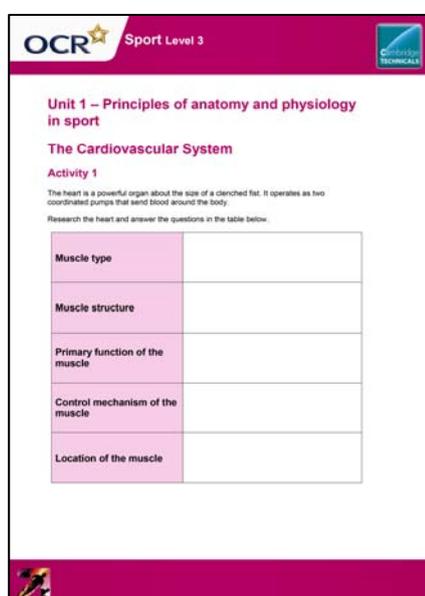


Unit 1 – Principles of anatomy and physiology in sport

The Cardiovascular System

Instructions and answers for Teachers

These instructions should accompany the OCR resource 'The Cardiovascular System', which supports the OCR Level 3 Cambridge Technical in Sport Unit 1 – Principles of anatomy and physiology in sport



Muscle type	
Muscle structure	
Primary function of the muscle	
Control mechanism of the muscle	
Location of the muscle	

Associated files:
The Cardiovascular System
(activity)

Activity 1 – 15 minutes
Activity 2 – 15 minutes
Activity 3 – 15 minutes
Activity 4 – 15 minutes



This activity offers an opportunity for English skills development.

The teacher could introduce the heart as a muscle and ask the learners to research and complete Activity 1. The teacher could then facilitate a group discussion about the main features of the heart, ie left and right atria, left and right ventricles, valves and vessels. The learners could then work in small groups to label the diagram in Activity 2. A group discussion on the structure and function of arteries, veins, capillaries, arterioles and venules could take place before Activity 3 is undertaken. Activity 4 could be completed after a group discussion on heart rate, stroke volume and cardiac output.



Activity 1

The heart is a powerful organ about the size of a clenched fist. It operates as two coordinated pumps that send blood around the body.

