Listen to the Data

Use vibration measurements to compare sounds.

P.4.6C.2 "In relation to how sound is perceived by humans, analyze and interpret data from observations and measurements to report how changes in vibration affect the pitch and volume of sound."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what each measurement tells you, then circle two test letters in the table that keep one measurement the same while the other changes.

Maya's Rubber Band Tests

1. Maya stretched a rubber band across an empty tissue box and plucked it. She heard a note as the band moved back and forth. A phone tool estimated how many times the band vibrated each second from its sound. Another tool measured sound level in decibels (dB). Maya kept the phone the same distance from the box for every test.

2. Maya changed how tightly the band was stretched and how hard she plucked it. A faster vibration makes a higher pitch. Pitch is how high or low a sound seems. A stronger vibration moves more air and sounds louder. Sound level in decibels helps compare loudness. Read the measurements to find what changed in each test.

3. In the table, each letter stands for one pluck. The band and box were the same in every test. To find what affects pitch, compare tests with the same sound level but different vibration rates. To find what affects loudness, compare tests with the same vibration rate but different sound levels. Look for these patterns.

RUBBER BAND SOUND MEASUREMENTS

Test	Vibrations each second	Sound level (dB)
A	120	50
B	240	50
C	120	70
D	240	70

2 ANSWER WITH EVIDENCE

Use the passage

1. Compare tests A and B. Which has the higher pitch? Use the measurements to explain.

2. Compare tests A and C. Which sounds louder? Use the measurements to explain.

3. Compare tests B and C. How would their pitches and loudness differ?

4. Compare tests B and D. What stays the same about the sounds, and what changes? Use both measurements.

3 YOUR TURN

Your own words

Make up two new tests using vibration rates and sound levels not in the table. Give both measurements for each test, then tell how the pitch and loudness would compare.

ANSWER KEY

Listen to the Data

GRADE 4 · P.4.6C.2

PART 1 · READ AND MARK

Underline what each measurement tells you, then circle two test letters in the table that keep one measurement the same while the other changes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Compare tests A and B. Which has the higher pitch? Use the measurements to explain.	**B has the higher pitch because its vibration rate is 240 each second, compared with 120 for A.**
2	Compare tests A and C. Which sounds louder? Use the measurements to explain.	**C sounds louder because its sound level is 70 dB, compared with 50 dB for A.**
3	Compare tests B and C. How would their pitches and loudness differ?	**B has a higher pitch because it vibrates faster. C is louder because its sound level is higher.**
4	Compare tests B and D. What stays the same about the sounds, and what changes? Use both measurements.	**Their pitch stays the same because both have 240 vibrations each second. D is louder because it measures 70 dB instead of 50 dB.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Test E has 150 vibrations each second and a sound level of 45 dB. Test F has 300 vibrations each second and a sound level of 60 dB. F would sound higher in pitch and louder than E.

Accept any two new tests with rates and sound levels that are not in the table, as long as the pitch comparison follows the vibration rates and the loudness comparison follows the sound levels.