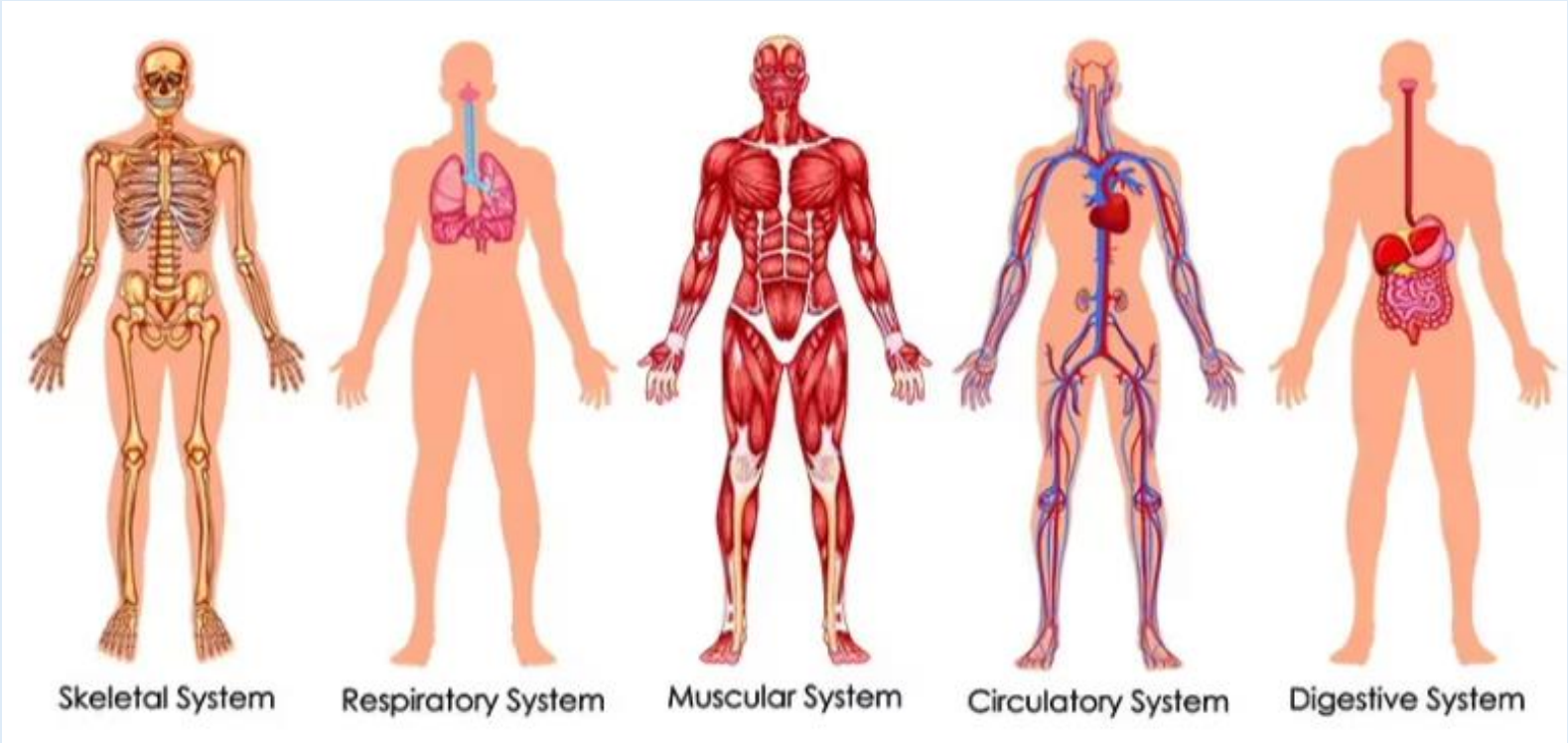
Body Systems



KHS S2 Science

Cell Organisation

04/02/2025

Page 4

Starter

How many body systems do you know of? List as many as you can.

_____

_____

Cell Organisation

04/02/2025

Page 4

Learning Intentions:

- To be able to describe how the body is organised.
- To be able to give examples of the main organs and systems of the body.

Cell Organisation

04/02/2025

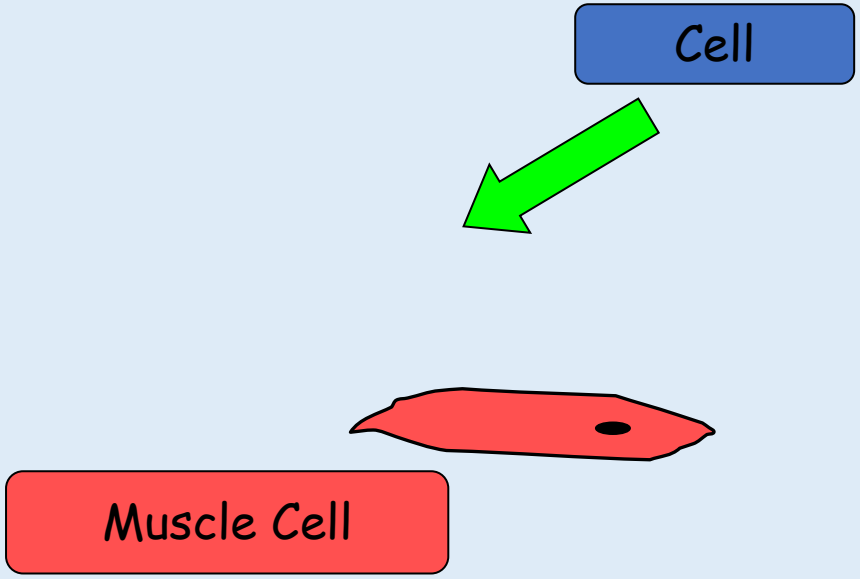
Page 4

Success Criteria

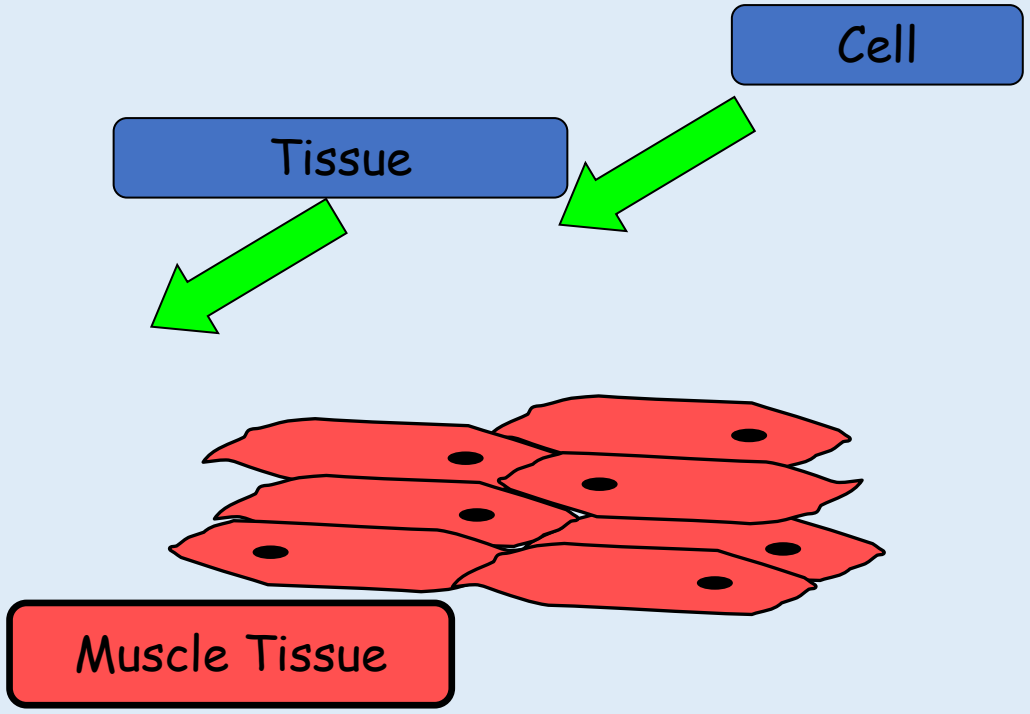
- ❑I can describe how the body is organised.
- ❑I can give examples of the main organs and systems of the body.

The cell is the basic unit in the bodies of living things.

