell how many times she tried each condition.

What Makes a Ruler Sound Different?

1. In science club, Nia made a sound with a plastic ruler at the edge of a desk. She held one end down and plucked the part that stuck out. The ruler moved back and forth, making the air move too. Pitch tells how high or low a sound is. Volume tells how loud or soft it is. Nia wondered what could change each one.

2. First, Nia tested pitch. She let 8 centimeters of the ruler stick out and gently plucked its tip. She listened, then tried 16 centimeters, using the same ruler and the same kind of pluck. She tried each length three times. The shorter part made a higher sound, while the longer part made a lower sound. She wrote down what she heard after every try.

3. Next, Nia tested volume. She left 12 centimeters of the ruler over the edge for every try. She plucked it gently three times, then plucked it more strongly three times without bending it too far. The stronger plucks made a louder sound. Nia changed only how strongly she plucked so she could tell what caused the change in volume.

2 ANSWER WITH EVIDENCE

Use the passage

1. To test pitch, what did Nia change? Name one thing she kept the same.

2. Why would using a different ruler for the 16-centimeter try make Nia's pitch test less fair?

3. Suppose one 16-centimeter try sounded different from the others. What part of Nia's plan would help her check that result?

4. In the volume test, what did Nia keep the same, what did she change, and what happened?

3 YOUR TURN

Your own words

Plan a test of how distance from a small speaker affects how loud its sound seems. Tell what you would change, what you would keep the same, how you would repeat and record the test, and what you predict.

ANSWER KEY # Ruler Sound Lab

GRADE 4 · P.4.6C.1

PART 1 · READ AND MARK

Underline what Nia changed in each test, circle two details she kept the same, and number the two sentences that tell how many times she tried each condition. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	To test pitch, what did Nia change? Name one thing she kept the same.	**She changed the length of ruler sticking out. She used the same ruler or the same kind of pluck.**
2	Why would using a different ruler for the 16-centimeter try make Nia's pitch test less fair?	**If both the ruler and the length changed, she could not tell which change caused a difference in pitch.**
3	Suppose one 16-centimeter try sounded different from the others. What part of Nia's plan would help her check that result?	**She tried each length three times and recorded what she heard, so she could compare the tries.**
4	In the volume test, what did Nia keep the same, what did she change, and what happened?	**She kept 12 centimeters of the ruler over the edge, changed how strongly she plucked, and heard a louder sound from stronger plucks.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would play a soft sound from a speaker and listen from one meter away, then three meters away. I would keep the sound and the speaker's volume setting the same. I would listen from each distance three times and write down how loud the sound seems each time. I predict it will seem quieter from three meters away.

For the marking job, accept the two tested changes, any two valid details held constant, and numbers beside the trial-count sentences in paragraphs two and three. For Your Turn, accept a clear distance test that keeps the sound source consistent, repeats and records observations, and predicts a change in loudness.