Sound and Pulse

Plan a fair test and graph heart rate data

HAP.10.5 "Plan and conduct an investigation to test the effects of various stimuli on heart rate and/or blood pressure. Construct graphs to analyze data and communicate conclusions."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the condition Maya changed, circle what she measured, and number two steps that make her trials more comparable.

Does Sound Change Your Pulse?

1. During a school wellness lab, Maya wondered whether a soundtrack's tempo could affect pulse rate. Heart rate is the number of heartbeats per minute. To test her question, she planned three sound conditions: quiet, slow instrumental music, and fast instrumental music. Sound condition was the variable she changed; heart rate was the response she measured.

2. Maya sat still for two minutes before each condition, then listened for one minute and counted her pulse for the next full minute while the condition continued. She wore the same headphones throughout and used one fixed volume for both music tracks. She repeated each condition twice, with a rest between trials, and changed the order on the second round.

MAYA'S HEART RATE BY SOUND CONDITION

Sound condition	Trial 1 (beats/min)	Trial 2 (beats/min)
Quiet	70	72
Slow music	74	76
Fast music	82	84

3. The table shows Maya's pulse readings. She can average the two trials for each condition, then draw a bar graph with sound conditions on the horizontal axis and average heart rate on the vertical axis. A higher value during fast music would show an association in her trials, not prove that fast music raises everyone's heart rate.

2 ANSWER WITH EVIDENCE

Use the passage

1. What did Maya change between conditions, and what response did she measure?

2. Identify two steps in Maya's plan that make the trials more comparable.

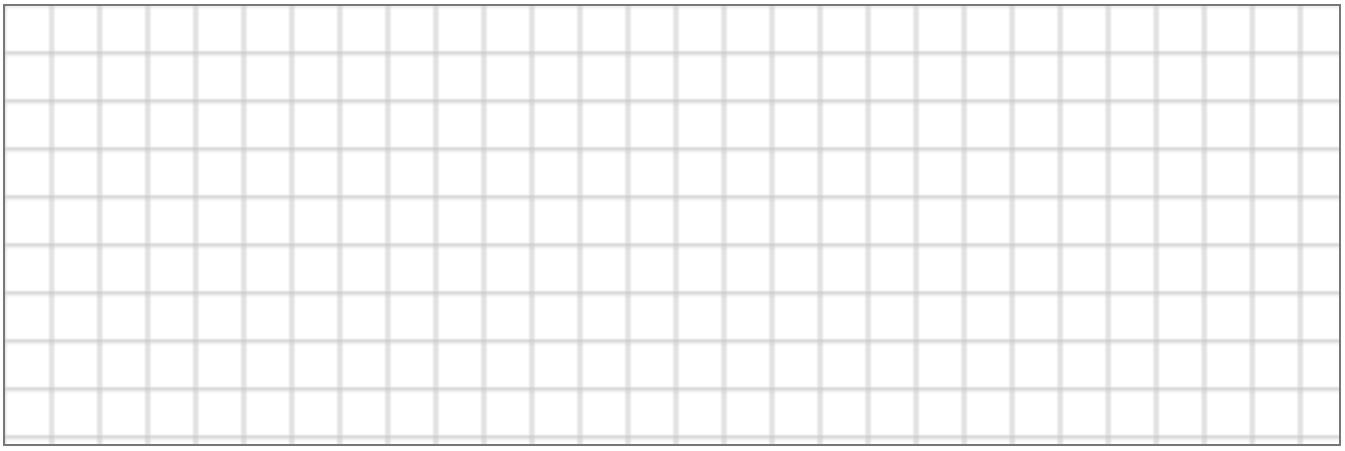
3. Calculate the average heart rate for the quiet trials and for the fast-music trials.

4. Which condition had the highest heart rate in both trials? Why can't Maya use these results to claim everyone will respond the same way?

3 YOUR TURN

Your own words

On the grid, draw a bar graph of the average heart rate for all three sound conditions, with labeled axes and a useful scale. Below it, write two sentences: one conclusion limited to Maya's results, and one safe follow-up test naming a new sound condition and one step you would keep the same.



Sound and Pulse

PART 1 · READ AND MARK

Underline the condition Maya changed, circle what she measured, and number two steps that make her trials more comparable. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What did Maya change between conditions, and what response did she measure?	**She changed the sound condition and measured her heart rate in beats per minute.**
2	Identify two steps in Maya's plan that make the trials more comparable.	**Accept any two: she sat still for two minutes before each condition, used the same headphones, kept the volume fixed for both music tracks, used the same listening and pulse-counting times, or rested between trials.**
3	Calculate the average heart rate for the quiet trials and for the fast-music trials.	**Quiet: (70 + 72) ÷ 2 = 71 beats/min. Fast music: (82 + 84) ÷ 2 = 83 beats/min.**
4	Which condition had the highest heart rate in both trials? Why can't Maya use these results to claim everyone will respond the same way?	**Fast music had the highest heart rate in both trials. The data came from only Maya, so they cannot establish how everyone responds.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Graph: horizontal axis labeled Sound condition, with bars for quiet, slow music, and fast music; vertical axis labeled Average heart rate (beats/min), scaled from 0 to 100 by 20; bar values 71, 75, and 83. In Maya's trials, average heart rate was highest during fast music and lowest in quiet. I would test nature sounds while keeping the listening time at one minute.

Accept a clearly labeled graph with correctly placed averages, even if students choose a different useful scale. The conclusion should stay within Maya's data, and the follow-up should name a safe new condition and a step held constant.