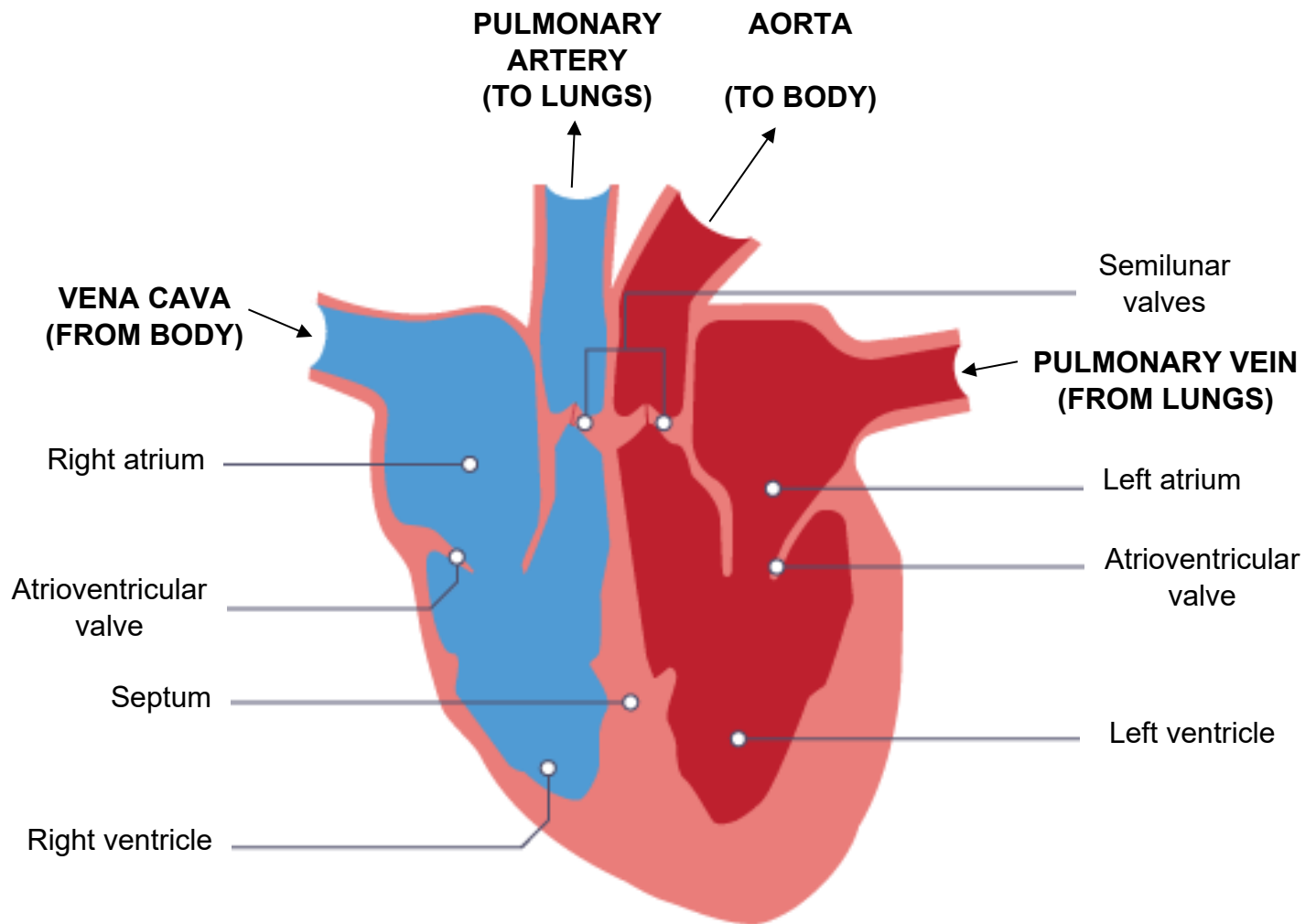


A. HEART STRUCTURE



- The two **top** chambers are called **atria**.
- The two **bottom** chambers are called **ventricles**.
- There are **four** main **blood vessels** connected to the heart.
- There are **two** different types of **valve** that **prevent blood** from flowing **backwards**.
- The **septum** separates the **left** and **right atria** and **ventricles**.
This makes sure that **oxygenated** blood and **deoxygenated** blood **do not mix**.
- If they **did mix**, blood **leaving** the heart would contain **less oxygen**, so our **cells** would **respire less** and **release less energy**.