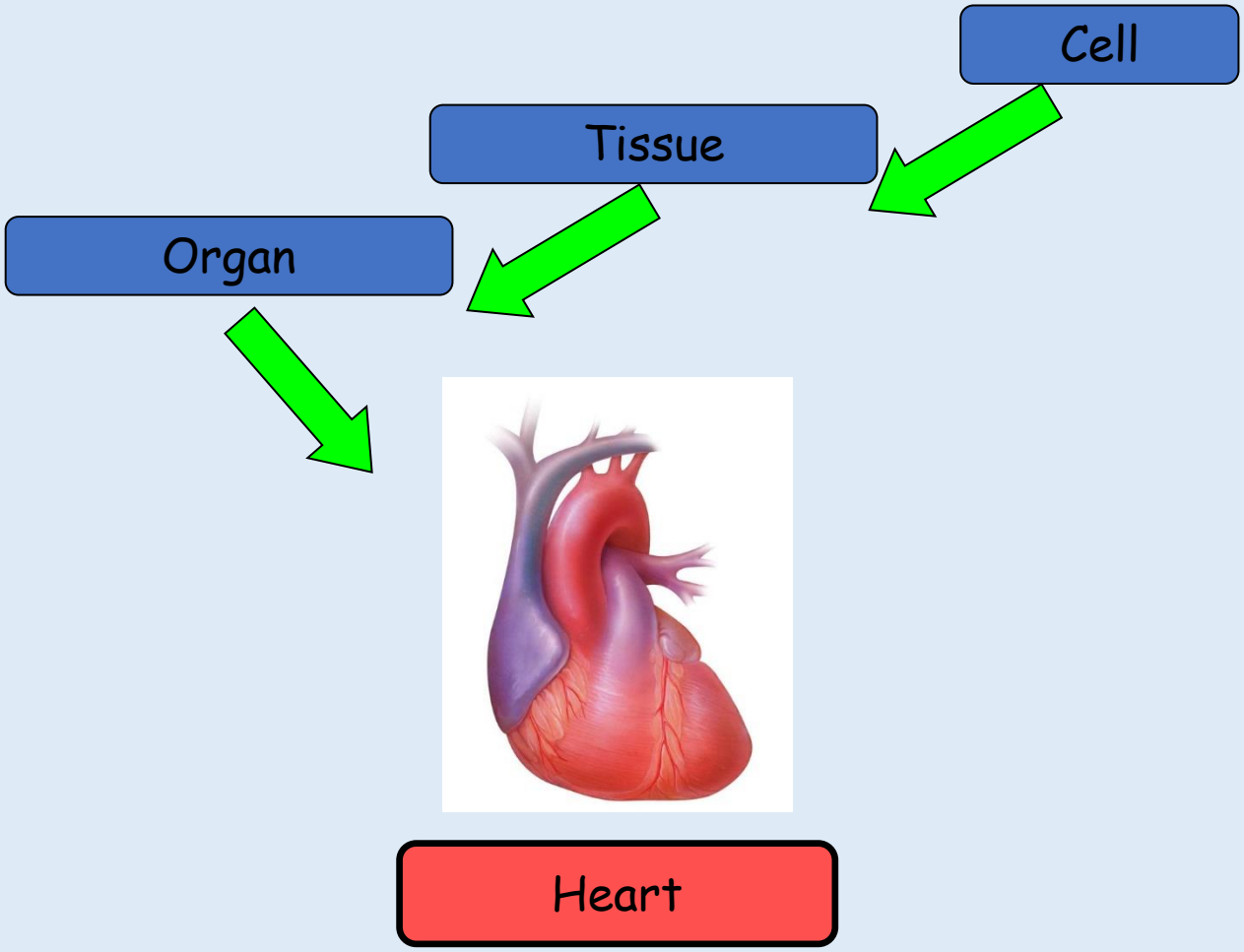
These living things are made up of a variety of different cell types - specialised cells that have a particular jobs.



In a large organism, like a mammal, the specialised cells have to group with other cells of the same type – tissues.



A body organ is made up of several types of tissue.
The heart is an organ made up of muscle tissue.



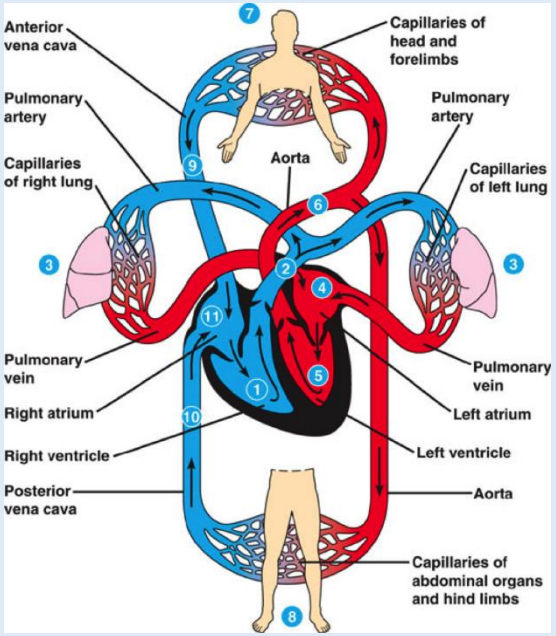
Several organs working together can be arranged into a body system. Each system has a specific job to do.

