

KEY STAGE 4 – NCFE LEVEL 1/2 TECHNICAL AWARD IN HEALTH & FITNESS – YEAR 10

CONTENT AREA 1.4 – CIRCULATORY SYSTEM

Big Picture: To Develop a Broad Understanding of the Structure and Function of the Body Systems

Blood Vessels

The learner will understand the structure of the **blood vessels** and how the structure relates to the functions of blood distribution:

Veins

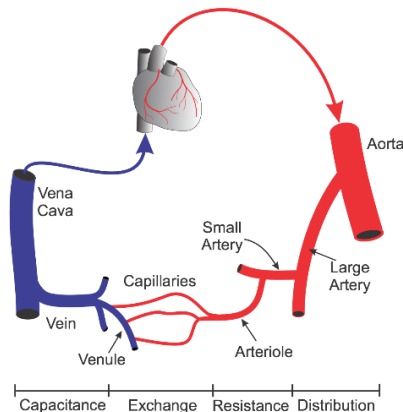
- Thin walls
- Wide lumen
- Contain valves to ensure blood flows in one direction
- Carry blood to the heart
- Carry blood under low pressure

Arteries

- Thick, muscular walls
- Narrow lumen
- Carry blood away from the heart to the body
- Carry blood under high pressure
- Smooth muscle that can vasoconstrict/vasodilate to increase or reduce blood flow

Capillaries

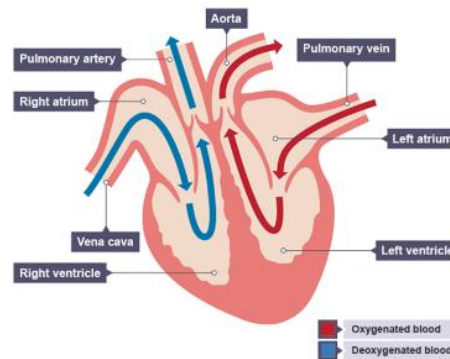
- The smallest blood vessels
- Very thin walls (one cell thick)
- Assist with gaseous exchange at the alveoli in the lungs
- Diffusion of gases at muscles and other organs located, their characteristics and functions. This includes:



Heart Structure

The learner will understand the 2 sides that the heart is divided into (left and right) and how to locate the following structures:

- Atrium (left and right)
- Ventricles (left and right)
- Pulmonary Artery
- Pulmonary Vein
- Vena Cava
- Aorta
- Valves
 - Bicuspid
 - Tricuspid
 - Aortic
 - Pulmonary
- Septum



Don't let the atriums and ventricles confuse you.
Remember that A is before V in the alphabet so **A**triums
(which starts with the letter A) is above the **V**entricles
(which starts with the letter V).

Blood Redistribution

The learner will understand how the blood vessels redistribute blood (vascular shunt) during fitness activities:

Vascular Shunt

The function of blood redistribution to the muscles with greater demand, while diverting away from areas of lower demand, through:

- the widening of blood vessels (vasodilation)
- the narrowing of blood vessels (vasoconstriction)



Cardiac Cycle

Learners will understand the order of the cardiac cycle and the pathway of deoxygenated and oxygenated blood around the heart:

Deoxygenated Blood

From the body → vena cava → right atrium → tricuspid valve → right ventricle → pulmonary valve → pulmonary artery → to the lungs → pick up oxygen and nutrients to become oxygenated.

Oxygenated Blood

From the lungs → pulmonary vein → left atrium → bicuspid valve → left ventricle → aortic valve → aorta → to the body → drop off oxygen and nutrients, pick up waste products and become deoxygenated.

Remember that the blood enters the tricuspid first, not the bicuspid valve. Remember this saying, "First always try, before you buy". By remembering this phrase, you will remember that the tricuspid (try) is before the bicuspid (buy) valve.