B. THE JOURNEY OF BLOOD (look at the heart diagram as you read this)

- **Oxygenated** blood is taken from the **lungs** to the **left atrium** by the **pulmonary vein**.
- The **left atrium contracts** and **pushes blood** into the **left ventricle**.
- The **left ventricle contracts** and **pushes blood** up and out of the **aorta**.
- The **aorta** takes blood to the **body organs**, which **use** the **oxygen** for **respiration**.
- After this, the **blood** is **deoxygenated**.
- The **vena cava** takes **deoxygenated** blood back to the **right atrium**.
- The **right atrium contracts** and **pushes blood** into the **right ventricle**.
- The **right ventricle contracts** and **pushes blood** up and out of the **pulmonary artery**.
- The **pulmonary artery** then takes blood to the **lungs**, where it becomes **oxygenated**.
- The **cycle** then **repeats** itself.

C. COMPARING THE LEFT AND RIGHT SIDES

LEFT SIDE	RIGHT SIDE
Deals with oxygenated blood	Deals with deoxygenated blood
Higher pressure	Lower pressure
Pumps blood to the body organs (= SYSTEMIC circulation)	Pumps blood to the lungs (= PULMONARY circulation)
Thicker left ventricle – more muscle	Thinner right ventricle – less muscle

D. WHY IS THE LEFT VENTRICLE THICKER THAN THE RIGHT VENTRICLE?

- Left ventricle has **more muscle** tissue
- (So) **more pressure** generated
- (To) pump blood a **greater distance** (from head to toes)

