**3276CARDIO-RESPIRATORY EXERCISE PHYSIOLOGY WORKBOOK**

# The Circulatory System

## Blood Composition

* Plasma makes up approximately \_\_\_\_\_\_ of blood volume
* Cells and platelets make up approximately \_\_\_\_\_\_ of blood volume
	+ \_\_\_\_\_\_ Platelets
	+ \_\_\_\_\_\_ Red Blood Cells (RBC)
	+ \_\_\_\_\_\_ White Blood Cells (WBC)

## Blood Function

*Match the statements.*



# Circulation and the Heart

## Blood Vessels

**Arteries**: Thick, muscular vessels that transport \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the heart. Pass blood to smaller vessels called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and then to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ where gas exchange occurs.

**Capillaries**: Narrow vessels with thin walls, site of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between blood and tissues.

**Veins**: Less muscular, flexible vessels that carry \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the heart. Contain valves to prevent back flow of blood.

## Circulation Pathway

## Heart Circulation

**Pulmonary Circulation:** Delivers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood from the \_\_\_\_\_\_\_\_\_\_\_ side of the heart to the \_\_\_\_\_\_\_\_\_\_\_.

**Systemic Circulation:** Delivers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood from the \_\_\_\_\_\_\_\_\_\_\_ side of the heart to the \_\_\_\_\_\_\_\_\_\_\_.

## Functions of the Heart

1.

2.

3.

## Anatomy of the Heart

|  |  |  |
| --- | --- | --- |
| **Layer** | **Description** | **Function** |
| Pericardium |  |  |
| Myocardium |  |  |
| Endocardium |  |  |

## Structure of the Heart

*Label the diagram using the terms in your word bank. Colour the path of oxygenated and deoxygenated blood.*



# Function of the Heart

## Cardiac Impulses

*Define the following terms:*

|  |  |
| --- | --- |
| **Term** | **Definition / Function** |
| Sinoatrial Node (SA Node) |  |
| Atrioventrical Node (AV Node) |  |
| Purkinje Fibres |  |
| Cardiac Cycle |  |
| Diastole |  |
| Systole |  |

## Cardiac Cycle

The cardiac cycle can be described as the sequence of events that make up one heartbeat.

*Describe what takes place during* ***diastole*** *and both* ***atrial and ventricular systole.*** *Be sure to mention whether the different chambers of the heart are relaxed or contracted and what is occurring with the different valves of the heart.*

|  |
| --- |
| **Diastole** |
|  |
| **Systole** |
| **Atrial Systole** | **Ventricular Systole** |
|  |  |

## Factors Affecting Heart Rate

Heart contraction is affected by ***hormones*** and the ***nervous system.***

**Parasympathetic Nervous System (PNS):** brings the body systems to rest (REST and DIGEST).

**Sympathetic Nervous System (SNS):** prepares the body for action (FIGHT or FLIGHT).

During exercise the \_\_\_\_\_\_ releases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ onto the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which increases HR. During recovery the \_\_\_\_\_\_ sends impulses down the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which slows the heart rate and brings the body back to rest.

***Use your prior knowledge about the ventilator system to complete the phrases below.***

|  |  |
| --- | --- |
| Increased rate of… |  |
| As a result, CO₂ levels in blood… |  |
| This change is detected by… |  |
| The medulla oblongata sends a signal to secrete the hormone… |  |
| The effect of this hormone is to… |  |
| As a result the CO₂ levels in the blood… |  |
| This is again detected by… |  |
| The PNS sends a signal down the… |  |
| Eventually the heart rate will… |  |

## Sounds of the Heart and Blood Distribution

***Describe the action that matches each of the heart sounds and record your heart rate as measured with a stethoscope***

“Lub” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

“Dub” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Heart Rate according to the stethoscope: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Fill in the graph with the changes in blood distribution at rest vs. during exercise. Provide an explanation.***

Explanation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Blood Pressure

Resting, healthy adult range for blood pressure is generally \_\_\_\_\_\_ mmHg (systolic) to \_\_\_\_\_\_ mmHg (diastolic) and is read as “\_\_\_\_\_\_ over \_\_\_\_\_\_ mmHg”

* **Low blood pressure:** 90-100 / 50-60 mmHg
* **High blood pressure:** 140/100 mmHg

***Complete the paragraphs below using the terms from the word banks provided.***

To Do: Green box pg. 41

What is your blood pressure?

Answer questions #1-5

## Cardiac Output

*Define the following important terms*

|  |  |  |  |
| --- | --- | --- | --- |
| **Term** | **Definition** | **Unit** | **Symbol** |
| Pulmonary Circulation |  | --- | --- |
| Systemic Circulation |  | --- | --- |
| Cardiac Output |  |  |  |
| Stroke Volume |  |  |  |

**Cardiac Output (Q)** = (Stroke Volume x Heart Rate) / 1000