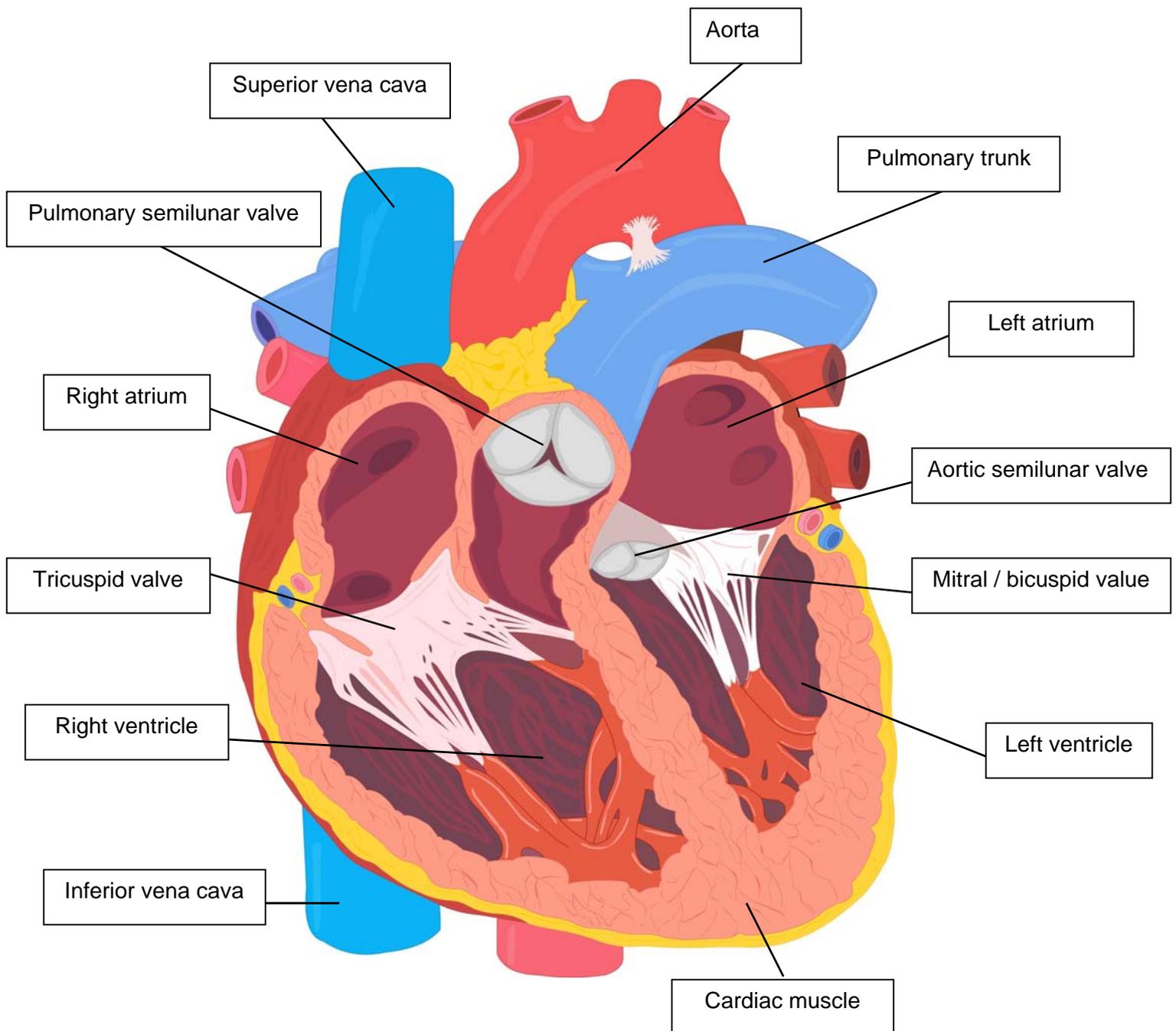
Research the heart and answer the questions in the table below.

Muscle type	Cardiac muscle
Muscle structure	A combination of striated (striped) and smooth muscle
Primary function of the muscle	Allows the pumping action of the heart
Control mechanism of the muscle	The heart's automatic nervous system, assisted by the central nervous system
Location of the muscle	The heart – to the left of the centre in between the lungs



Activity 2

On the diagram below, label the main features of the heart.

