Pulse and Balance

Design a test of cardiovascular recovery

HS-AP8-7 "Design an experiment to illustrate how the cardiovascular system maintains homeostasis."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the steps that set up the comparison, circle each time a pulse is measured, and number two conditions that should stay the same. These marks will help you evaluate the experiment.

What Happens After a Brisk Walk?

1. You hurry down a hallway and stop at the door. Your heart is beating faster than it was a few minutes ago. During activity, muscles need more oxygen, and the cardiovascular system moves blood to help meet that need. When you stop, your pulse usually slows as your body adjusts to the lower demand. A pulse count gives an estimate of heart rate, but it does not measure every part of circulation. To investigate this response, an experiment needs a starting measurement, a planned change in activity, and measurements afterward. Those steps make it possible to look for a pattern of recovery.

2. A student could sit quietly for five minutes, then count their pulse for 15 seconds and multiply by four to estimate beats per minute. Next, the student could walk a flat hallway at a steady pace for two minutes. The student would count their pulse again immediately after the walk and at one, three, and five minutes after stopping. Each count would last 15 seconds, starting at the stated time. On another day, the student could follow the same timing but remain seated instead of walking. This comparison helps show whether a change in pulse follows the activity rather than the passage of time alone.

3. For a fair comparison, the student should use the same hallway, walking pace, pulse-counting method, and length of quiet sitting in repeated walking trials. Recording several trials can show whether the pattern is consistent. The predicted pattern is a higher pulse after walking, followed by a gradual move toward the starting rate during recovery. A steady pulse in the seated comparison would strengthen the link between activity and the change. The results could support a claim that heart rate adjusts as the body's needs change. Pulse counts alone, however, cannot show exactly how much blood or oxygen reaches the muscles.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why does the plan include a day when the student remains seated instead of walking?

2. Which pulse measurements would you compare to test whether the student recovers after walking, and what pattern would support recovery?

3. Choose two conditions the student should keep the same across walking trials. How does controlling them improve the test?

4. If the student's pulse rises after walking, what could that result support, and what could pulse counts alone not prove?

3 YOUR TURN

Your own words

Design a different, safe experiment using a change from sitting to standing. Gravity can briefly shift blood toward the legs when you stand. Describe a comparison, pulse-measurement times, two conditions to control, and a predicted pattern that would support cardiovascular adjustment.

Pulse and Balance

PART 1 · READ AND MARK

Underline the steps that set up the comparison, circle each time a pulse is measured, and number two conditions that should stay the same. These marks will help you evaluate the experiment. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why does the plan include a day when the student remains seated instead of walking?	**The seated day provides a comparison to help determine whether pulse changes follow walking rather than time alone.**
2	Which pulse measurements would you compare to test whether the student recovers after walking, and what pattern would support recovery?	**Compare the pulse immediately after walking with the counts at one, three, and five minutes and the starting count. Recovery would appear as a gradual move toward the starting rate.**
3	Choose two conditions the student should keep the same across walking trials. How does controlling them improve the test?	**For example, keep the walking pace and hallway the same. This makes differences in pulse less likely to result from a change in walking conditions.**
4	If the student's pulse rises after walking, what could that result support, and what could pulse counts alone not prove?	**It could support a claim that heart rate adjusts to changing activity. Pulse counts alone cannot prove how much blood or oxygen reaches the muscles.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would sit quietly for five minutes, count my pulse for 15 seconds, then stand up beside a chair. I would count my pulse immediately and at one, three, and five minutes after standing. On another day, I would stay seated and take counts at the same times. I would use the same pulse-counting method and length of quiet sitting each day. A brief rise after standing, followed by a steadier rate, compared with little change while seated, would support the idea that heart rate adjusts when body position changes.

Accept safe designs with a clear sitting comparison, timed pulse measurements, controlled conditions, and a prediction that distinguishes adjustment from an unchanged pulse. Students should not claim that pulse counts directly measure blood pressure or oxygen delivery.