E. COMPARING THE MAIN BLOOD VESSELS

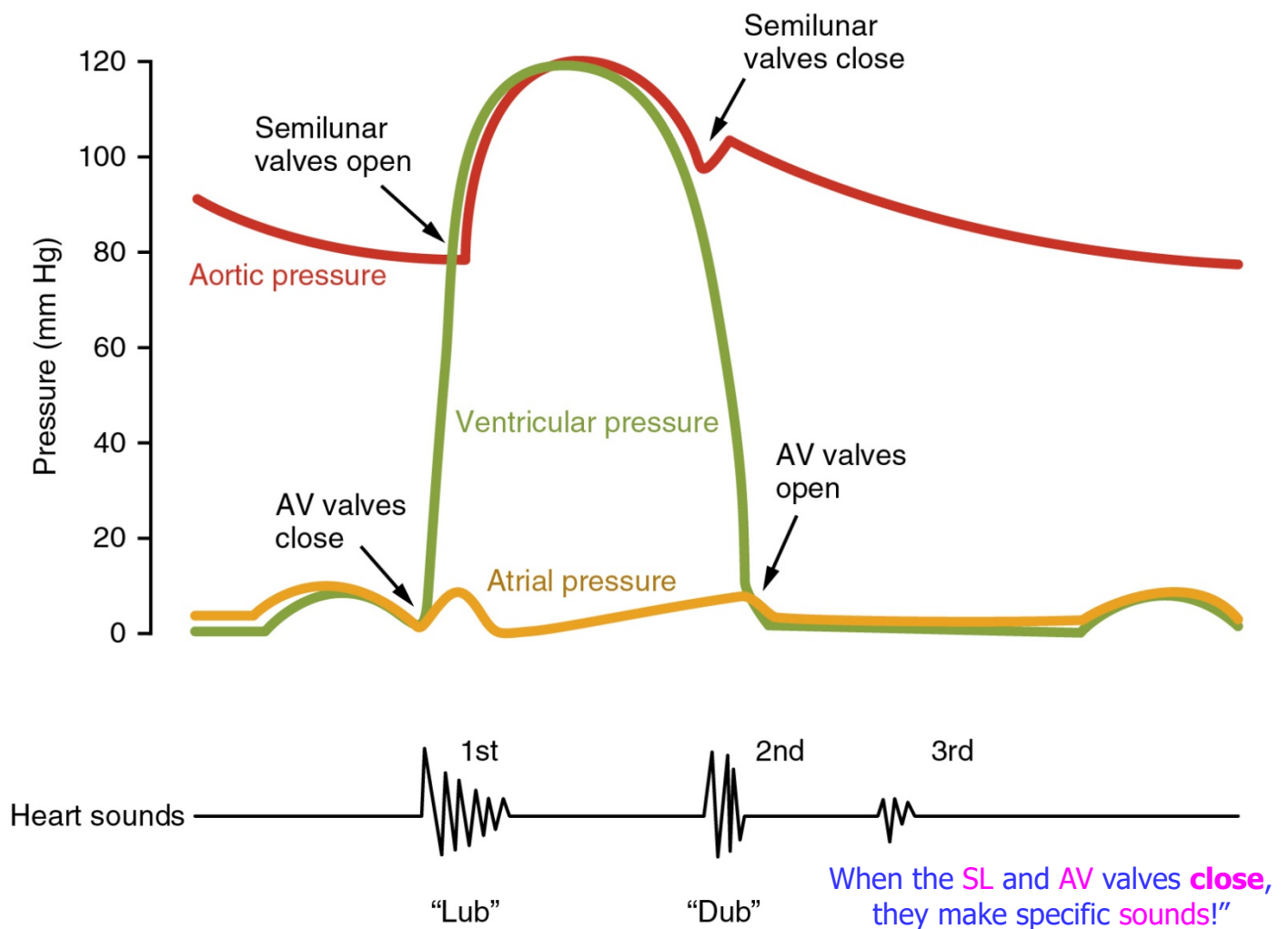
	Pulmonary Vein	Aorta	Vena Cava	Pulmonary Artery
Artery or vein	Vein	Artery	Vein	Artery
Blood carried	Oxygenated	Oxygenated	Deoxygenated	Deoxygenated
Takes blood from	Lungs	Left ventricle	Body organs	Right ventricle
Takes blood to	Left atrium	Body organs	Right atrium	Lungs

F. WHAT CAUSES THE VALVES TO OPEN AND CLOSE?

- The **atrioventricular (AV)** valves are between the **atria** and **ventricles**.
- The **semilunar (SL)** valves are between the **ventricles** and **arteries**.

