Standing Pressure

Trace how blood flow and body sensors respond to a change in position

HAP.8 "Obtain, evaluate, and communicate information explaining how the structures of the cardiovascular system are related to its functions. a. Create a model to show how a pressure gradient moves blood through the circulatory system. b..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what creates or changes blood pressure, circle structures and sensors that help control blood flow, and number the events from standing to pressure recovery.

What Happens When You Stand?

1 When you stand up quickly, gravity briefly pulls blood toward your legs. Less blood returns to the heart, so the next beats may pump less blood into the arteries. Blood pressure is the force of blood against artery walls. The table shows sample measurements from one person sitting, just after standing, and one minute later.

SAMPLE MEASUREMENTS DURING A CHANGE IN POSITION

Position	Blood pressure (mmHg)	Heart rate (beats/min)
Seated	112/72	72
Just after standing	98/66	88
One minute after standing	110/70	78

2 A pressure gradient moves blood from higher pressure to lower pressure. The heart's muscular walls generate high pressure in arteries, while veins return blood at lower pressure. Valves in the heart and veins limit backward flow. Capillaries have thin walls that allow materials to move between blood and tissues.

3 Pressure sensors called baroreceptors in major arteries detect the sudden drop and signal the brainstem. It speeds the heart and tightens some blood vessels, helping restore pressure. Chemoreceptors monitor blood oxygen, carbon dioxide, and acidity; changes can alter breathing and heart activity. Together, circulation and breathing help supply cells and remove waste as conditions change.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did blood pressure and heart rate change just after the person stood up? Use numbers from the table.

2. Why can standing briefly lower arterial pressure? Connect gravity, blood return, and the heart's pumping.

3. How do the heart's walls and valves help move blood through the circulatory system?

4. If blood carbon dioxide rises, how can chemoreceptors help circulation and breathing work together?

3 YOUR TURN

Your own words

Sketch a labeled model of blood flow while someone climbs stairs. Use arrows to show pressure changes and one-way flow, and label how chemoreceptors and breathing help working muscles.

Standing Pressure

PART 1 · READ AND MARK

Underline what creates or changes blood pressure, circle structures and sensors that help control blood flow, and number the events from standing to pressure recovery. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did blood pressure and heart rate change just after the person stood up? Use numbers from the table.	**Blood pressure fell from 112/72 to 98/66 mmHg, while heart rate rose from 72 to 88 beats per minute.**
2	Why can standing briefly lower arterial pressure? Connect gravity, blood return, and the heart's pumping.	**Gravity pulls blood toward the legs, so less returns to the heart. The next beats may pump less blood into the arteries, lowering pressure.**
3	How do the heart's walls and valves help move blood through the circulatory system?	**The muscular walls create high arterial pressure that drives blood toward lower-pressure vessels. Valves limit backward flow.**
4	If blood carbon dioxide rises, how can chemoreceptors help circulation and breathing work together?	**Chemoreceptors detect the change. Breathing and heart activity can change to help remove carbon dioxide and supply cells.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A sketch shows the muscular heart pumping blood into high-pressure arteries, then through thin-walled capillaries in leg muscles, then into low-pressure veins that return blood to the heart. Forward arrows show flow, and heart and vein valves are labeled as limiting backward flow. Breathing is labeled as bringing in oxygen and removing carbon dioxide. Chemoreceptors are labeled as sensing rising carbon dioxide and helping change breathing and heart activity.

Accept equivalent explanations that correctly connect a pressure gradient to flow and valves to limited backflow. The model should show circulation as a route, not just a list of structures.