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DATE 25- Oct - 21

CLASS VIII

SUBJECT: Physical Education

TOPIC: Chapter - 4 Circulatory System

TEACHER'S NAME: Ms. Kusum Thakur

Good Morning Students,

This lesson is of class VIII for the subject of PHYSICAL EDUCATION, topic Circulatory System which is covered in Chapter 4.

Page No. submitted to you on 25- Oct - 21 this voice of MS. KUSUM THAKUR.

If all students are ready then let us start with topic Meaning, Position of Heart

All of you please listen carefully as i will be asking a few questions in between the chapter.

Introduction :-

Let us first discuss the structure of Heart. Heart is approximately equal to size of closed fist and is a triangular shape organ of body, whose base is on the upper side and apex is on the lower side. The apex of the heart bends towards the left side. The weight of the heart is approximately 300 gm. Heart is made up of muscles called Cardiac muscles.

Position of Heart :-

Heart is present between the two lungs and behind the chest bone or sternum. Heart is divided into two parts, left and right side. Each side further has upper and lower region. The upper region is known as auricle and lower region is known as Ventricle. Thus heart has two Auricles and two Ventricles.

Myocardium :-

Myocardium is the muscular centre layer of the heart between the outer layer (epicardium) and the inner layer (endocardium). The myocardium is found in the walls of all four chambers of the heart.

Meaning of Circulatory System :-

The system that moves blood throughout the body. The circulatory system is composed of the heart, arteries, capillaries and veins. This remarkable system transports oxygenated blood from the lungs and heart throughout the body via the arteries. The blood goes through the capillaries which are situated between the arteries and veins.

Circulation and its types :-

The circulation of blood throughout the body mainly depends upon the heart.

There are three types of circulation

- 1) Systemic circulation
- 2) Pulmonary circulation
- 3) Portal circulation

1) Systemic circulation :- Systemic circulation describes the movement of blood from the heart through arteries to the periphery, and back to the heart through the veins.

2) Pulmonary circulation :- It describes the movement of blood from the heart to the lungs and back to the heart.

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3) Portal circulation :- It describes the movement of blood from the gut area through the liver to the heart.

Layers of the heart :-

Three layers of tissue form the heart wall. The outer layer of the heart wall is the epicardium, the middle layer is the myocardium, and the inner layer is the endocardium.

Chambers of the heart :-

The internal cavity of the heart is divided into four chambers.

1) Right Atrium

3) Left Atrium

2) Right Ventricle

4) Left Ventricle.

The two atria are thin-walled chambers that receive blood from the veins. The two ventricles are thick-walled chambers that forcefully pump blood out of the heart. Differences in thickness of the heart chambers walls are due to variations in the amount of myocardium present which reflects the amount of force each chamber is required to generate.

The right atrium receives deoxygenated blood from systemic veins, the left atrium receives oxygenated blood from the pulmonary veins.

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Atrium (Heart)

The Atrium is the upper chamber through which blood enters the Ventricles of the Heart. There are two Atria in the human heart - the left atrium receives blood from the pulmonary (lung) circulation, and the right atrium receives blood from the vena cava. The atria receive blood while relaxed (diastole), then contract (Systole) to move blood to the Ventricles.

Ventricles :- The heart has four chambers. The upper two chambers are the atria, and the lower two are the ventricles. The chambers are separated by a wall of tissue called the septum. Blood is pumped through the chambers, aided by four heart valves. The Valves open and close to let the blood flow in only one direction.

Arteries :- The arteries are the blood vessels that deliver oxygen-rich blood from the heart to the tissues of the body. Each artery is a muscular tube lined by smooth tissues.

Vein :- A blood vessels that carries blood that is low in oxygen content from the body back to the heart. Veins are part of the afferent wing of the circulatory system, which returns blood to the heart.

An Artery is a vessel that carries blood that is high in oxygen away from the heart to the body.

Capillaries :- Capillaries are tiny blood vessels connecting arteries to veins. These blood vessels carry oxygen and nutrients to individual cells throughout the body.

Heart Rate :- A normal resting heart rate for adults ranges from 60 to 100 beats per minute. A lower heart rate at rest implies more efficient heart function and better cardiovascular fitness. Heart rates vary from person to person. It is lower when you are at rest and higher when you exercise. For example, well trained athlete might have a normal resting heart rate closer to 40 beats per minute.

There are a few places on your body where it is easier to take your pulse :-

- 1) The inside of your wrists.
- 2) The inside of your elbows
- 3) The sides of your neck
- 4) The tops of your feet

Put the tips of your index and middle fingers on your skin.

