

**Key Elements: Human Biology (Circulatory System)****Estimated Time: 14–16 hours**

By the end of this course, students will have an understanding of the structures and function of the circulatory system, including the heart, blood vessels, blood, and the role of lymphatic system.

***Vocabulary***

anterior vena cava, antibody, antigen, aorta, arterial duct atrioventricular valve, autonomic nervous system, atrioventricular (AV) node, blood, blood pressure, blood velocity, blood vessel, capillary-tissue fluid exchange, carotid artery, chordae tendineae, coronary artery, coronary vein, diastolic pressure, fetal circulation, heart rate, hepatic portal vein, hepatic vein, hypertension, hypotension, iliac artery, iliac vein, jugular vein, left atrium, left ventricle, lymph capillaries, lymph node, lymphatic system, lymphatic veins, mesenteric artery, oval opening, plasma, platelets, posterior vena cava, pulmonary arteries, pulmonary circulation, pulmonary trunk, pulmonary veins, Purkinje fibres, red blood cell, renal artery, renal vein, right atrium, right ventricle, sinoatrial (SA) node, semi-lunar valve, septum, subclavian artery, subclavian vein, systemic circulation, systolic pressure, total cross-sectional area, umbilical artery, umbilical vein, valve, veins, venous duct, vessel wall, white blood cell

***Knowledge***

- structures of the circulatory system and their inter-relationships
- structure of the heart
- relationship between heart rate and blood pressure
- structures and functions of blood vessels
- pulmonary and system circulation
- components of blood
- fetal circulation
- roles of antigens and antibodies
- structures and functions of the lymphatic system

***Skills and Attitudes***

- interpret graphs, tables, and diagrams
- demonstrate safe and correct dissection technique
- demonstrate correct use of a compound microscope (e.g., blood slides)
- demonstrate correct use of a dissection microscope (e.g., heart dissection)
- demonstrate proper technique for handling and disposing of laboratory materials
- create models (e.g., antigens and antibodies, specific aspects of the circulatory system such as the heart)
- conduct experiments (e.g., to test the effect of physical activity on heart rate and blood pressure)
- communicate results (e.g., using tables, graphs, diagrams, lab reports)
- demonstrate ethical, responsible, co-operative behaviour
- show respect for living things

HUMAN BIOLOGY (CIRCULATORY SYSTEM)

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<p>C3 describe the inter-relationships of the structures the heart</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identify and give functions (including where blood is coming from and going to, as applicable) for each of the following:                             <ul style="list-style-type: none"> <li>– left and right atria</li> <li>– left and right ventricles</li> <li>– coronary arteries and veins</li> <li>– anterior and posterior vena cava</li> <li>– aorta</li> <li>– pulmonary arteries and veins</li> <li>– pulmonary trunk</li> <li>– atrioventricular valves</li> <li>– chordae tendineae</li> <li>– semi-lunar valves</li> <li>– septum</li> </ul> </li> <li><input type="checkbox"/> recognize heart structures using both internal and external diagram views</li> </ul>
<p>C4 analyse the relationship between heart rate and blood pressure</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> describe the location and functions of the sinoatrial (SA) node, atrioventricular (AV) node, and Purkinje fibres</li> <li><input type="checkbox"/> describe how the autonomic nervous system increases and decreases heart rate and blood pressure</li> <li><input type="checkbox"/> differentiate between systolic and diastolic pressures</li> <li><input type="checkbox"/> describe hypertension and hypotension and their causes</li> <li><input type="checkbox"/> demonstrate the measurement of blood pressure</li> </ul>
<p>C5 analyse the functional inter-relationships of the vessels of the circulatory system</p> <p><i>Suborganizer 'Human Biology (Circulatory System)' PLO C5 continued on page 65</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identify and give the function (including where the vessel is carrying blood from and where it is carrying blood to) of each of the following:                             <ul style="list-style-type: none"> <li>– subclavian arteries and veins</li> <li>– jugular veins</li> <li>– carotid arteries</li> <li>– mesenteric arteries</li> <li>– anterior and posterior vena cava</li> <li>– pulmonary veins and arteries</li> <li>– hepatic vein</li> <li>– hepatic portal vein</li> <li>– renal arteries and veins</li> <li>– iliac arteries and veins</li> <li>– coronary arteries and veins</li> <li>– aorta</li> </ul> </li> <li><input type="checkbox"/> describe and differentiate among the five types of blood vessels with reference to characteristics such as                             <ul style="list-style-type: none"> <li>– structure and thickness of vessel walls</li> <li>– presence of valves</li> <li>– direction of blood flow (toward or away from the heart)</li> </ul> </li> </ul>

Prescribed Learning Outcomes	Suggested Achievement Indicators
<p><i>Suborganizer 'Human Biology (Circulatory System)' PLO C5 continued from page 64</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> differentiate between pulmonary and systemic circulation with respect to oxygenation or deoxygenation of blood in the vessels involved</li> <li><input type="checkbox"/> demonstrate a knowledge of the path of a blood cell from the aorta through the body and back to the left ventricle</li> <li><input type="checkbox"/> relate blood pressure and blood velocity to the total cross-sectional area of the five types of blood vessels</li> <li><input type="checkbox"/> describe capillary-tissue fluid exchange</li> <li><input type="checkbox"/> identify and describe differences in structure and circulation between fetal and adult systems, with reference to umbilical vein and arteries, oval opening, venous duct, arterial duct</li> </ul>
<p>C6 describe the components of blood</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> describe the shape, function, and origin of red blood cells, white blood cells, and platelets</li> <li><input type="checkbox"/> list the major components of plasma</li> <li><input type="checkbox"/> explain the roles of antigens and antibodies</li> </ul>
<p>C7 describe the inter-relationships of the structures of the lymphatic system</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> describe the functions of the lymphatic system</li> <li><input type="checkbox"/> identify and give functions of lymph capillaries, veins, and nodes</li> </ul>