DIFFERENCES in **PRESSURE** cause **VALVES** to **OPEN** or **CLOSE**

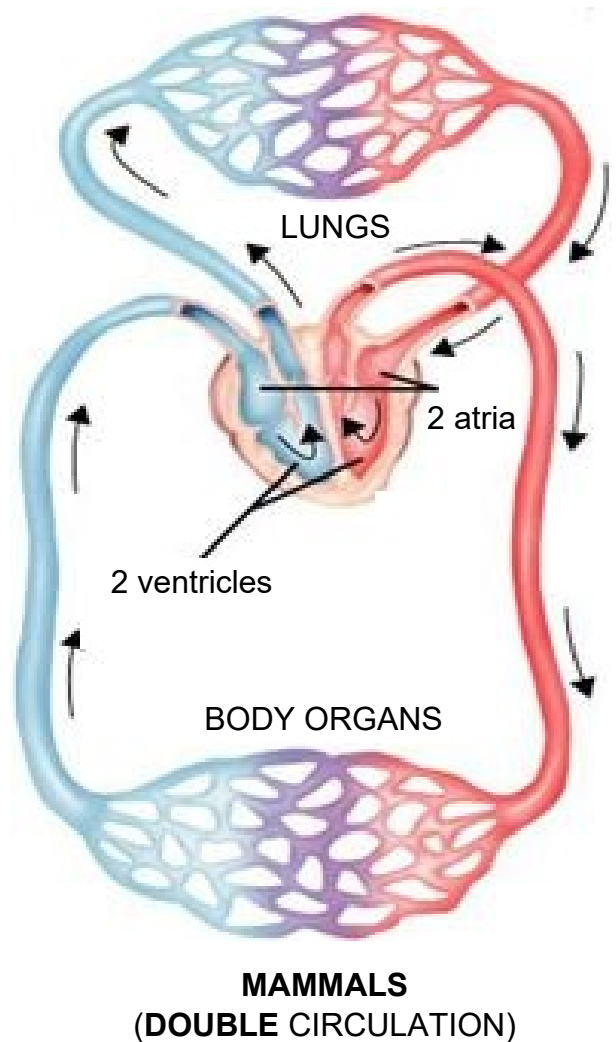
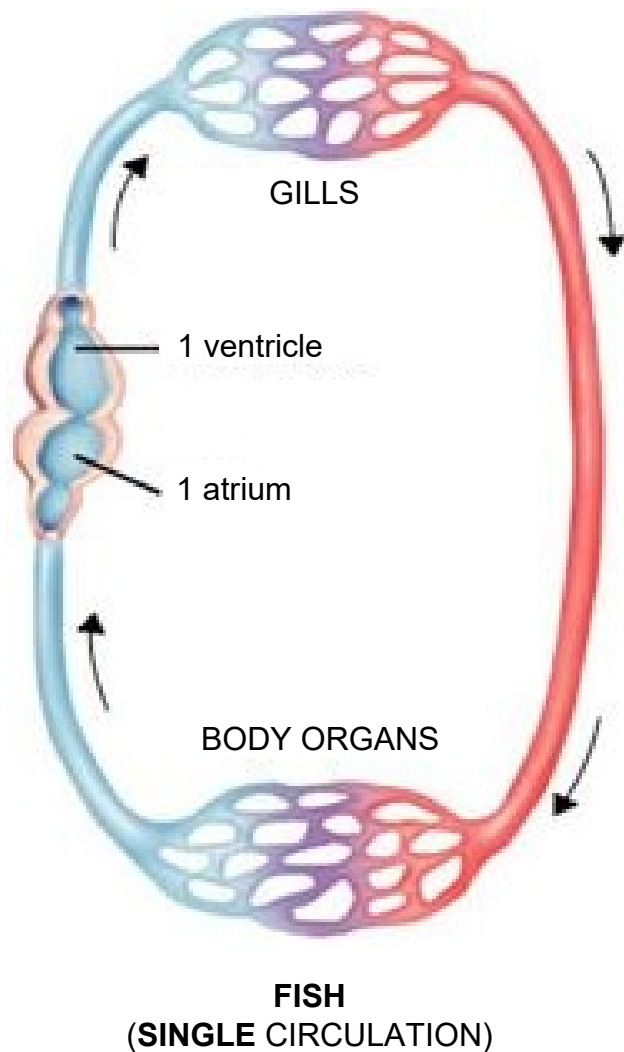
Look at what is **EITHER SIDE** of a **VALVE** and work out where the **PRESSURE** must **BE GREATER** to **OPEN** or **CLOSE** it



- Doctors can work out if the valves are **closing** correctly by listening for these **heart sounds**.