Press lightly until you feel the blood pulsing beneath your fingers. You may need to move your fingers around until you feel it.

What things affects Heart Rate :-

- 1) Weather :- Your pulse may go up a bit in higher temperature and humidity levels.
- 2) Standing up :- It might spike for about 20 seconds after you first stand up from sitting.
- 3) Emotions :- stress and anxiety can raise your heart rate. It may go up when you are very happy or sad.
- 4) Body size :- People who have severe obesity can have a slightly faster pulse.
- 5) Medications
- 6) Caffeine and nicotine :- Coffee, tea, and soda raise your heart rate, so does tobacco.

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Stroke Volume :-

In cardiovascular physiology, stroke volume is the volume of blood pumped from the left ventricle per beat. Stroke volume is an important determinant of cardiac output, which is the product of stroke volume and heart rate. It is also used to calculate ejection fraction, which is stroke volume divided by end-diastolic volume. Because stroke volume decreases in certain conditions and disease states, stroke volume itself correlates with cardiac function.

Cardiac output :-

The amount of blood the heart pumps through the circulatory system in a minute. The amount of blood put out by the left ventricle of the heart in one contraction

is called the stroke volume. The stroke volume and the heart rate determine the cardiac output. A normal adult has a cardiac output of 4.7 liters of blood per minute.

Students before going further in the Chapter, let me ask you a few questions. Write answers in your notebook. The questions are :-

Q1 Define the terms :-

- Heart Rate
- Stroke Volume
- Cardiac Output

Answers to the above questions :-

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Ans-4 a) Heart Rate :- It is the number of contractions / pumping of Heart in one minute. It is about 72 times per minute.

b) Stroke Volume :- It is the Volume of blood pumped out by heart in one beat.

c) Cardiac output :- It is the amount of blood pumped out by Heart in one minute. It is 5-6 litres at basal level.

Continuing with the topic let us discuss about Blood.

Meaning of blood :- Blood is a body fluid in human that delivers necessary substances such as nutrients and oxygen to cells and transports metabolic waste products away from those same cells. Blood is a fluid that moves through the vessels of a circulatory system. It includes plasma, blood cells, and cell fragments called platelets.

Composition of Blood :-

- | | |
|--------------------|----------------------|
| 1) Red blood cells | 2) White blood cells |
| 3) Platelets | 4) Plasma |

1) Red blood cells :- Red blood cells are responsible for carrying oxygen and carbon-dioxide. The red blood cells are marked by glycoproteins that define the different blood types. (4.7 to 6.1 million (male), 4.2 to 5.4 million (female)).

2) White blood cells :- White blood cells are part of the body's immune system; they destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances. The cancer of leukocytes is called leukemia. (4,000 - 11,000 leukocytes).

3) Platelets :- Platelets also called Thrombocytes are cell fragments involved in blood clotting.

4) Plasma :- Plasma is the main components of blood and consists mostly of water, with proteins, ions, nutrients and dissolved gases. The denser cells and platelets move to the bottom of the tube, forming red and white layers, while the plasma remains at the top forming a yellow layer. Plasma is a pale yellowish, watery substance that surrounds blood cells and carries them around the body.

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Hope you all have understood the topic of Heart and Blood. All of you are required to read the chapter again from the Text book or these given notes of date 25-oct-21

Home Assignments questions are as follows:-

- Q1 What are 'arteries'?
- Q2 What is Vein?
- Q3 What is difference between Arteries and Veins?
- Q4 Describe the composition of blood? Define Blood.
- Q5 Draw a neat diagram of Human Heart?
- Q6 Define the terms:- Systolic and Diastolic?
- Q7 Explain Ventricles, Systemic circulation, Capillaries.
- Q8 Define the terms:- Circulatory system?
- Q9 What is the position of Heart in human body?
- Q10 What are the 3 layers of the heart wall?
- Q11 What are the 3 layers of Circulation?

Thank you.

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ANSWER- KEY

Q1 What are arteries?

Ans. The arteries are the blood vessels that deliver oxygen-rich blood from the heart to the tissues of the body.

Q2 What is Vein?

Ans. A blood vessel that carries blood that is low in oxygen content from the body back to the heart.

Q3 What is the difference between Arteries and Veins?

