Testing the Tune

How experimental procedures strengthen a comparison

SS24.P.2b "Identify and explain systematic procedures necessary for conducting an experiment and improving the validity of results.*"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB As you read, underline the steps that make the comparison fair, circle what the club changes, and draw a box around what it measures.

Does Music Change Memory?

1. Can background music change how well students remember new words? A school psychology club proposes an experiment with volunteers who agree to take part. The researchers predict that students who study with instrumental music will recall fewer words than students who study in silence. Each volunteer studies the same list of 20 unfamiliar words for five minutes. Then the list is removed, and each student writes down as many words as possible in two minutes. The number of correctly recalled words is the outcome measured. To test the prediction, the club must change the sound condition without changing the word list or timing.

2. The club randomly assigns volunteers to a music group or a silent group, rather than letting students choose. This makes existing differences, such as study habits, less likely to be concentrated in one group. Both groups work in the same room at different times, with identical instructions, lighting, and headphones. The music group hears the same instrumental track at the same volume; the silent group wears headphones with no audio. A researcher uses a timer for every session. If one group had a longer study period, a difference in recall could reflect extra study time rather than the sound condition.

3. Before assigning groups, the club checks whether volunteers already know words on the proposed list and selects one unfamiliar list for everyone. Otherwise, prior knowledge might raise scores for reasons unrelated to music. The club records each score without students' names and compares the groups' average numbers of correctly recalled words. A difference between groups would support a claim about music's effect in this setup, not prove it helps every student in every setting. To check whether the result holds up, the club could repeat the procedure with new volunteers and another unfamiliar word list.

2 ANSWER WITH EVIDENCE

Use the passage

1. What does the club change between groups, and how does it measure the outcome?

2. Why does the club randomly assign volunteers instead of letting them choose a group?

3. What could go wrong if the music group had more study time? Identify the procedure that prevents this problem.

4. Why does the club check whether volunteers know the words before starting, and what does it do with that information?

3 YOUR TURN

Your own words

Design a different experiment to test whether a brief movement break affects puzzle performance. In 4 to 6 sentences, state your prediction, how you would assign volunteers to groups, what each group would do, how you would measure performance, and two steps that would make the comparison fair.

ANSWER KEY

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HIGH SCHOOL · SS24.P.2b

PART 1 · READ AND MARK

As you read, underline the steps that make the comparison fair, circle what the club changes, and draw a box around what it measures. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What does the club change between groups, and how does it measure the outcome?	**The club changes whether students hear instrumental music or silence. It measures the number of words each student correctly recalls.**
2	Why does the club randomly assign volunteers instead of letting them choose a group?	**Random assignment makes existing differences, such as study habits, less likely to be concentrated in one group.**
3	What could go wrong if the music group had more study time? Identify the procedure that prevents this problem.	**Extra study time could explain a difference in recall instead of music. The club gives everyone five minutes to study and uses a timer.**
4	Why does the club check whether volunteers know the words before starting, and what does it do with that information?	**Prior knowledge could raise recall scores for reasons unrelated to music. The club selects one unfamiliar word list for everyone.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict that a two-minute movement break will increase the number of puzzles solved. I would randomly assign volunteers to a break group or a no-break group. One group would walk for two minutes while the other sits quietly for two minutes, and then both groups would try the same ten puzzles. I would count how many puzzles each person solves correctly. Everyone would receive the same instructions and have five minutes to work.

Accept equivalent explanations that connect a procedure to the problem it prevents. For Your Turn, look for a measurable outcome and at least two specific ways to keep the groups' conditions comparable.