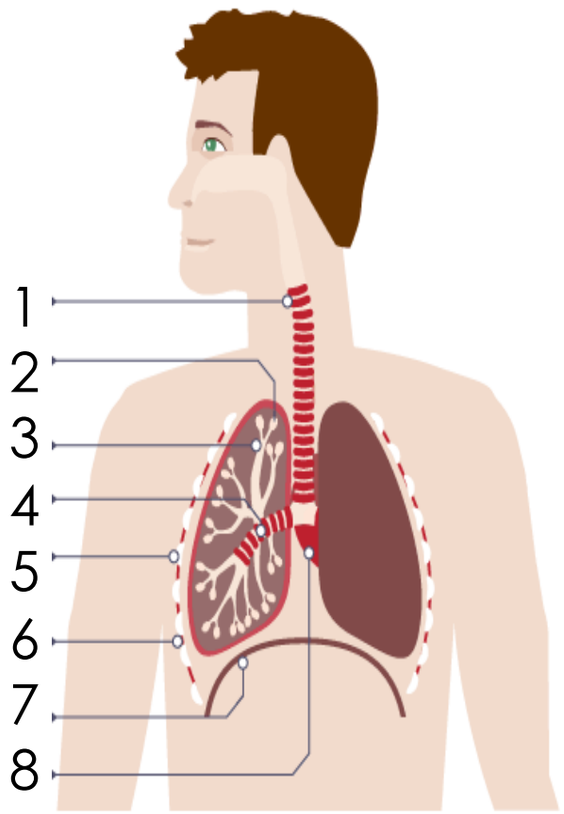
The de Ferrers Trust

BIOLOGY – YEAR 9 – CIRCULATION

A THE LUNGS

1	Trachea
2	Alveoli
3	Bronchiole
4	Right bronchus
5	Ribs
6	Intercostal muscles
7	Diaphragm
8	Heart



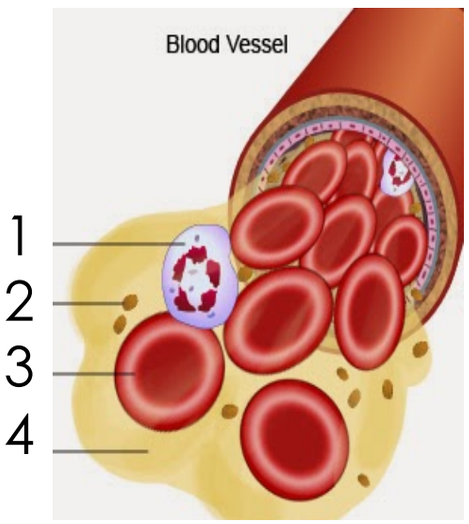
B ALVEOLI ADAPTATIONS

1	Thin walls	Capillary wall one cell thick
2	Moist layers	From mucus in alveoli
3	Large surface area	Many alveoli
4	High concentration gradient	Blood enters with low O_2 and high CO_2
5	Large capillary network	Good blood supply

C. BLOOD VESSELS

	Name	Function	Structure
1	Arteries	Carries blood *away* from the heart under high pressure	• Small lumen • Thick muscular and elastic walls • Walls can stretch and withstand high pressure
2	Veins	Carries blood *to* the heart under low pressure	• Large lumen • Have valves to stop blood flowing the wrong way • Thin walls
3	Capillaries	Carries blood to tissues and cells Connects arteries and veins	• One cell thick giving a short diffusion distance for substances to move between the blood and tissues • Very narrow lumen