Cardio Measurement

The learner will understand the following cardiovascular measurements, including how they are measured (limited to maximal heart rate and cardiac output) and understand how they are relevant to health and fitness:

Heart rate (HR) – measured by beats per minute (BPM)

Maximum heart rate (MHR) = 220 minus age

Stroke volume (SV)

Cardiac output (CO)

The relationship between stroke volume, heart rate and cardiac output linked with cardiac output equation:

$$CO = SV \times HR$$

Blood Pressure

The learner will understand the 2 different types of blood pressure, the ranges of blood pressure classification and factors that affect blood pressure:

Systolic
Diastolic

Range of Blood Pressure Classifications:

- The ideal range – between 90/60mmhg and 120/80mmhg
- Elevated blood pressure – between 121/81mmhg and 139/89mmhg
- High blood pressure is more than 140/90mmhg
- Low blood pressure is less than 90/60mmhg

Factors that affect Blood Pressure:

activity levels
stress
diet
age

Remember: ASDA

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HOMEWORK / SUPPORT / UNDERSTANDING

The key questions, key vocabulary & assessment level guidance below can all be used for Homework/Home learning on this topic

Key Questions

Outline the structure of arteries, explaining how it helps them perform their function.

Explain how the structure of capillaries help them perform their function.

Outline the structure of veins, explaining how it helps them perform their function.

Outline the vascular shunt process.

The vascular shunt mechanism redistributes blood to where it is in demand through vasodilation and vasoconstriction. State the role each of these have in the process of transporting blood around the body.

Name the four blood vessels that are attached to the four chambers of the heart.

Name the four valves in the heart that prevent backflow of blood.

State the role of the septum in the heart.

Describe concentric muscle contraction.

Describe eccentric muscle contraction.

What role do the aorta and pulmonary arteries have in the heart?

What role do the vena cava and pulmonary veins have in the heart.

What is the formula used to calculate your maximum heart rate?

State the equation to calculate cardiac output?

Explain what is meant by systolic and diastolic pressure.

Key Vocabulary

Aorta – The largest artery in the body.

Artery – A blood vessel that carries blood away from the heart.

Atrium – Each of the two upper chambers of the heart that receives blood that comes into the heart.

Blood pressure – The pressure that is exerted by the blood against the walls of blood vessels.

Capillary – A tiny blood vessel where substances are exchanged between the blood and the body cells.

Coronary artery – An artery that supplies blood to the heart itself.

Heart – A hollow, muscular organ that pumps blood throughout the body.

Pulmonary artery – An artery in the pulmonary circulation that carries deoxygenated blood from the right side of the heart to the lungs.

Pulmonary vein – The vein that transfers oxygenated blood from the lungs to the heart.

Red blood cell – A cell in the blood that takes up oxygen in the lungs and delivers it to cells elsewhere in the body.

Valve – A flap of tissue in the heart or vein that prevents blood from flowing backwards.

Vein – A blood vessel that carries blood back to the heart.

Vena Cava – A very large vein that brings deoxygenated blood to your heart to get oxygen.

Ventricle – Each of the two lower chambers of the heart that pumps blood out of the heart.

White blood cell – A blood cell that fights disease.

Assessment Method

Written Examination - 40% of the technical award

Written examination:

- 80 marks.
- 1 hour 30 minutes.
- a mixture of multiple-choice, short-answer and extended-response questions.

The written examination is a terminal assessment and will assess the learner's knowledge and understanding of all content areas.

The examination is set and marked by NCFE. The assessment assesses learners' knowledge and understanding of the content areas of this qualification.

A variety of assessment questions will be used, including multiple-choice, short-answer and extended response questions. This will enable learners to demonstrate their breadth of knowledge and understanding of the subject and ensure achievement at the appropriate level, including stretch and challenge. Questions will be written in plain English and in a way that is supportive and accessible to learners of all abilities.

The examination date is expected to take place in May/June every year. Please refer to the external assessment timetable available on the NCFE website.

(Remaining 60% is the internal assessment is at school)