Assessor Marking Guide

Programme Name	**Health and Fitness Coach (Personal Trainer) (Level 4)**	
Assessment Number	**Assessment 4 of 4**	
Assessment Title	**Cardiovascular and Respiratory System quiz**	
Course Number	**Course 1**	**Version 2** **Level 4** **Credit 10**
Course Title	**Anatomy and Physiology**	

Internal feedback related to design of assessment tools should be submitted via the online Continuous Improvement Form (eCIF).

This assessment leads to the following graduate profile and learning outcomes.

NZQA GPO	Learning Outcome	Task #
Apply knowledge of anatomy and physiology to adapt and deliver safe and effective exercise programmes to individuals. (15 credits)	**2.1** Identify and describe the structure and function of major systems of the human body and their physiological responses (acute and chronic) to exercise. (7 credits)	Tasks 1 – 3

NZQF Level 4 Descriptors	
Knowledge	• Broad operational and theoretical knowledge in a field of work or study
Skills	• Select and apply solutions to familiar and sometimes unfamiliar problems. • Select and apply a range of standard and nonstandard processes relevant to the field of work or study.
Application	• Self-management of learning and performance under broad guidance. • Some responsibility for performance of others.

ADMINISTRATION

Assessors are required to provide feedback to students:

- Constructive feedback to the student must be documented within assessment evidence. Including where resubmission is required.
- Notes on demonstrated performance and application of skills, knowledge, attributes; future improvement/development planning e.g., task management, study skills; relationship to other programme content and use in career.

Student evidence must be assessed against all specified criteria to meet learning outcomes.

- Any adaption in assessment methods must be documented and attached to the assessment by the assessor (where deemed necessary to be fair and transparent in relation to student's specified needs).
- Assessment Pack Cover should be dated and signed by assessor when the student has received the final result.
- Assessment opportunities must be indicated accurately.
  Where any practical criteria are not achieved, an additional practical sheet must be used for reassessment for all practical outcomes and attached to this assessment pack. Refer to Assessment opportunities policy for additional detail.
- The student must sign the post-assessment agreement after receiving final result.
- It is the Assessors responsibility to ensure all relevant documentation is included in the assessment prior to reporting and filing.

- Samples of assessments will be forwarded to internal and/or external parties for moderation as required.

Where appropriate **sample answers and or exemplars** may be included: Sample answers are a guide only providing an example of the sufficiency of qualitative and quantitative evidence the assessor could expect to see.

ASSESSMENT SCHEDULE *Give feedback to student on successes, for N add a note to the student on here or on their assessment evidence (e.g. in Turnitin) about how to improve for resubmission.*	
Task Evidence	**Achievement Criteria / Judgement**
Task 1	a) Accurate labelling provided b) FOUR components accurately identified
Task 2	a) Pathway identified correctly and described b) Accurate descriptions are provided c) Accurate description provided including normal value and reasons for unhealthy score provided. (100-150 words) Normal value 120/80. Answer could contain but not limited to increased fat deposits in arteries, lack of exercise, diabetes, or obesity.
Task 3	a) Changes accurately identified (100-150 words) Answer could contain but not limited to increase heart size, increase heart strength, decrease resting HR, slower increase during training. b) Accurate explanation provided (100-150 words) c) Adaptations correctly identified (100-150 words) Answer could contain but not limited to increased alveoli, increased capillary density, increased surface area for diffusion. d) Differences accurately explained in relation to Heart rate. (50-100 words)