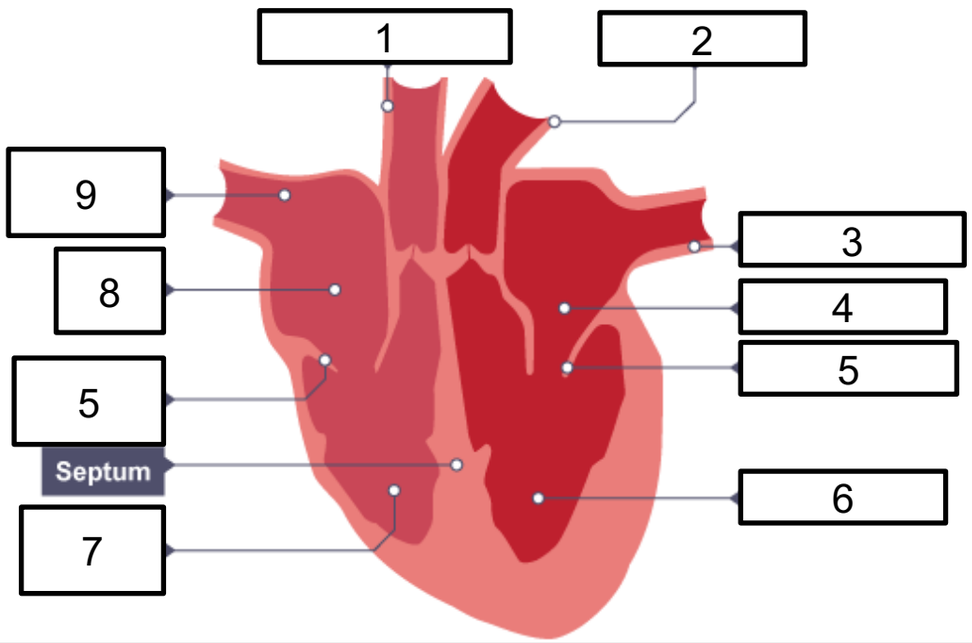
D BLOOD

	Components	Diagram	Function
1	White blood cell		Part of the immune system to defend the body against pathogens.
2	Platelets		Form blood clots to create barriers to infection.
3	Red blood cell		Binds to oxygen and transports it around the body.
4	Plasma		The liquid part of the blood that transports substances such as urea, glucose, hormones and blood cells around the body.

BIOLOGY – YEAR 9 – CIRCULATION & NON-COMMUNICABLE DISEASES

E THE HEART

1	Pulmonary artery	Carries deoxygenated blood to the lungs
2	Aorta	Carries oxygenated blood to the body
3	Pulmonary vein	Brings oxygenated blood from the lungs
4	Left atrium	Pushes blood to left ventricle
5	Heart valve	Prevents backflow of blood
6	Left ventricle	Pumps blood to body
7	Right ventricle	Pumps blood to lungs where gas exchange takes place
8	Right atrium	Pushes blood into right ventricle. The pacemaker is located here.
9	Vena cava	Brings deoxygenated blood from body



F HEALTH ISSUES

1	Health	A state of physical and mental well-being
2	Communicable disease	A disease which is caused by a pathogen so can be spread from person to person
3	Non-communicable disease	A disease which is not caused by a pathogen so can not be spread from person to person.
4	Risk factor	Any aspect of your lifestyle or substance in your body that can increase the risk of a disease developing e.g. smoking, diet
5	Carcinogen	A substance which increases the risk of developing cancer e.g. ionising radiation
6	Cancer	The result of changes in cells that lead to uncontrolled growth and division by mitosis.
7	Benign tumour	A non-cancerous tumour that does not spread in the body.
8	Malignant tumour	Cancerous tumour that can spread in the blood to other parts of the body, forming secondary tumours.
9	Coronary arteries	The arteries that supply the heart muscle with oxygen.
10	Coronary heart disease (CHD)	When the coronary arteries become narrowed by the build-up of layers of fatty material within them.
11	Heart attack	This reduces the flow of blood, resulting in less oxygen for the heart muscle, which can lead to heart attacks.
12	Artificial heart	Can be used to keep patients alive while waiting for a heart transplant or to allow the heart to rest during recovery.

BIOLOGY – YEAR 9 – NON-COMMUNICABLE DISEASES

G TREATMENTS FOR CHD

	Treatment	Description	Advantages	Disadvantages
1	Stent	Inserted into blocked coronary arteries to keep them open	Widens the artery – allows more blood to flow, so more oxygen is supplied. Less serious surgery	Can involve major surgery so there is a risk of infection, blood loss, blood clots and damage to blood vessels. Risks from anaesthetic used during surgery.
2	Statins	Drugs that reduce blood cholesterol levels, slowing down the deposit of fatty material in the arteries.	Effective No need for surgery Can prevent CHD from developing	Possible side effects such as muscle pain, headaches and sickness Cannot cure CHD so patient will have to take tables for many years.
3	Replace faulty heart valves	Heart valves that leak or do not open fully, preventing control of blood flow to the heart, can be replaced with biological or mechanical valves.	Allows control of blood flow to the heart Long-term cure for faulty heart valves	Can involve major surgery – risk of infection and blood loss Risks from anaesthetic used during surgery.
4	Transplant	A donor heart or heart and lungs can be transplanted.	Long-term cure for the most serious heart conditions Treats problems that cannot be treated in other ways	Transplant may be rejected if there is not a match between donor and patient. Lengthy process. Major surgery – risk of infection and blood loss.

H RISK FACTORS

	Treatment	Disease	Effects of risk factor
1	Diet (obesity) and amount of exercise	Type 2 diabetes	Blood glucose levels not controlled.
		Cardiovascular diseases	Increased blood cholesterol can lead to CHD.
2	Alcohol	Impaired liver function	Long-term alcohol use causes liver cirrhosis, meaning that the liver can not remove toxins from the body or produce sufficient bile.
		Impaired brain function	Damages the brain and can cause anxiety and depression.
3	Smoking	Lung disease and cancers	Cigarettes contain carcinogens which can cause cancers
4	Carcinogens and genetic risk factors	Cancers	UV rays from the Sun can cause cancers
			Some genetic factors make an individual more likely to develop certain cancers