

Class 9 - Physical Education and Well Being

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Cardiorespiratory System

CBSE NOTES

Cardiorespiratory System - Practice Worksheet

Strengthen your foundation with key concepts and basic applications.



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Solve the following questions. Write your answers in the space provided.

1. Define breathing and explain the process involved in breathing. What muscles are primarily responsible for this?

Hint: Refer to the sections discussing ventilation and muscle function in breathing.

2. What is the difference between respiration and breathing? Discuss the types of respiration with examples.

Hint: Review the section that contrasts breathing with cellular respiration.



Solve the following questions. Write your answers in the space provided.

3. Explain the structure and function of the heart in the circulatory system. How does it contribute to cardiovascular health?

Hint: Look for details on heart structure and its physiological roles.

4. Describe the circulatory system and differentiate between pulmonary and systemic circulation.

Hint: Refer to sections covering blood flow routes in relation to heart chambers.



Solve the following questions. Write your answers in the space provided.

5. What is cardiac output, and how is it calculated? Provide its significance in physical activity.

Hint: Examine the definition and related calculations in the textbook.

6. Discuss the importance of blood pressure. What do systolic and diastolic pressures indicate?

Hint: Look for details regarding blood pressure measures and their health implications.



Solve the following questions. Write your answers in the space provided.

7. Explain the role of arteries, veins, and capillaries in the circulatory system.

Hint: Refer to the sections detailing blood vessel functions.

8. What adaptations occur in the cardiorespiratory system during exercise? Describe the physiological changes.

Hint: Review the section discussing exercise effects on cardiorespiratory functions.



Solve the following questions. Write your answers in the space provided.

9. Analyze the significance of the 'lub-dub' heart sounds. What do they indicate about heart function?

Hint: Look into sections explaining heart sounds and their physiological importance.



Check your answers with the solutions below.

1. Define breathing and explain the process involved in breathing. What muscles are primarily responsible for this?

Solution: Breathing is the physical act of inhaling oxygen (O₂) and exhaling carbon dioxide (CO₂). It involves the diaphragm, which contracts and moves downward during inhalation, increasing the chest cavity's volume, allowing the lungs to expand. The intercostal muscles assist in this process. Upon exhalation, the diaphragm relaxes, aided by the natural elasticity of lung tissues and abdominal muscles that help push air out. This rhythmic process also reflects the body's need for oxygen during physical activities and the removal of CO₂, a metabolic waste product. Various activities, such as exercise, can impact the rate and depth of breathing significantly.

2. What is the difference between respiration and breathing? Discuss the types of respiration with examples.

Solution: Respiration is a biochemical process occurring in cells, where oxygen is utilized to convert glucose into usable energy (ATP), with CO₂ and water as by-products. Breathing refers specifically to the physical act of moving air in and out of the lungs. The three types of respiration include: 1. External Respiration: Gas exchange between the lungs and blood (in alveoli). 2. Internal Respiration: Gas exchange between blood and body tissues. 3. Cellular Respiration: Process in mitochondria where glucose is broken down with oxygen to produce energy (ATP). Each type plays a crucial role in maintaining cellular and overall physiological functions.

3. Explain the structure and function of the heart in the circulatory system. How does it contribute to cardiovascular health?

Solution: The heart functions as a dual pump within the circulatory system, comprising four chambers: right atrium, right ventricle, left atrium, and left ventricle. It circulates oxygen-poor blood from the body to the lungs through the right side and oxygen-rich blood from the lungs to the body via the left side. The heart's valves ensure unidirectional blood flow and prevent backflow. Regular physical activity strengthens heart muscles, enhances cardiac output, and aids in efficient blood circulation, contributing significantly to cardiovascular health by reducing the risk of heart diseases.



Check your answers with the solutions below.

4. Describe the circulatory system and differentiate between pulmonary and systemic circulation.

Solution: The circulatory system is responsible for transporting nutrients, oxygen, and waste products throughout the body. Pulmonary circulation involves blood flow from the right side of the heart to the lungs for gas exchange, where CO₂ is removed and O₂ is absorbed, returning to the left side of the heart. Systemic circulation, on the other hand, distributes oxygen-rich blood from the left side of the heart to the body tissues, delivering oxygen while collecting CO₂ for return. This double circulatory system ensures effective separation of oxygen-rich and oxygen-poor blood, optimizing oxygen delivery to cells.

5. What is cardiac output, and how is it calculated? Provide its significance in physical activity.

Solution: Cardiac output (CO) is the volume of blood pumped by the heart per minute, calculated using the formula: $CO = \text{Stroke Volume (SV)} \times \text{Heart Rate (HR)}$. Stroke volume represents the amount of blood ejected with each heartbeat, and heart rate includes the number of beats per minute. Understanding CO is crucial during physical activity, as it indicates how well the heart meets the increased oxygen demands of muscles and tissues during exercise. A higher CO during intense activities shows efficient heart function and conditioning.

6. Discuss the importance of blood pressure. What do systolic and diastolic pressures indicate?

Solution: Blood pressure measures the force of blood against arterial walls, primarily influenced by cardiac output and vascular resistance. Systolic pressure, the first number in a reading, indicates the pressure in arteries when the heart contracts and pumps blood. Diastolic pressure, the second number, reflects the pressure when the heart is at rest between beats. Monitoring blood pressure is vital for assessing cardiovascular health; high or low readings can indicate various health issues, including hypertension or hypotension, affecting overall well-being.



Check your answers with the solutions below.

7. Explain the role of arteries, veins, and capillaries in the circulatory system.

Solution: Arteries carry oxygen-rich blood away from the heart to tissues under high pressure, with the ability to stretch and recoil during heartbeats. As arteries branch into arterioles and eventually capillaries, they allow for nutrient, oxygen, and waste exchange at the cellular level. Capillaries, one cell thick, are essential for this diffusion process. Veins collect oxygen-depleted blood from capillaries and return it to the heart under lower pressure. Valves in veins assist in preventing backflow, maintaining circulation back to the heart.

8. What adaptations occur in the cardiorespiratory system during exercise? Describe the physiological changes.

Solution: During exercise, the cardiorespiratory system undergoes several adaptations: increased breathing rate and depth enhance oxygen intake, while heart rate rises significantly to boost cardiac output, ensuring efficient oxygen delivery to muscles. Blood vessels dilate (vasodilation) in active areas to increase blood flow, whilst redirecting circulation from non-essential organs. These changes help maintain homeostasis, deliver energy for prolonged activity, and improve overall efficiency and endurance over time, which are central aspects of physical fitness.

9. Analyze the significance of the 'lub-dub' heart sounds. What do they indicate about heart function?

Solution: 'Lub-dub' refers to the sounds produced by the heart during contraction and relaxation phases. The 'lub' sound occurs when the mitral and tricuspid valves close as the ventricles contract. The 'dub' sound corresponds to the closing of the aortic and pulmonary valves when the ventricles relax. These sounds are indicators of normal heart function and cardiac cycle progression. Abnormalities, such as heart murmurs, can signify underlying problems within heart valve closure or blood flow, warranting further investigation.



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