Cell

Tissue

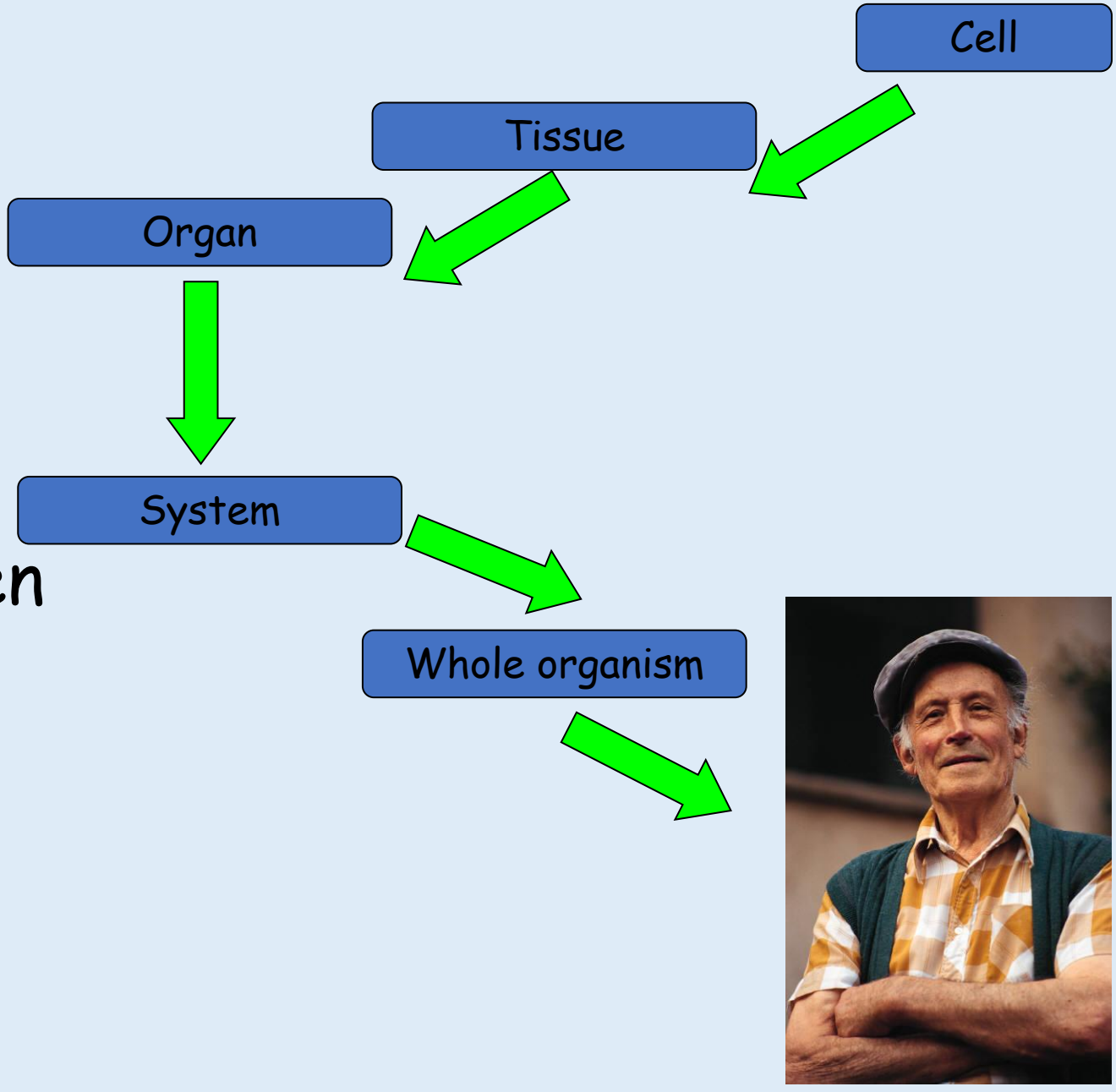
Organ

System



Circulatory System

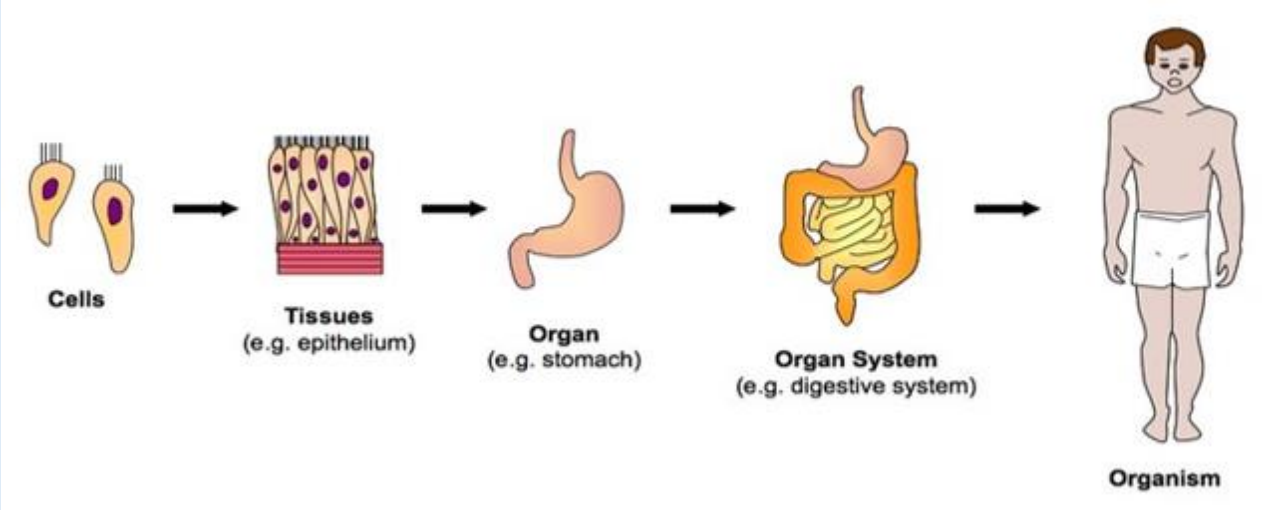
All systems form the complete organism when working together.



Cell organisation

Page 4

Cells which carry out similar roles join together to make tissues which build up into organs. Groups of organs work together to form organ systems.



Cell organisation

System

Tissue

Whole organism

Organ

Cell

Sort these from simplest structure to most complicated

Learning Check

Simplest

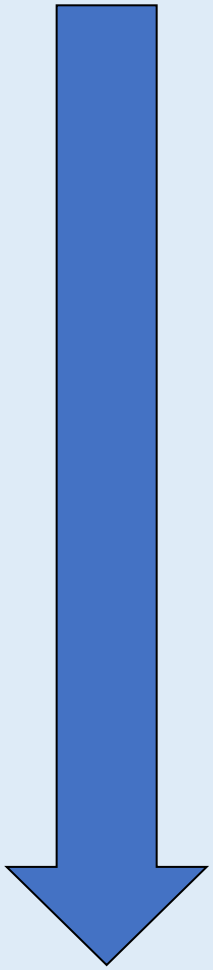
Cell

Tissue

Organ

System

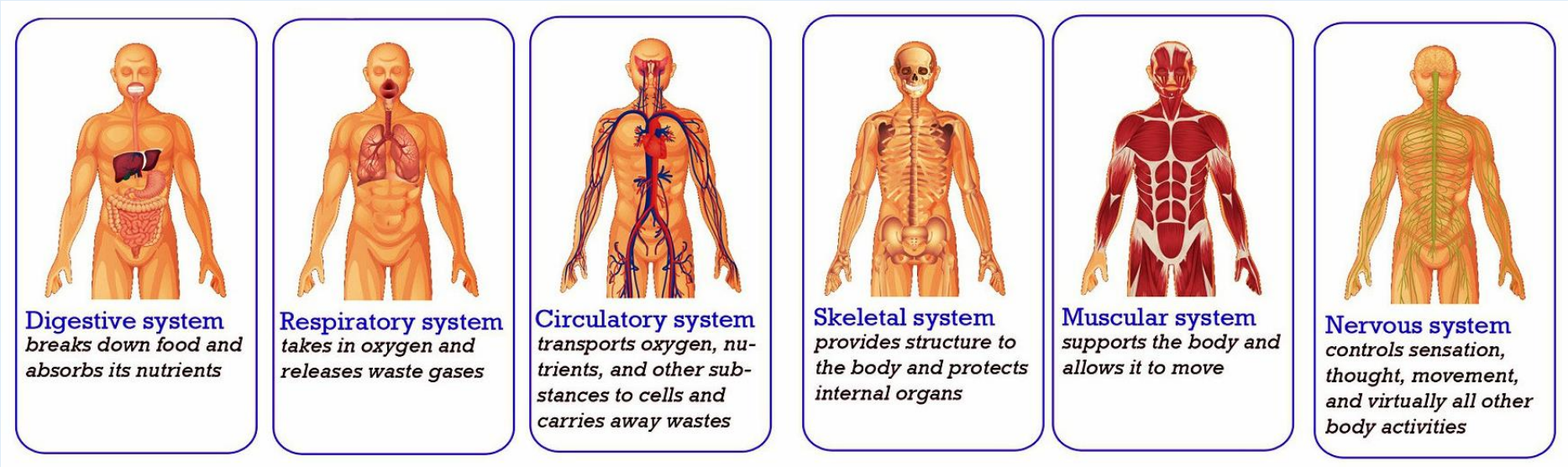
Whole organism



Complex

Body Systems

- Examples of body systems are circulatory, respiratory, digestive, skeletal, nervous and reproductive.
- Later in this unit you will learn more about some of these systems.



Build a Body Game

- Arrange yourselves into teams of 4.
- Collect a Pupil Game Sheet per player, a dice and a team set of Build a Body Game Cards.
- The youngest player rolls the dice first, each number represents a different body system:

1. Digestive system
2. Respiratory system
3. Circulatory system
4. Skeletal system
5. Muscular system
6. Nervous system

- Add the correct system to your game sheet, the first person to build a complete organism wins!

Plenary

Can you name 5 keywords from today's lesson?

Blood

04/02/2025

Page 6

Starter

Write down three different cell types and describe their structure.

_____

_____

Blood

04/02/2025

Page 6

Learning Intentions:

- I am learning about blood.

Cell Organisation

04/02/2025

Page 6

Success Criteria

- ❑I can state the components of blood.
- ❑I can describe the function of our blood.

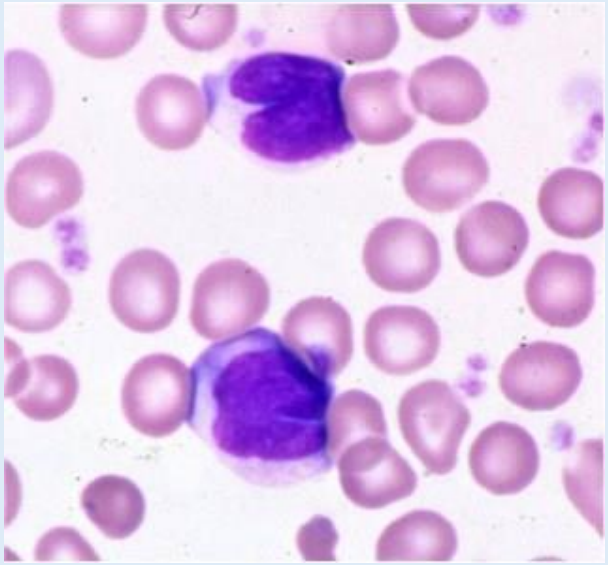
Blood

- Your blood contains red blood cells, white blood cells and plasma.

Red blood cells carry oxygen around your body.

