

Class 9 - Physical Education and Well Being

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Cardiorespiratory System

CBSE NOTES

Cardiorespiratory System - Mastery 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. Explain the roles of the diaphragm and intercostal muscles during the processes of breathing. Illustrate your answer with a labeled diagram.

Hint: Consider how the movements change the volume in the thoracic cavity.

2. Describe the process of gas exchange at the alveoli. How does this relate to the concept of diffusion?

Hint: Draw a diagram showing the alveoli and capillaries to better visualize the process.



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

3. Contrast external respiration with internal respiration and relate these processes to cellular respiration.

Hint: Create a table to help differentiate these processes.

4. Analyze how vigorous exercise affects heart rate and breathing rate. Discuss the physiological adaptations that enable these changes.

Hint: Consider how body systems work together during physical exertion.



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

5. Illustrate and explain the structure of the human heart. Detail how blood flows through the heart during the cardiac cycle.

Hint: Use a diagram to show blood flow pathways distinctly.

6. Describe how arteries, veins, and capillaries differ in structure and function. Why are these differences important for circulatory efficiency?

Hint: Creating a Venn diagram may help organize these differences.



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

7. Discuss the significance of cardiac output and blood pressure. How do they correlate during exercise?

Hint: Consider how these measures can indicate physical fitness.

8. Explain the term 'double circulatory system' and its significance in maintaining efficient oxygen transport in humans.

Hint: Illustrate each circuit to visualize their distinct pathways.



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

9. Evaluate the impact of training on the cardiorespiratory system. What long-term adaptations occur with consistent exercise?

Hint: Discuss both chronic and acute changes in your response.

10. Investigate the relationship between oxygen consumption and physical activity levels. How does this relationship change with different kinds of exercises?

Hint: Consider creating a chart comparing different exercise types and their oxygen demands.



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Check your answers with the solutions below.

1. Explain the roles of the diaphragm and intercostal muscles during the processes of breathing. Illustrate your answer with a labeled diagram.

Solution: The diaphragm contracts and moves downward creating a vacuum that draws air into the lungs, while the intercostal muscles elevate the rib cage. This can be represented in a diagram showing the diaphragm position during inhalation and exhalation.

2. Describe the process of gas exchange at the alveoli. How does this relate to the concept of diffusion?

Solution: At the alveoli, oxygen diffuses from the alveoli into the blood due to a higher concentration of oxygen in the alveoli. Conversely, carbon dioxide diffuses from the blood where it is more concentrated to the alveoli to be exhaled. This illustrates diffusion's principle by demonstrating movement from high to low concentration.

3. Contrast external respiration with internal respiration and relate these processes to cellular respiration.

Solution: External respiration occurs in the lungs (gas exchange between air and blood), while internal respiration happens at the cellular level (gas exchange between blood and cells). Both are essential for cellular respiration, which converts oxygen into energy (ATP) and produces carbon dioxide as a waste product.

4. Analyze how vigorous exercise affects heart rate and breathing rate. Discuss the physiological adaptations that enable these changes.

Solution: During vigorous exercise, heart rate and breathing rate increase to supply more oxygen and remove carbon dioxide. The body adapts by increasing stroke volume, enhancing cardiac output, and making breathing more efficient through improved muscle efficiency and lung capacity.



Check your answers with the solutions below.

5. Illustrate and explain the structure of the human heart. Detail how blood flows through the heart during the cardiac cycle.

Solution: The heart consists of four chambers: right atrium, right ventricle, left atrium, and left ventricle. Blood flows from the body to the right atrium, to the right ventricle, to the lungs (via pulmonary circulation), then to the left atrium and left ventricle before being pumped out to the body (systemic circulation).

6. Describe how arteries, veins, and capillaries differ in structure and function. Why are these differences important for circulatory efficiency?

Solution: Arteries have thick, elastic walls for high-pressure blood; veins have thinner walls and valves to prevent backflow; capillaries are thin for efficient nutrient and gas exchange. These adaptations support the circulatory systems' efficiency in transporting blood and nutrients.

7. Discuss the significance of cardiac output and blood pressure. How do they correlate during exercise?

Solution: Cardiac output (heart rate x stroke volume) is the amount of blood the heart pumps. During exercise, both increase to meet the demands of working muscles, while blood pressure rises due to increased heart force and decreased vascular resistance.

8. Explain the term 'double circulatory system' and its significance in maintaining efficient oxygen transport in humans.

Solution: The double circulatory system consists of pulmonary (lungs) and systemic (body) circuits, ensuring oxygen-rich and oxygen-poor blood do not mix. This efficiency allows for effective oxygen transport critical for metabolism, ensuring that tissues receive adequate oxygen.



Check your answers with the solutions below.

9. Evaluate the impact of training on the cardiorespiratory system. What long-term adaptations occur with consistent exercise?

Solution: Regular training strengthens the heart muscle, increases stroke volume, enhances lung capacity, and improves oxygen extraction efficiency. Long-term adaptations lead to lower resting heart rates, improved endurance, and overall health.

10. Investigate the relationship between oxygen consumption and physical activity levels. How does this relationship change with different kinds of exercises?

Solution: Oxygen consumption increases with physical activity intensity. Aerobic exercises lead to a steady state of oxygen uptake, while anaerobic exercises result in bursts of activity without relying solely on oxygen, leading to different metabolic pathways being engaged.



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