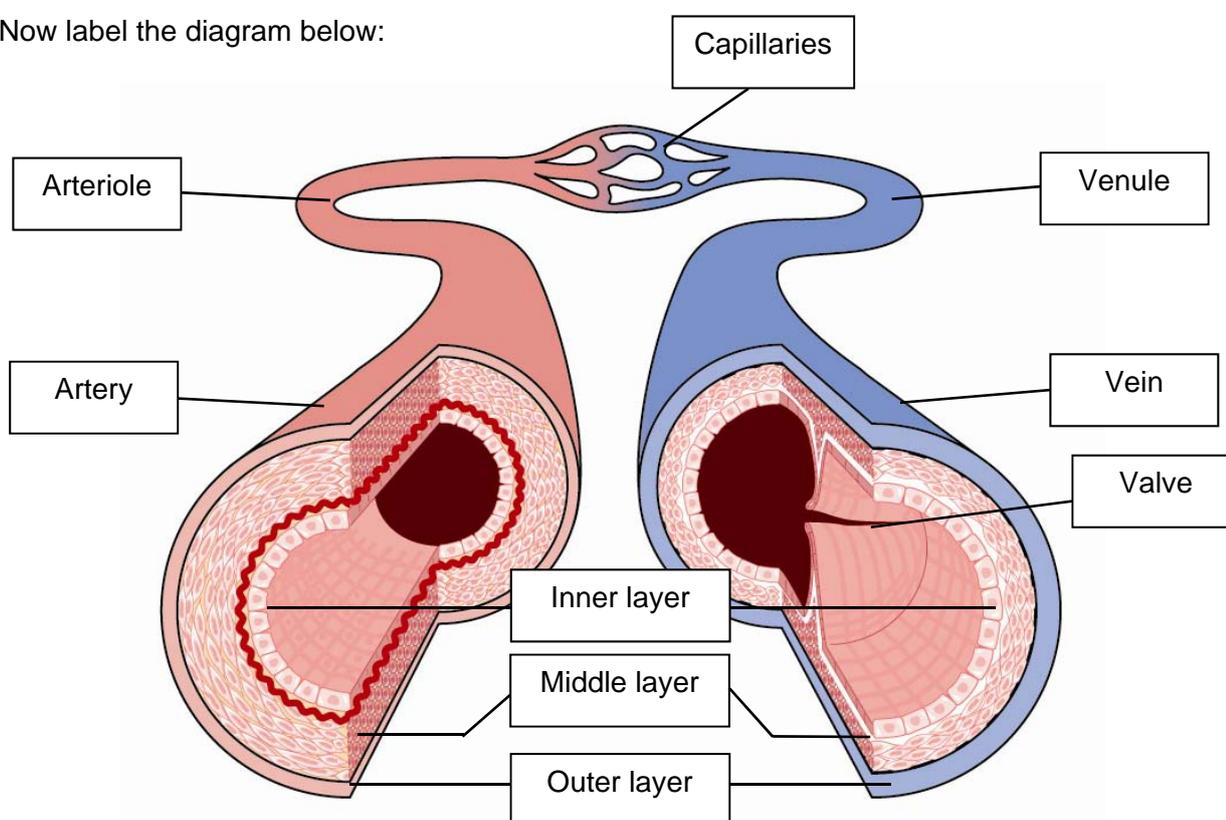


Activity 3

Having learnt about the blood vessels, use your knowledge to complete the table below. You must describe the function and structure of the: arteries, veins and capillaries. You may want to use additional resources such as the internet, books and diagrams.

Vessel name	Structure and function
Arteries	Thick and elastic in texture, and can the high pressure of when the heart contracts. Arteries carry oxygenated blood away from the heart. The muscular action of these vessels pushes blood through the arteries to the relevant parts of the body.
Veins	More flexible than an artery, has thinner walls, and pocket valves that carry blood back to the heart. The blood is under low pressure; therefore it flows slowly and smoothly.
Capillaries	The smallest of the blood vessels. There are numerous capillaries that carry the blood between the arteries and the veins.

Now label the diagram below:



Activity 4

Having learnt about the function of the cardiovascular system during exercise, use your knowledge to complete this worksheet.

You must describe: stroke volume, cardiac output and heart rate. You may want to use additional resources such as the internet, books and diagrams.

Stroke volume	The amount of blood pumped by the left ventricle of the heart in one contraction. The <u>stroke</u> volume is not all the blood contained in the left ventricle; normally, only about two-thirds of the blood in the ventricle is expelled with each beat. Together with the heart rate, the stroke volume determines the output of blood by the heart per minute (cardiac output).
Cardiac output	The volume of blood pumped by the heart per minute is called the cardiac output and is the product of the stroke volume and the heart rate. At rest, in the average adult, the cardiac output is 5 litres/min and in exercise it may rise to 35 litres/min.
Heart rate	The number of heartbeats per unit of time, usually per minute (referred to as beats per minute). The heart rate is based on the number of contractions of the <u>ventricles</u> (the lower chambers of the heart).
Resting heart rate	The resting heart rate is measured while the subject is at rest but awake, and not having recently exerted him or herself. The typical resting heart rate in adults is 60–80 beats per minute.
Maximum heart rate	The maximum heart rate is the highest heart rate an individual can achieve without severe problems through exercise stress, and depends on age. To work out your maximum heart rate calculate $220 - \text{your age}$.

To give us feedback on, or ideas about the OCR resources you have used, email resourcesfeedback@ocr.org.uk

OCR Resources: *the small print*

OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources.

© OCR 2013 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content:

• English icon: AirOne/Shutterstock.com • Page 3 Heart image: mmutlu/Shutterstock.com • Page 4 Blood vessels image: Blamb/Shutterstock.com