Ans. ARTERIES

VEINS

1. Carry blood away from heart

1. Bring blood towards the heart

2. Have thick and more muscular walls

2. Have thin and less muscular walls.

3. Walls are elastic

3. Walls are non-elastic

4. Do not collapse when empty

4. Collapse when empty

5. Carry oxygenated blood

5. Carry deoxygenated blood

Q4 Describe the composition of blood? Define Blood.

Composition of Blood :-

Ans. 1. Red blood cells (Erythrocytes) 3) Platelets (Thrombocytes)
2. White blood cells (Leucocytes) 4) Plasma.

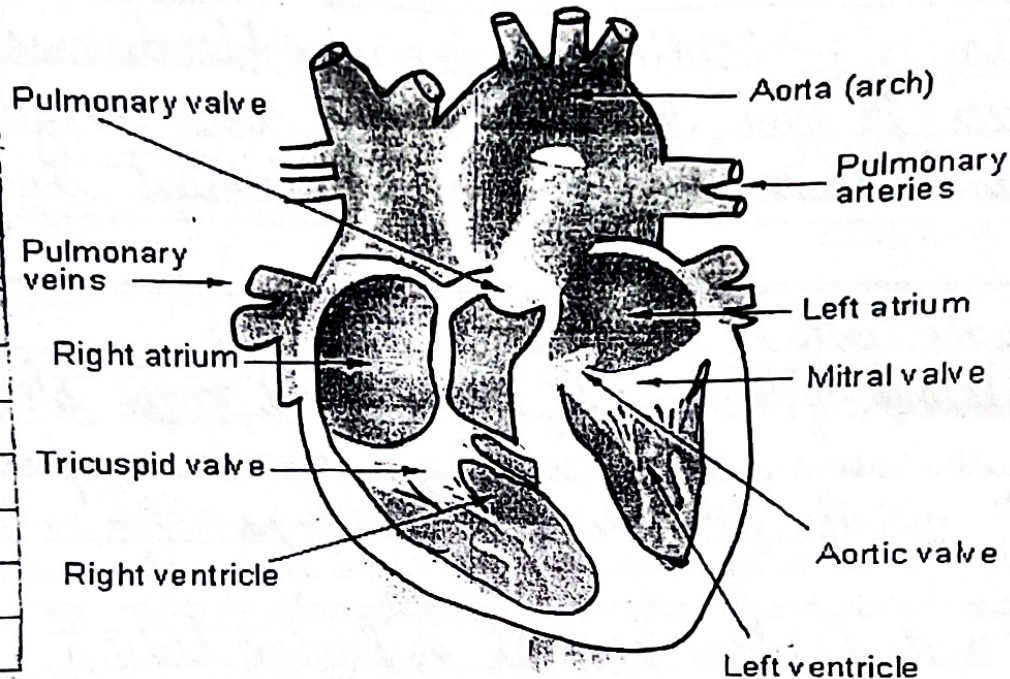
Blood is such a medium of transportation through which nutritional substances as well as oxygen is carried to parts of body. Blood consists of a colourless fluid called plasma. It is alkaline in nature, salty in taste, viscous and heavier than water.

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Q5 Draw a neat diagram of Human Heart?

Ans -



Q6 Define the terms :- Systolic and Diastolic

Ans → Systolic :- It is the upper or higher pressure of blood exerted on the walls of blood vessels while travelling. It is during the contraction. It is 120 mm/Hg in normal adult.

→ Diastolic :- It is the lower pressure of blood while travelling. It is during the relaxation of heart. It is 80 mm/Hg in normal adult.

Q7 Explain Ventricles, Systemic circulation, Capillaries.

Ans → Ventricles - The heart has four chambers. The lower two chambers are called ventricles. Blood is pumped through the chambers, aided by four heart valves.

→ Systemic circulation :- It describes the movement of blood from the heart through arteries to the periphery.

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and back to the heart through veins

→ Capillaries :- Capillaries are tiny blood vessels connecting arteries to veins. The blood vessels carry oxygen and nutrients to individual cells throughout the body.

Q8 Define the terms :- Circulatory System :-

Circulatory System :- The system that moves blood through out the body. The circulatory system is composed of the heart, arteries, capillaries and veins.

Q9 What is the position of Heart in human body?

Heart is located between your lungs in the middle of your chest, behind and slightly to the left of our breastbone.

Q10 What are the 3 layers of the heart wall?

1) Epicardium 2) Myocardium 3) Endocardium

Q11 What are the 3 types of circulation?

1) Systemic circulation 2) Pulmonary circulation 3) Portal Circulation.

Thank you.