

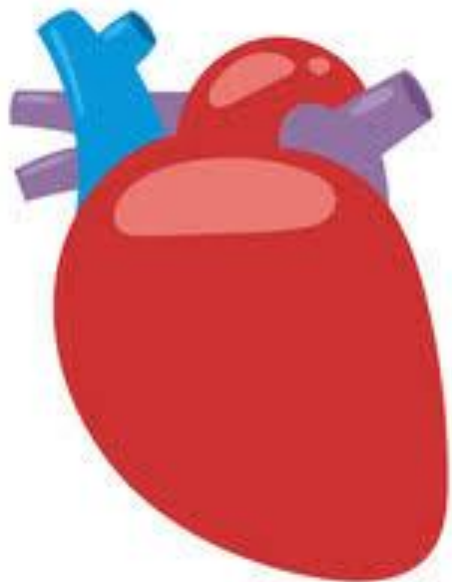
Cardiovascular

System Revision

Guide

St Mary's Catholic Academy

GCSE Physical Education

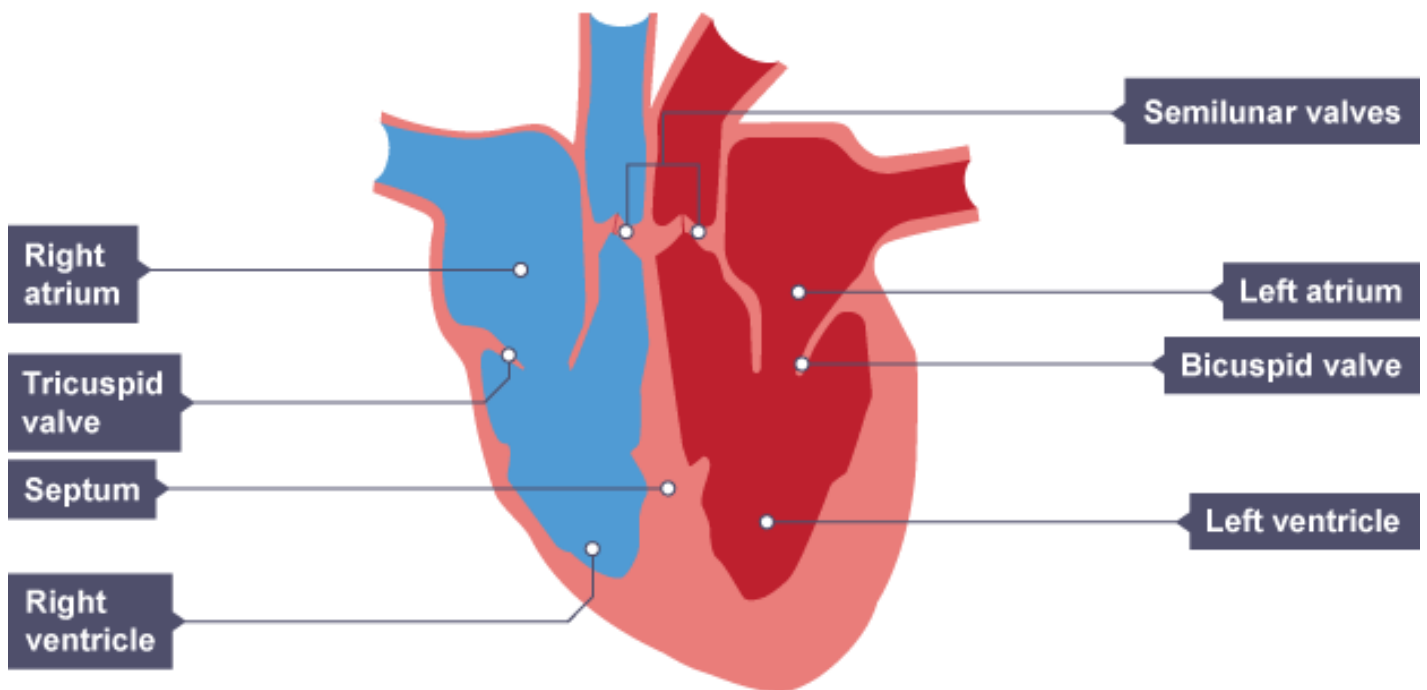


Structure of the Heart

The heart is a large **muscular pump** and is divided into **two halves** - the right-hand side and the left-hand side.