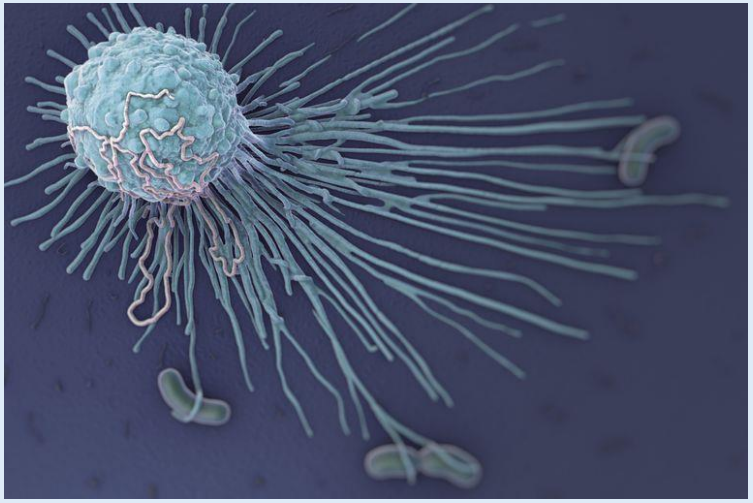
Plasma is mainly water with dissolved food, waste materials and other chemicals in it

Blood

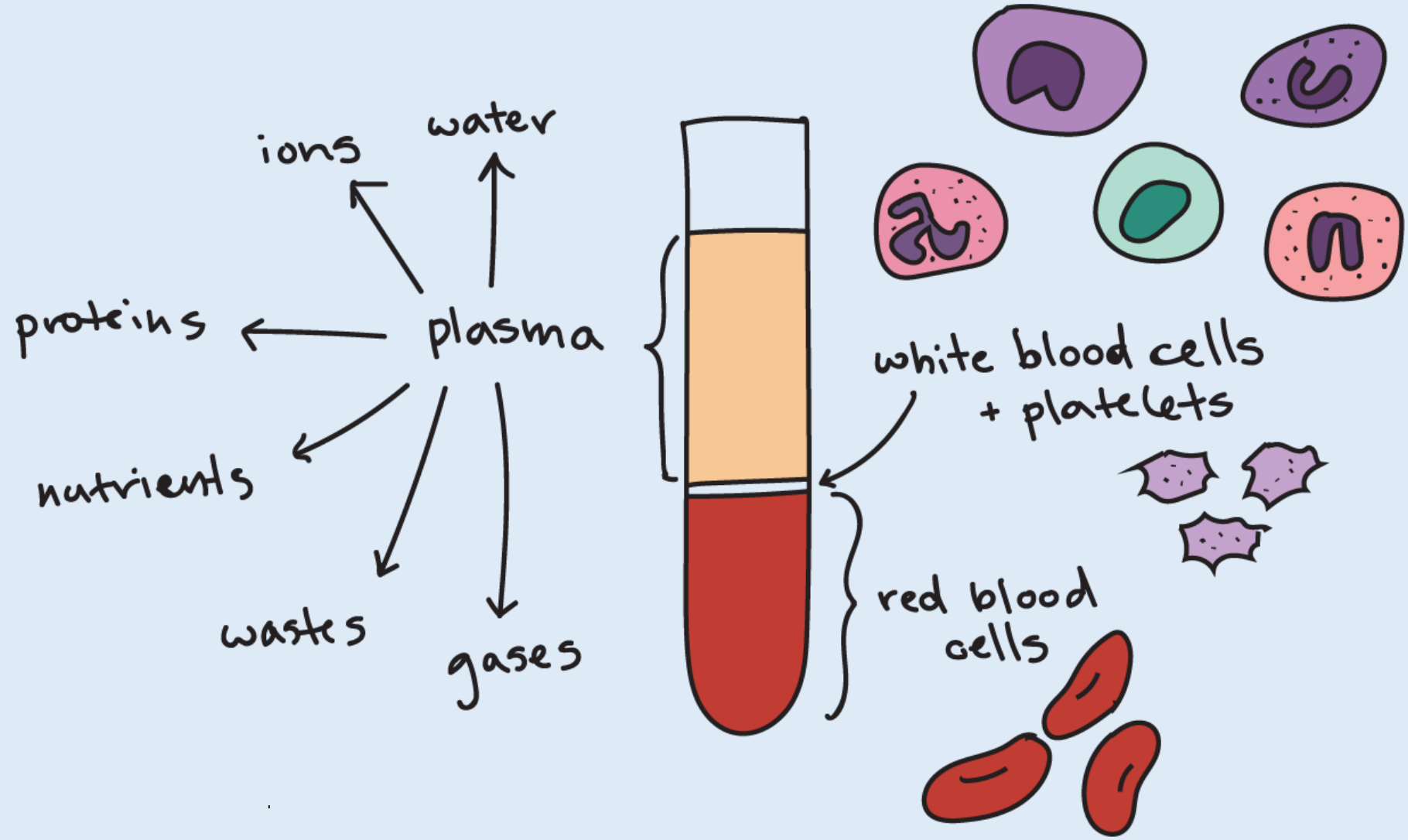


Some of your white blood cells produce 'antibodies' which stick to **antigens** on microbes and stop them from working and making you ill.

Other white blood cells do 'phagocytosis' which means that they can engulf (eat) microorganisms.



Blood


ions
water
proteins
plasma
nutrients
wastes
gases
white blood cells
+ platelets
red blood
cells

Blood

Page 6

Red blood cells carry oxygen around the body.

Plasma is mainly water with food and waste materials dissolved in it.

White blood cells play a key role in the immune system.

Blood Tests

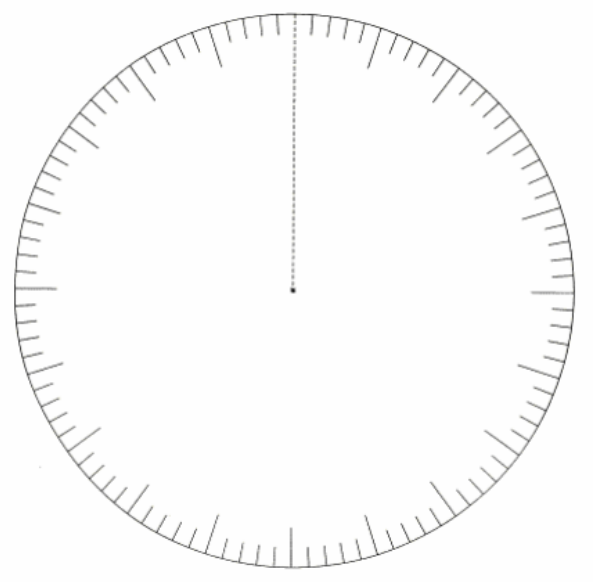
- Sometimes your doctor might want to take a blood sample.
- This blood sample would then be sent to a lab and tested by various different scientists to check for microorganisms, chemicals, and its composition.

Blood Cell Basics - Activity

Page 7

Remember that blood is made up of 4 different components:

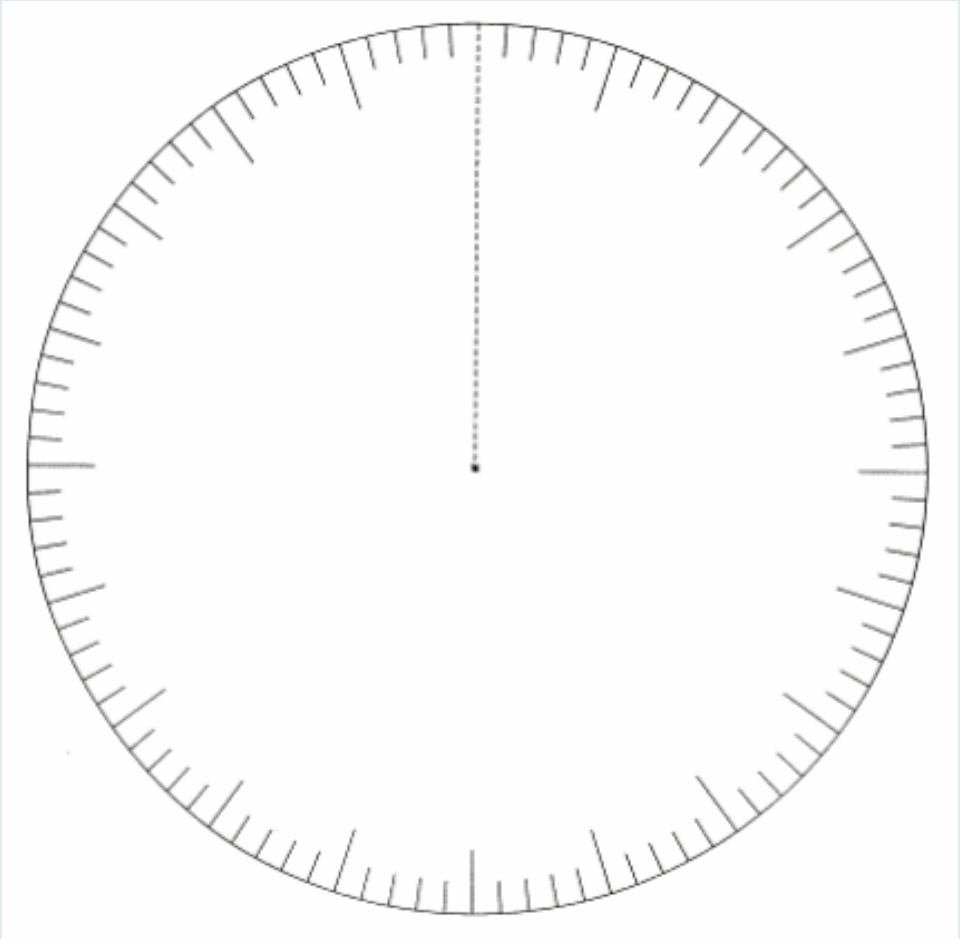
- Plasma – 55%
- Red blood cells – 43%
- White blood cells – 1%
- Platelets – 1%