Cardiovascular and Respiratory System Quiz

Sample Answers

Task 1 – Structure of the Cardiovascular and Respiratory system

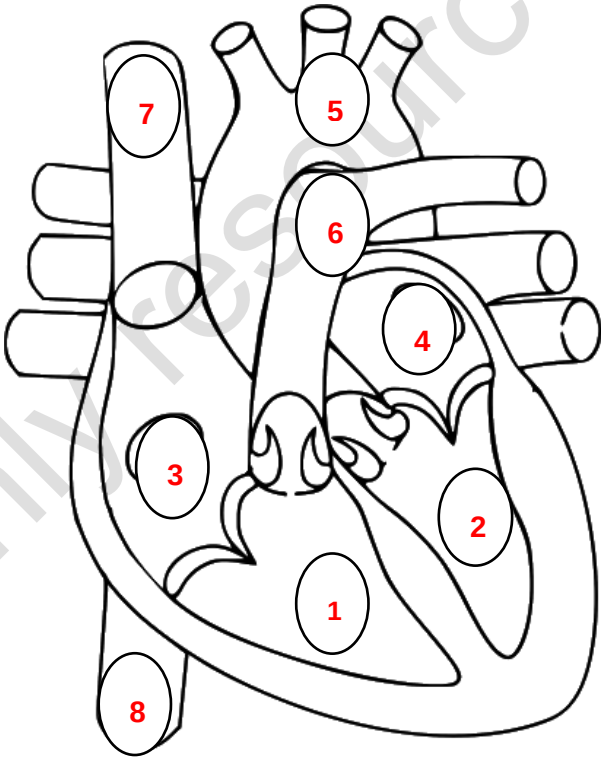
a) What are the FOUR main components of blood?

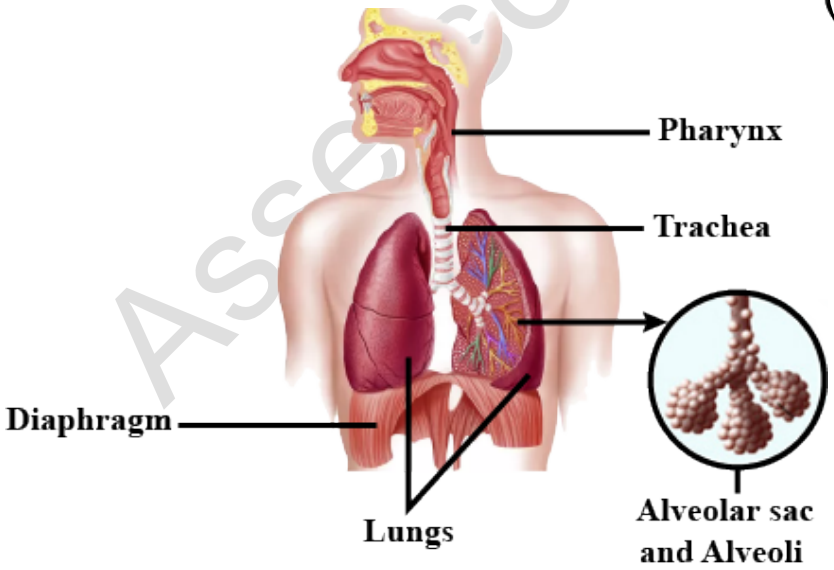
The Four main components of blood are Plasma, Red Blood cells, White blood cells and platelets.

b) Label these pictures of the Heart and Lungs. **Heart** - Use the numbers and place them on the picture in the correct place. One has been done for you. **Lungs** – Write the label in the space provided.

Heart

1. Right Ventricle 2. Left Ventricle
3. Right Atrium 4. Left Atrium
5. Aorta 6. Pulmonary Artery
7. Superior Vena Cava
8. Inferior Vena Cava





Respiratory System

1. Lungs
2. Alveoli
3, Trachea
4. Pharynx
5. Diaphragm

Task 2 – Functions of the Cardiovascular and Respiratory system

a) One of the main functions of the Respiratory system is to get oxygen from the outside air to our muscles. Describe the pathway and the processes by which this happens **(200 words total)**. *Your answer should discuss all, but is not limited to; pulmonary diffusion, pressure equilibrium, diffusion.*

Outside to lungs: Oxygen is drawn into the lungs because of pressure differences between the atmosphere (outside the body) and the pressure within the lungs, this is known as pressure equilibrium. When pressure in the lungs is less than the atmosphere it allows for air/oxygen to enter the lungs with mechanical assistance from our respiratory muscles. The oxygen travels down our trachea into the Bronchi and into the bronchioles. At the end of these are the alveoli or air sacs. For oxygen to enter the blood stream there needs to be a pressure difference in gas exchange between the alveoli and deoxygenated blood, as oxygen can only move from high to low pressure. This process also allows for carbon dioxide to be exchanged from deoxygenated blood (where CO2 is high) to the alveoli (low CO2 concentration) to then be expelled from the body through exhalation.