The **right-hand side** of the heart is responsible for pumping **deoxygenated** blood **to the lungs**.

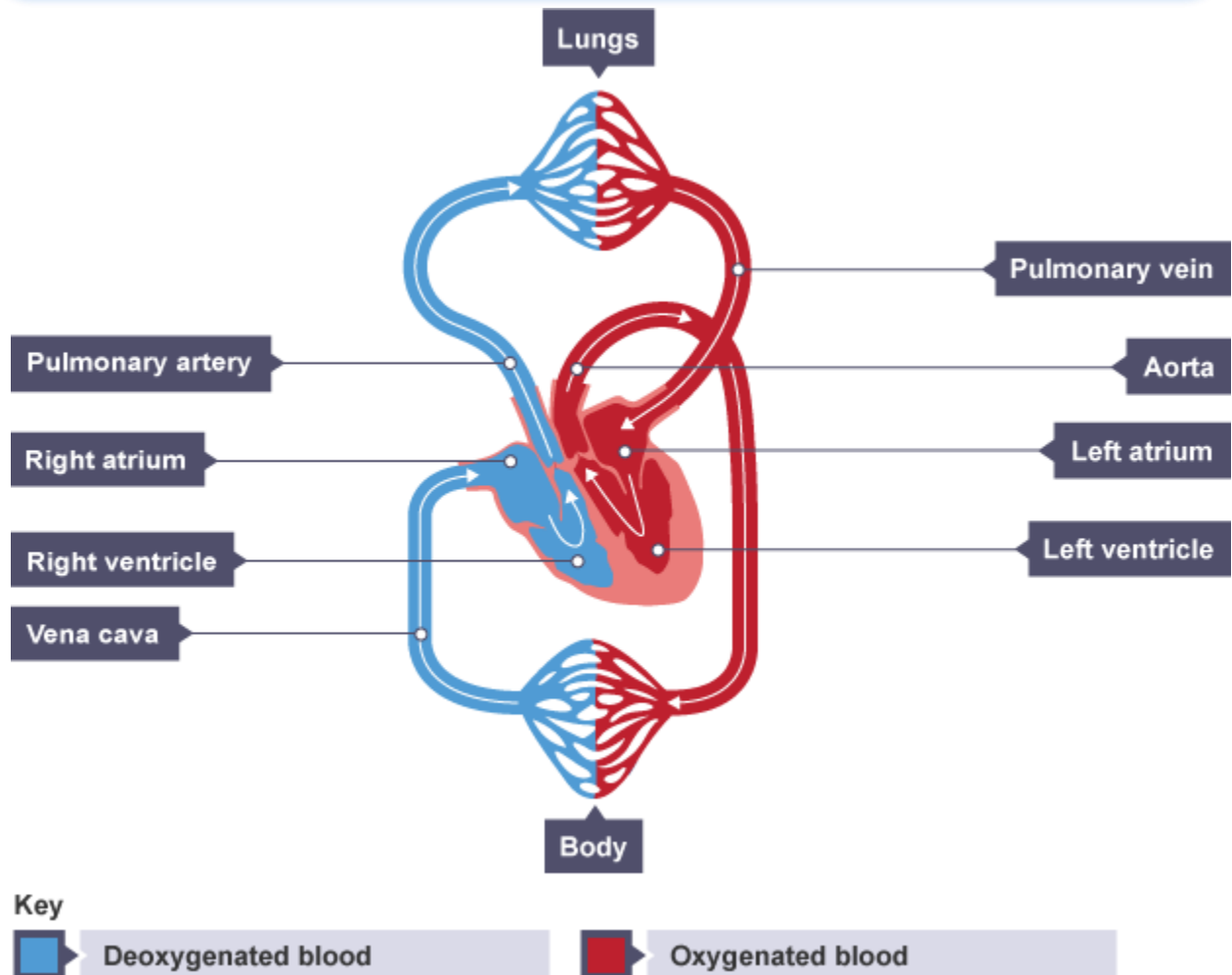
The **left-hand side** pumps oxygenated blood around **the body**.