Using this information, complete the pie chart in your booklet.

- Plasma – 55%
- Red blood cells – 43%
- White blood cells – 1%
- Platelets – 1%

Page 7



Plenary

Extension:

Write down three things you have learned about blood today.

_____

_____

Write down one question you now have.

_____

_____

CHALLENGE QUESTION

For next lesson, try to find out what vaccinations you have had! When did you have them? What were they for? **How do they work?**

Have you heard of **anti-vaxxers?** What do they believe?

The Heart

04/02/2025

Page 8

Starter

Rearrange the following anagrams and write down the definitions. (hint: they all relate to the blood and heart!)

1. Corbel Dolled	2. Decibel Howl Lot	3. A Lamps

Blood

04/02/2025

Page 8

Learning Intentions:

- I am learning about the heart.

Cell Organisation

04/02/2025

Page 8

Success Criteria

- ❑I can describe the role of the heart.
- ❑I can label a diagram of the heart.

Think-Pair-Share

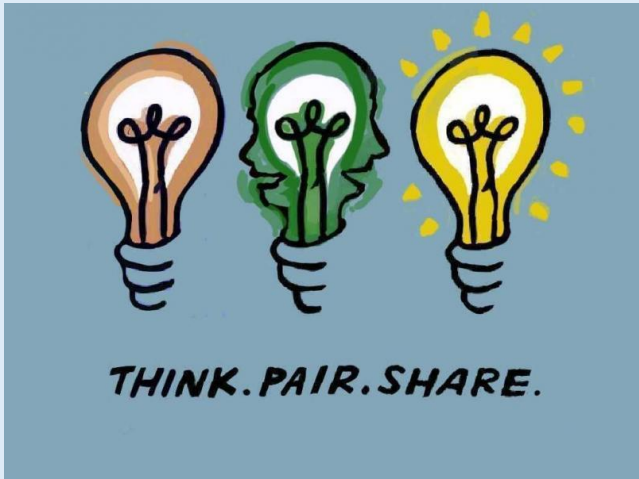
- In the first lesson, we learned about organs and body systems.

Page 8

Think-Pair-Share

Can you think which components of the body make up the circulatory system?

The heart and blood vessels containing blood



The Heart

- The heart is a muscular pump

- It sits in a cavity in your chest and is about the same size as a fist
    - Look at your fist… that's around the same size as your heart!

- Your heart's job is that it pumps blood from the lungs (where it collects oxygen) to the rest of your body tissues.

The Heart

- Video

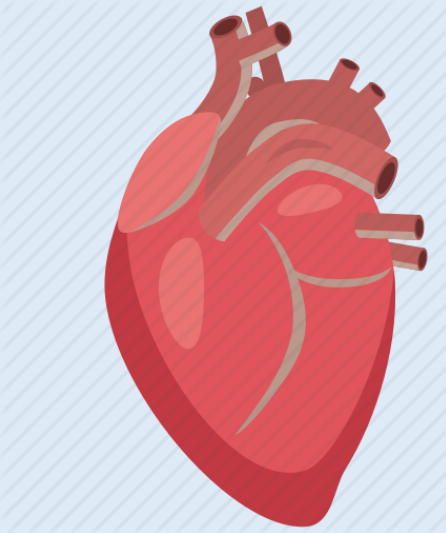
Page 8

Video

Write down three things that you have learned from the Circulatory System video.

_____

_____



The Heart

Page 8

The heart is a muscular organ that pumps blood around the body to deliver oxygen.

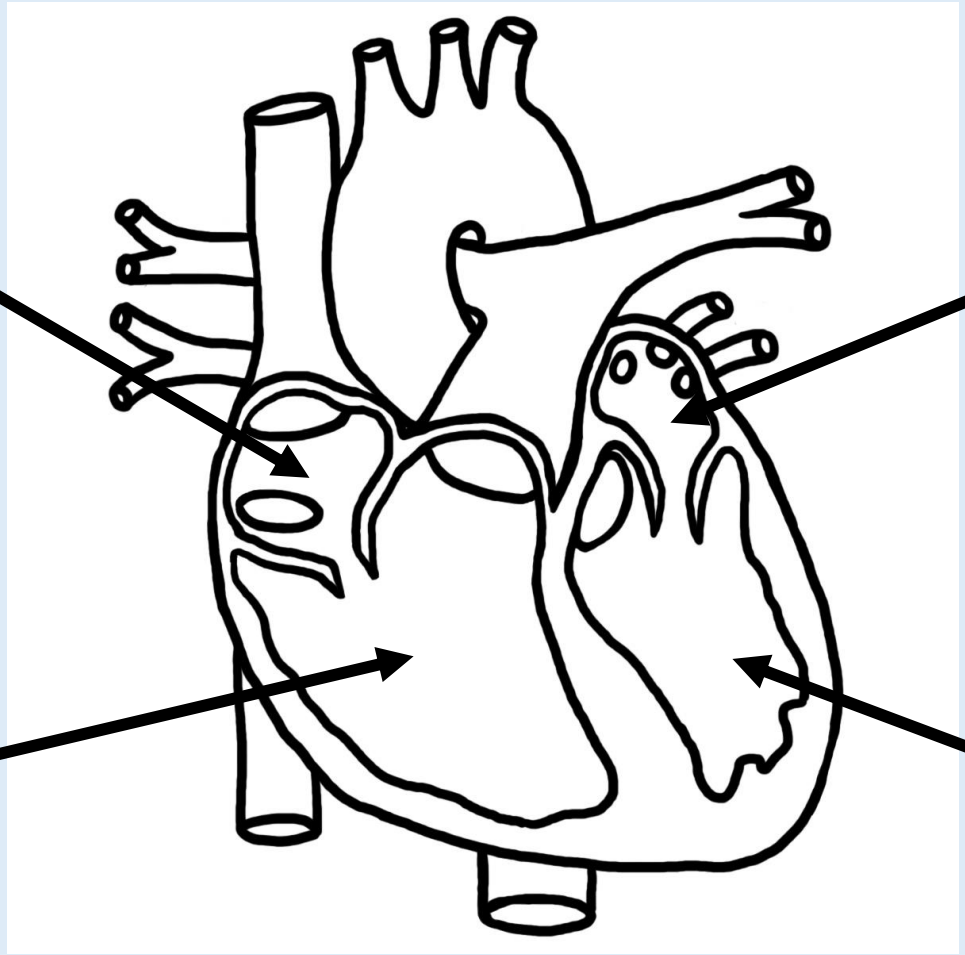
It contains four chambers and is connected to the rest of the body via blood vessels called arteries and veins.