Lungs to muscles: Oxygen is then carried by haemoglobin to the muscle cells. In order for O2 to enter the muscle cells, the pressure of O2 in the blood must be higher than the pressure of O2 in the muscle cells. The PCO2 of muscle also needs to be higher than the PCO2 of the blood for CO2 to exit the muscles and enter the blood stream for removal. During exercise these conditions are likely as the muscles are using O2 and producing CO2.

b) Describe the following functions of the Cardiovascular system.

Function	**Description**
Thermoregulation	This means the management of body temperature. Moving blood to the outside arteries in an attempt to dissipate heat if necessary or constricting those vessels to maintain heat.
Protection	This system carries around white blood cells and platelets which are used to protect us from cuts and infections.
Transport	The blood within the system carries around oxygen, CO2 as well as other key things such as hormones or nutrients to help keep the body performing at its best

c) Provide a definition of blood pressure and what desirable blood pressure values are at REST. What changes to blood pressure would you expect to observe in an individual participating in moderate to high intensity exercise? **80-120 words**

Blood pressure is the pressure of the circulatory blood against the walls of blood vessels. Systolic arterial pressure is maximum pressure reached in the arteries during the ventricular contraction phase of the heartbeat. Diastolic pressure is the minimum pressure recorded just prior to ventricular contraction (resting phases). It is generally recorded as systolic/diastolic (this means systolic over diastolic). The normal blood pressure is approximately 120/80 mmHg in adults.

Systolic arterial blood pressure increases during exercise and stabilises 2-3 mins after the start of exercise. Diastolic blood pressure remains unchanged or may insignificantly decrease in response to exercise.

Task 3 – Response to training of the Cardiovascular and Respiratory system

a) Describe the changes that happen to our heart after chronic aerobic training and how the changes would positively or negatively affect performance **(80-120 words)**

Chronic aerobic training would result in an increase in heart strength and size due to cardiac hypertrophy. The increase in heart strength would allow for an increase in stroke volume (blood flow/pumped per heart contraction), meaning overall heart rate is lower as the heart is not having to beat as fast to circulate the same amount of blood through the circulatory system.
This is an overall increase in cardiac output (stroke volume x heart rate) which would benefit performance as more oxygenated blood is able to be provided to the working muscles at a decreased workload which allows for more efficient exercise and greater workloads able to be achieved.

b) During training what happens to our breathing rate? Discuss the acute changes that occur and why these changes occur in response to exercise. **(80-120 words)**

When we start exercising, we find an increase in our breathing rate. This happens because we have an increased demand for oxygen from our muscles to continue to create energy. If we did not have an increase in breathing rate and a greater supply of oxygen, then a waste bi product would build up in the muscles (lactate) which limits our contraction ability and as a result performance would decrease. By increasing our breathing rate, we are for the most part matching the demands for oxygen from the muscles.

c) What chronic changes occur to our respiratory system in response to regular exercise? Provide AT LEAST TWO changes that occur. **(80-120 words)**

Within our lungs the main adaptation is the increase in the surface area for oxygen and CO2 diffusion. This is achieved by increasing the number of alveoli and increasing the capillary density around the current alveoli as well. This allows for more oxygen to be diffused across at any one time increasing the amount of oxygen we can breathe in and transport to our muscles.

The respiratory muscles also increase in strength because of regular exercise, which contributes to a greater total lung capacity caused by a greater ability of inspiration effort.

End of Quiz