Name	Function
Atria (Plurak of atrium)	This is where blood is collected when it eneters the heart.
Ventricles	These pump the blood out of the heart to the lungs or around the body.
Septum	This seperates the right hand side and the left hand side of the heart.
Tricuspid Valve	Allow blood flow from the right atrium to the right ventrical.
Bicuspid Valve	Allows blood flow from the left atrium and left ventrical.
Semilunar Valve	These stop the back flow of blood into the heart.

Blood vessels

There are **four main blood vessels** that take blood into and out of the heart.



The **aorta** is the **largest artery** in the body. It carries **oxygenated** blood away from the **left ventricle to the body**.

The **vena cava** is the **largest vein** in the body. It carries **deoxygenated** blood from the body **back to the heart**.

The **pulmonary artery** carries **deoxygenated** blood away from the **right ventricle to the lungs**.

The **pulmonary vein** returns **oxygenated** blood from the **lungs to the heart**.

Functions of the Cardiovascular System

- 1) Deliver oxygen and nutrients to the body.
- 2) Remove the waste products such as carbon dioxide and lactic acid.
- 3) Protection against disease and infection.
- 4) Maintain body temperature.

BLOOD PRESSURE

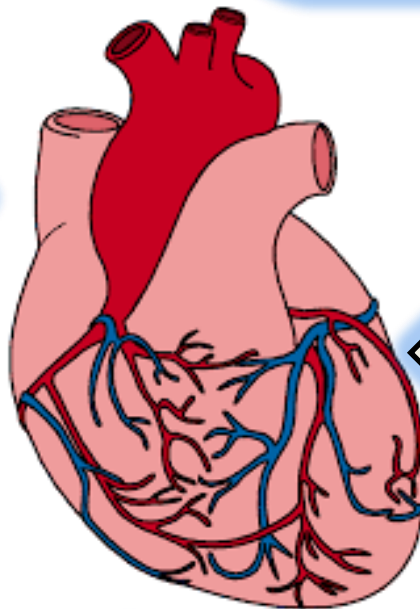
When the **heart contracts** it **pushes blood into blood vessels** which creates blood pressure.

A blood pressure reading consists of two values:

- 1) **Systolic value** – blood pressure when the **heart is squeezing**
- 2) **Diastolic value** – blood pressure when the heart is **relaxing**.

The average blood pressure for an adult is 120/80 mmHg. The **first number is the systolic value** and the **second number is the diastolic value**.

Heart rate (HR) is the number of times the **heart beats** (or the ventricles pump blood out) in **one minute**. The average resting HR is approximately 70 beats per minute (bpm).



Stroke volume (SV) is the amount of blood pumped out of the ventricles **each time they contract**. The average resting SV is approximately 70 ml.

Cardiac output (Q) is the amount of blood pumped from the heart **every minute** and can be calculated by **multiplying heart rate (HR) by stroke volume (SV)**.

Exercise and the Cardiovascular System

Heart rate is measured in beats per minute (bpm). During exercise the heart rate increases so that sufficient blood is taken to the working muscles to provide them with enough nutrients and oxygen. An increase in heart rate also allows for waste products to be removed.