VALVES	STATE	WHEN	HEART SOUND MADE
AV	OPEN	ATRIA PRESSURE > VENTRICLE PRESSURE	NONE
AV	CLOSE	VENTRICLE PRESSURE > ATRIA PRESSURE	"LUB"
SL	OPEN	VENTRICLE PRESSURE > AORTA PRESSURE	NONE
SL	CLOSE	AORTA PRESSURE > VENTRICLE PRESSURE	"DUB"

G. SINGLE AND DOUBLE CIRCULATION



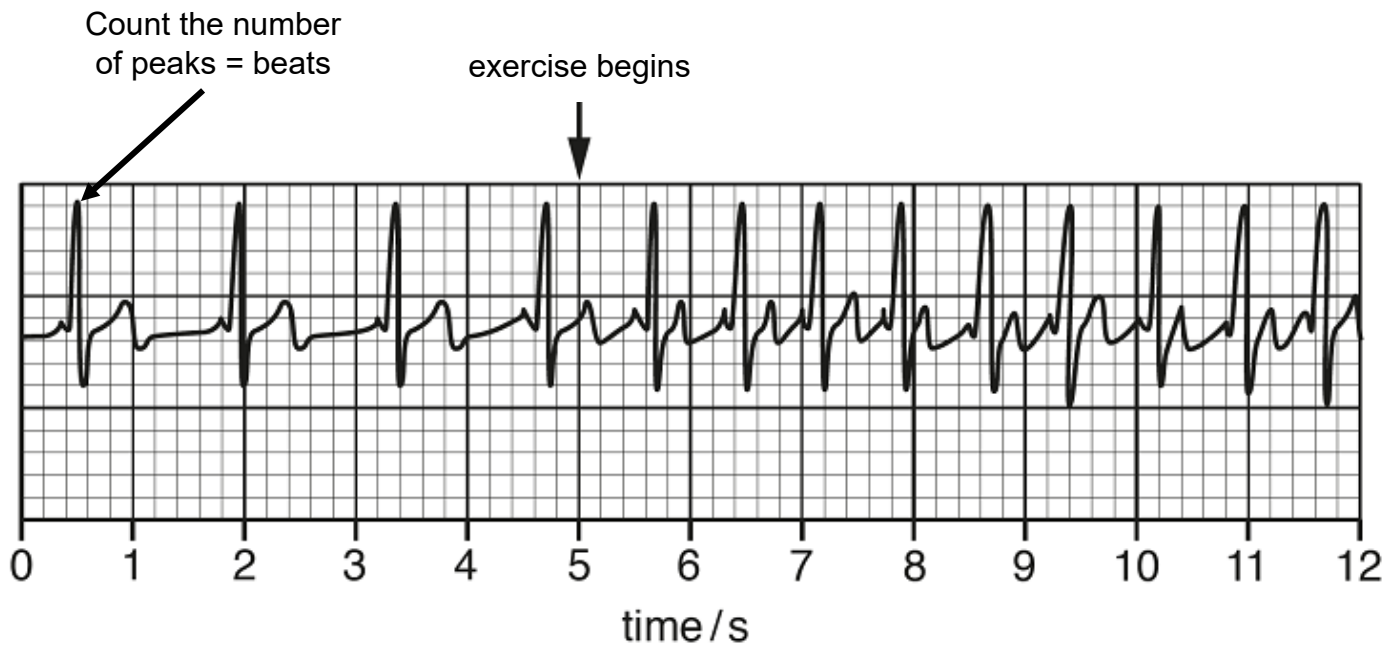
What is double circulation?

- Blood **passes through** the heart **twice** in **one circuit**.
- **Left side** of the heart takes blood to **body organs** under **higher pressure**.
(= **SYSTEMIC** CIRCULATION)
- **Right side** of the heart takes blood to the **lungs** under **lower pressure**.
(= **PULMONARY** CIRCULATION)

Advantage of double circulation

- **Higher pressure** generated
- (So) cells receive **more oxygen**
- (So) **more respiration** and **more energy released**

H. CALCULATING HEART RATE



- Heart rate **before** exercise = 4 heartbeats in 5 seconds = **48 beats per minute**

I. A MORE COMPLEX DIAGRAM OF THE HEART

- Do not be 'put off' by this – just **apply** what you have learned to **work out** where the different structures are in exams.