The Heart Diagram

On the diagram below, your teacher will help you to:

1. Draw arrows and label the chambers
2. Colour in the chambers red and blue to show areas of high oxygen and low oxygen
3. Add a key

Page 9



Right atrium

Left atrium

Right ventricle

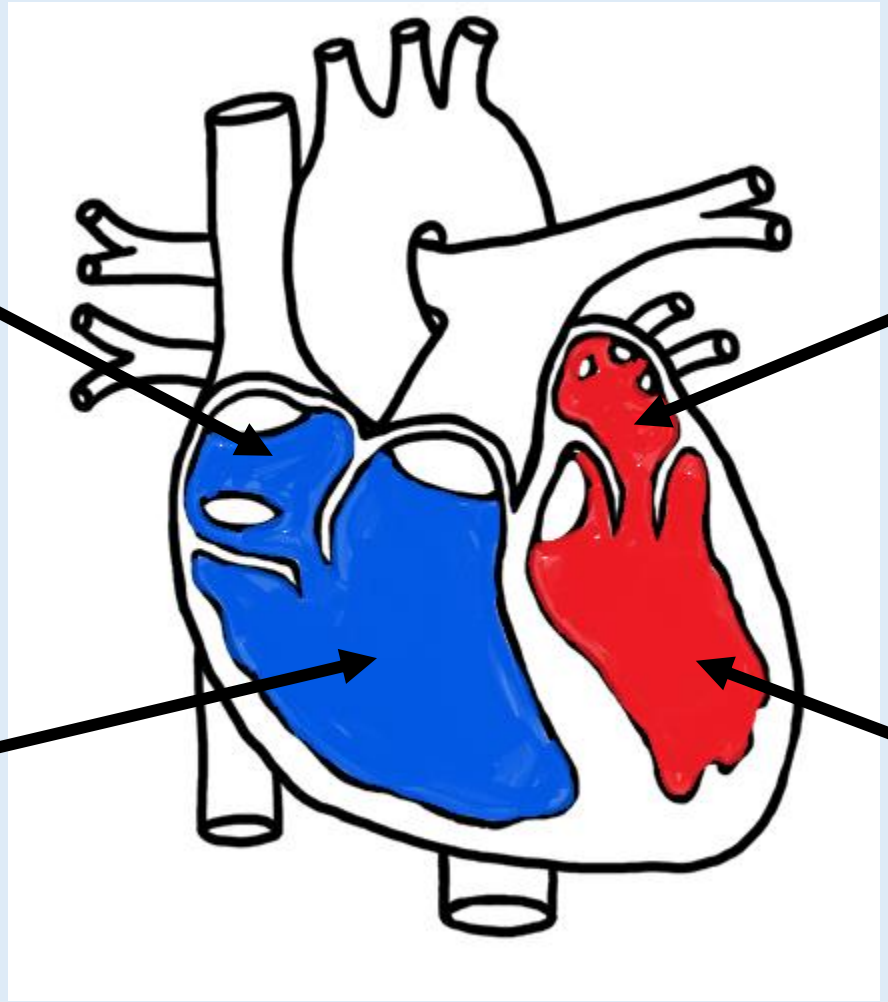
Left ventricle

The Heart Diagram

On the diagram below, your teacher will help you to:

1. Draw arrows and label the chambers
2. Colour in the chambers red and blue to show areas of high oxygen and low oxygen
3. Add a key

Page 9



Right atrium

Left atrium

Right ventricle

Left ventricle

The Heart Diagram

On the diagram below, your teacher will help you to:

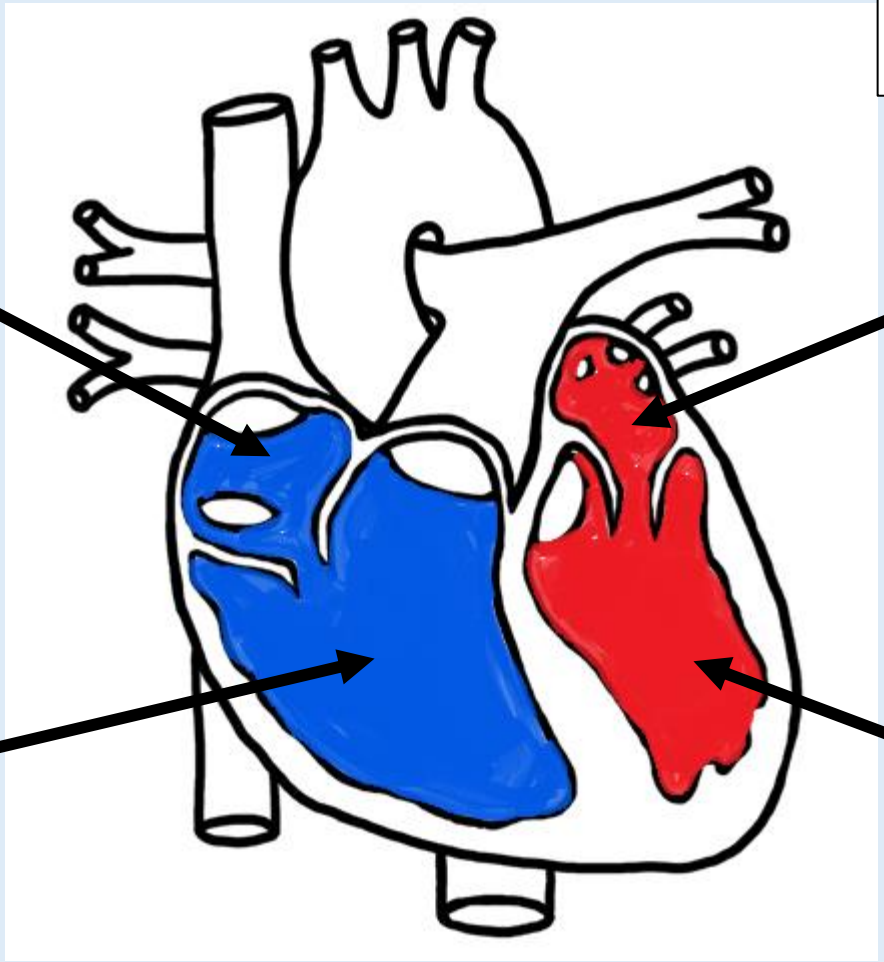
1. Draw arrows and label the chambers
2. Colour in the chambers red and blue to show areas of high oxygen and oxygen
3. Add a key

Page 9

Key:

= high oxygen

= low oxygen



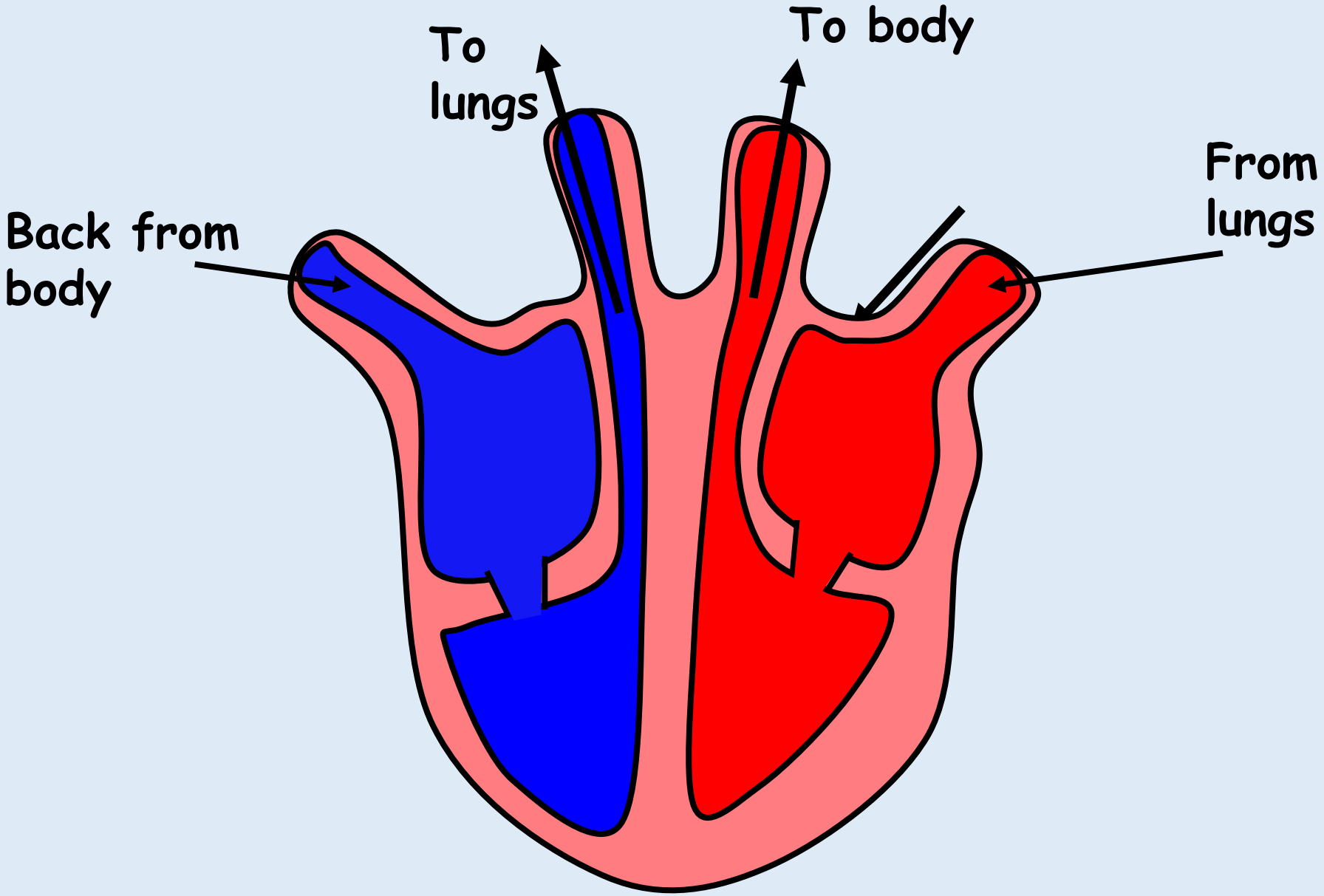
Right atrium

Left atrium

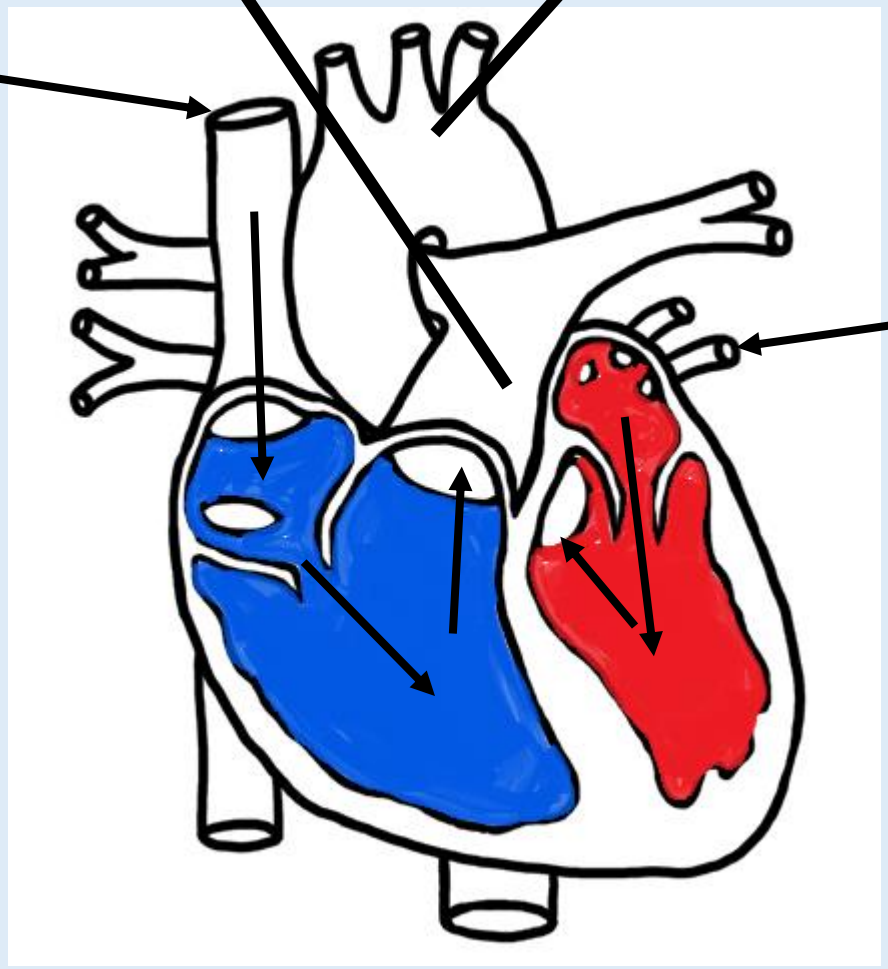
Right ventricle

Left ventricle

Direction of blood flow



Extension task: Add labels to show the direction of blood flow.



Plenary – Spot the mistake!

Copy and complete the sentences by fixing the errors:

- The body system which transports blood carrying useful substances around the body is the digestive system.
- The function of the heart is to help you breathe.

CHALLENGE ACTIVITY

For next lesson, check out the 'Microbe Magic' website to explore the Circulatory System!

The Flow of Blood

04/02/2025

Page 10

Starter

1. Name the four chambers of the heart.

---

2. Explain why we coloured in the right side of the right side of the heart blue and the left side of the heart red.

The Flow of Blood

04/02/2025

Page 10

Learning Intentions:

- I am learning about the flow of blood.

The Flow of Blood

04/02/2025

Page 10

Success Criteria

- ❑I can describe the flow of blood through the heart.
- ❑I can explain how oxygen travels around the body.
- ❑I can take part in a heart dissection.

Flow of Blood Through the Body

Rearrange the boxes

a. The blood delivers oxygen to the body tissues to allow them to have enough energy.

b. It then flows back into the left side of the heart where it is pumped out again to the rest of the body.

c. The blood flows into the lungs from the right side of the heart and collects oxygen (from the air we breathe).

Flow of Blood Through the Body

Page 10

The blood flows into the lungs from the right side of the heart and collects oxygen (from the air we breathe).

Flow of Blood Through the Body

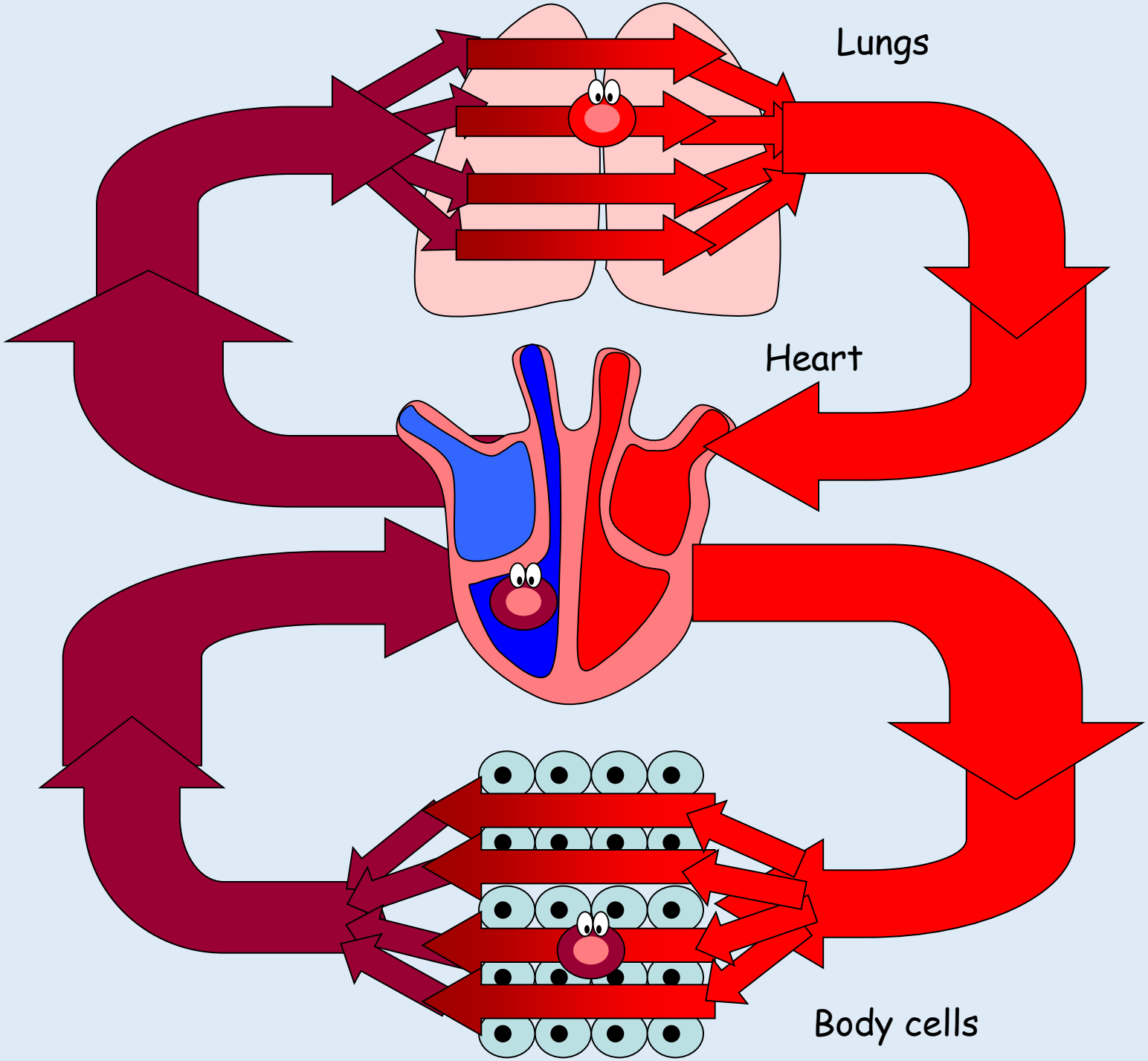
Page 10

It then flows back into the left side of the heart where it is pumped out again to the rest of the body.