Maximal heart rate can be worked out by the following equation:

$$\text{Maximum HR} = 220 - \text{age}$$

Stroke volume increases which means more blood is pumped out of the heart each time it contracts.

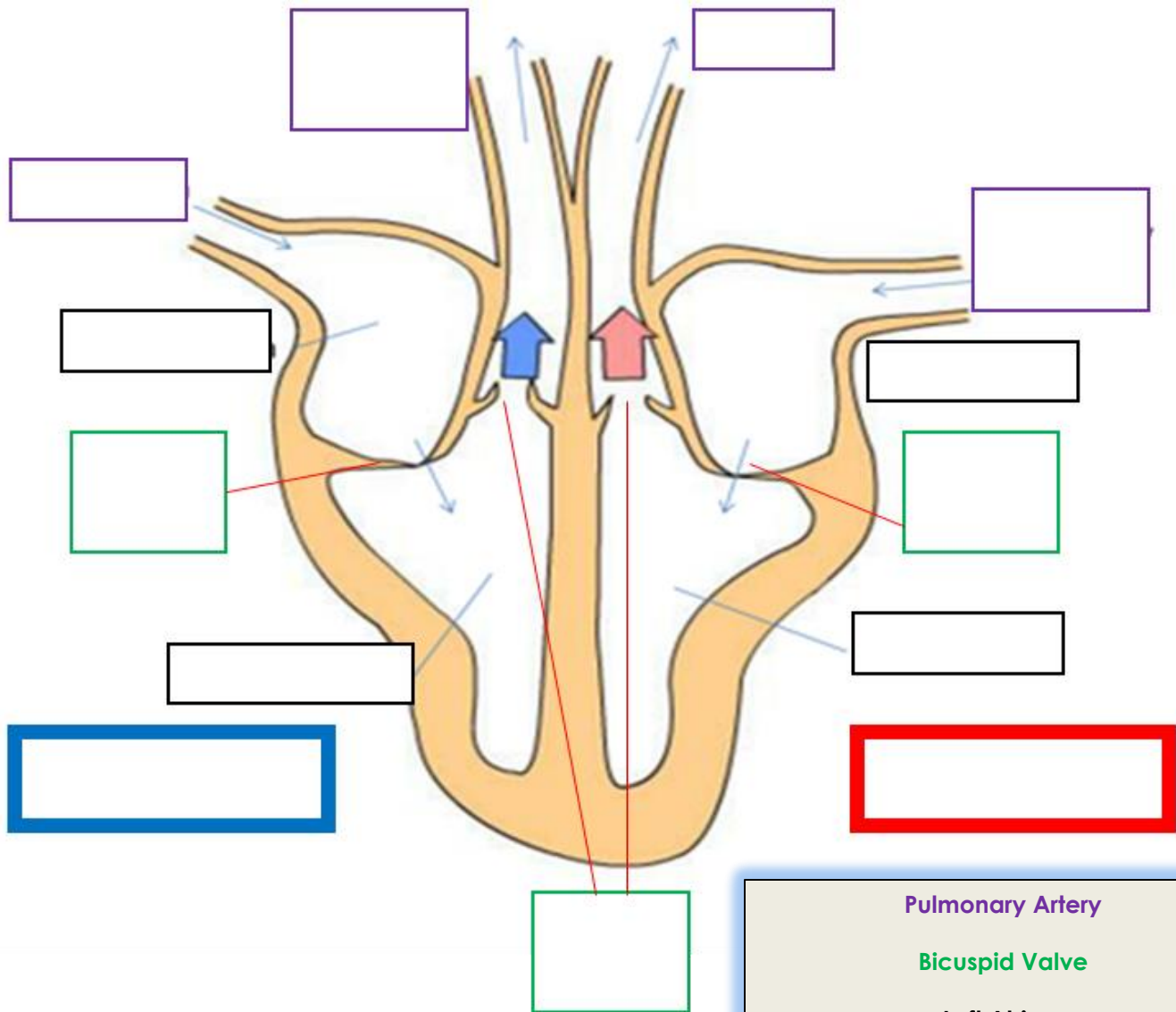


At rest a person's cardiac output is approximately 5 litres per minute, while during exercise it can increase to as much as 30 litres per minute as both their heart rate and stroke volume increase.

As exercise increases, cardiac output (Q) also increases. This has the effect of increasing blood pressure.

A typical blood pressure reading for a person at the start of exercise would be around 160/85 mmHg.

Tasks



Pulmonary Artery

Bicuspid Valve

Left Atrium

Right Ventricle

Oxygenated blood

Aorta

Right Atrium

Tricuspid Valve

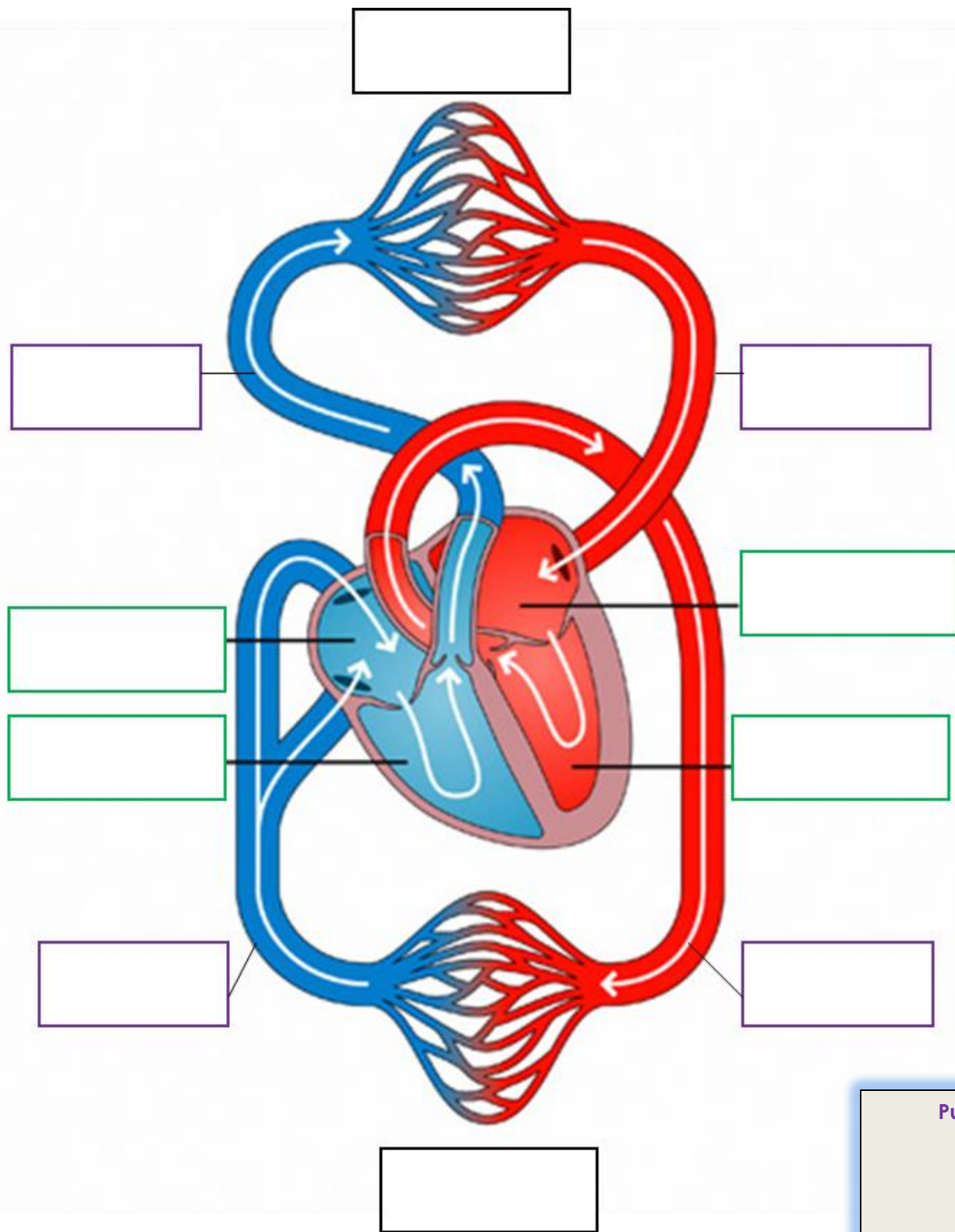
Vena Cava

Left Ventricle

Pulmonary Vein

Semilunar Valves

Deoxygenated blood



Pulmonary Artery

Body

Left Atrium

Right Ventricle

Aorta

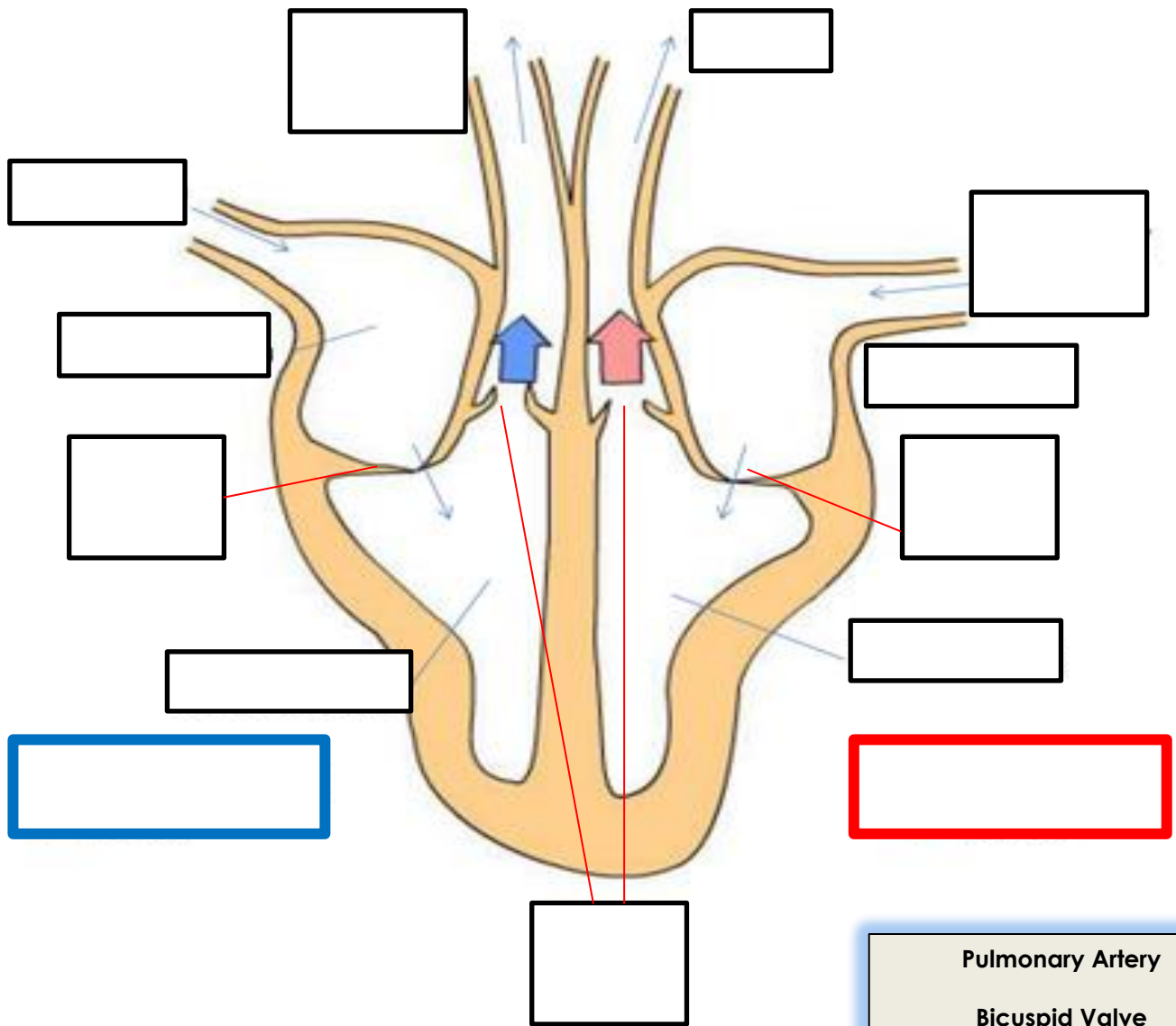
Right Atrium

Vena Cava

Left Ventricle

Pulmonary Vein

Lungs



Pulmonary Artery

Bicuspid Valve

Left Atrium

Right Ventricle

Oxygenated blood

Aorta

Right Atrium

Tricuspid Valve

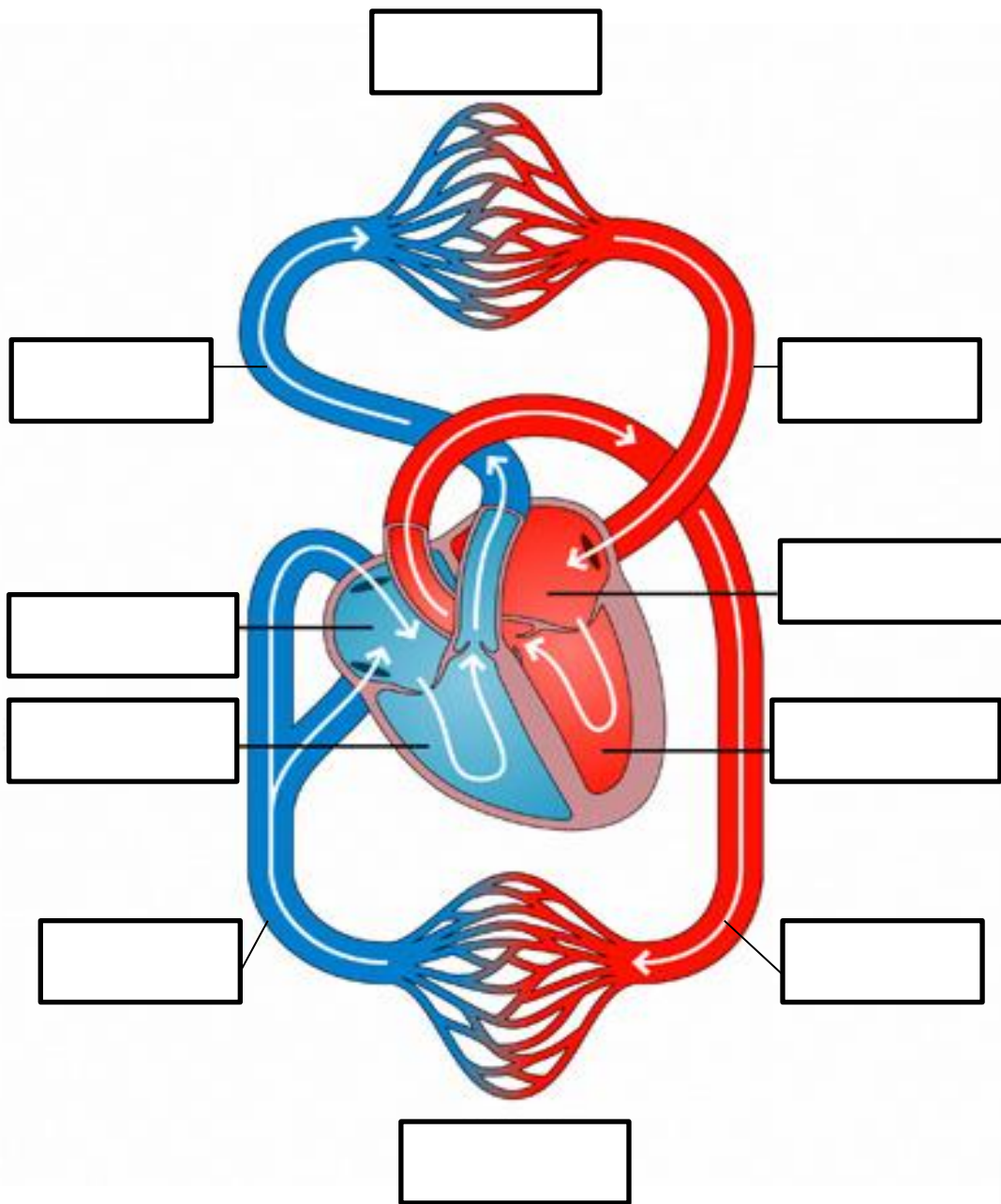
Vena Cava

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Pulmonary Artery

Body

Left Atrium

Right Ventricle

Aorta

Right Atrium

Vena Cava

Left Ventricle

Pulmonary Vein

Lungs

1 2

Figure 2 shows a diagram of the heart.

Using Figure 2, identify the names of the chambers of the heart labelled X and Y.
[2 marks]

Figure 2

Right

Left



X _____

Y _____

1 3

Define cardiac output.

[1 mark]

1 4

In 1999, Michael Johnson set a new world record for the 400m with a time of 43.18 seconds.

1 4 . 1

Justify why his performance was mainly aerobic or anaerobic.

[4 marks]

1 4 . 2

Athletes work at a percentage of maximal heart rate when training.

How is maximal heart rate calculated?

[1 mark]

Quick Questions

Which muscular structure separates the heart into left and right?

- 1) Ventricles
- 2) Atria
- 3) Septum

Which major artery exits the left ventricle and provides oxygenated blood to the body?

- 1) Pulmonary artery
- 2) Vena Cava
- 3) Aorta

Which condition occurs as a result of plaque building up in the arteries?

- 1) Atherosclerosis
- 2) Fracture
- 3) Abrasion

Which of the following functions of the cardiovascular system occurs in the veins?

- 1) Diffusion of gases
- 2) Carrying blood away from the heart
- 3) Carrying blood towards the heart

Which valve separates the left atrium from the left ventricle?

- 1) Tricuspid
- 2) Semilunar
- 3) Bicuspid

Which term can be used to describe the relaxation phase of the heart?

- 1) Systolic
- 2) Diastolic
- 3) Stroke Volume

Which of these blood pressure readings is the average blood pressure for an adult?

- 1) 120/80mmHg
- 2) 140/90 mmHg
- 3) 100/70mmHg

What is defined as "the amount of blood pumped out of the heart per minute"?

- 1) Stroke Volume
- 2) Heart Rate
- 3) Cardiac Output

Which formula is correct for cardiac output?

- 1) Stroke Volume x Heart Rate
- 2) Stroke Volume ÷ Heart Rate
- 3) Stroke Volume + Heart Rate

Which of the following is a key function of the cardiovascular system?

- 1) Nerve transmission
- 2) Producing movement
- 3) Maintaining body temperature

Answers

- 1) Septum
- 2) Aorta
- 3) Atherosclerosis
- 4) Carrying blood towards the heart
- 5) Bicuspid
- 6) Diastolic
- 7) 120/80 mmHg
- 8) Cardiac Output
- 9) $\text{Stroke volume} \times \text{heart rate}$
- 10) Maintaining body temperature