Flow of Blood Through the Body

Page 10

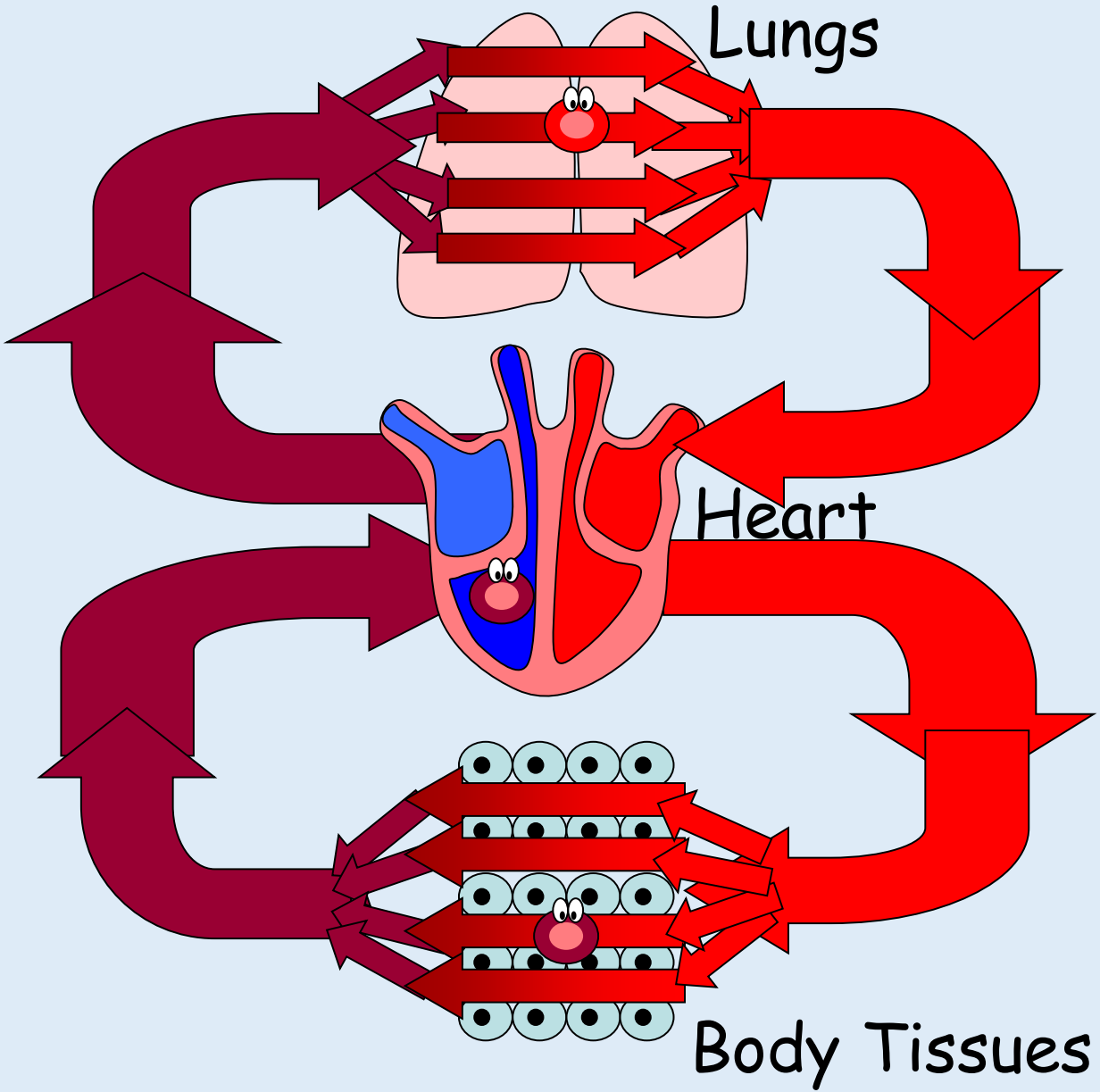
The blood delivers oxygen to the body tissues to allow them to have energy.


Lungs
Heart
Body cells

Flow of Blood

Label the lungs, heart and body tissues on the diagram below.

Page 11



Feel the beat

Before we look at the structure of the heart, lets check to see if those tickers are ticking!

You should do an activity for 30 seconds (try hopping on the spot) then check your arteries for a pulse.

Try holding your radial artery (inside your wrist) or carotid artery (on the neck) for 30 seconds.

- What does your heart sound like?
- How fast is it beating?
- What's the pattern?

Heart Dissection

You will now have the chance to watch a heart being dissected.

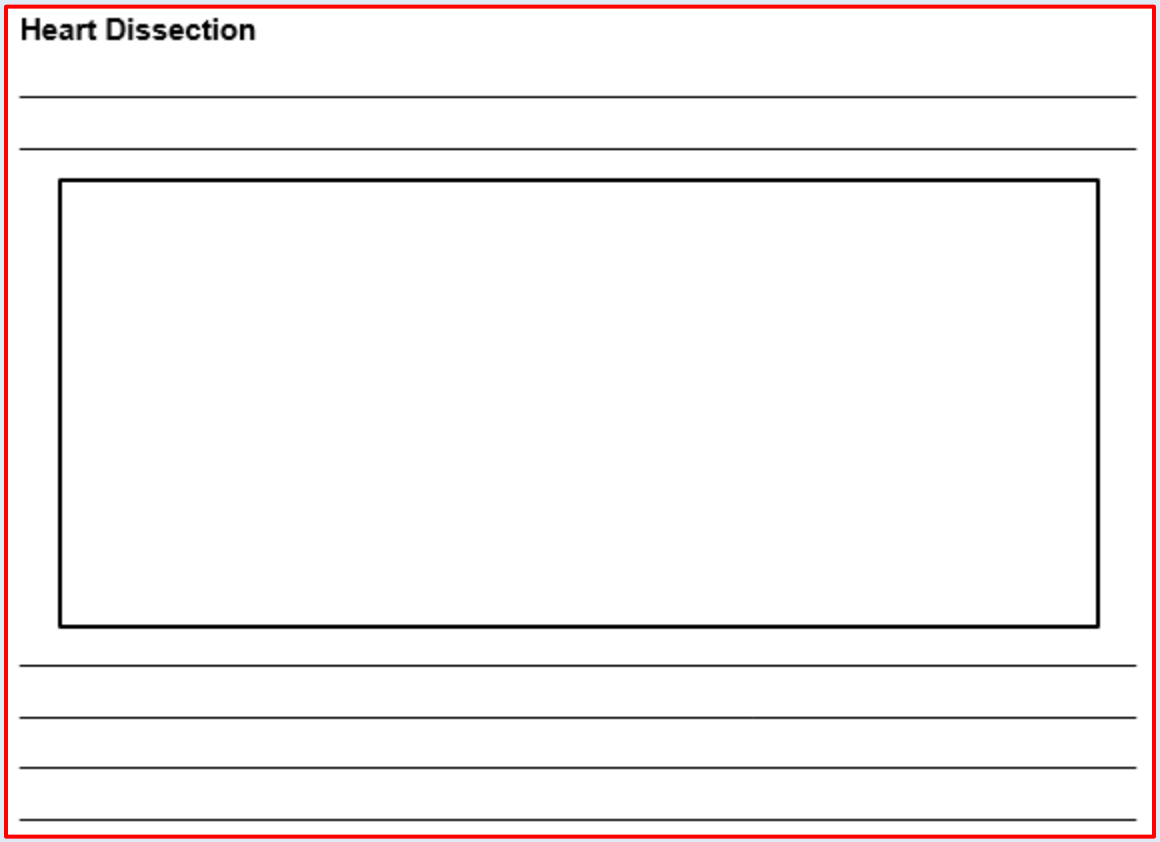
You should pay close attention to:

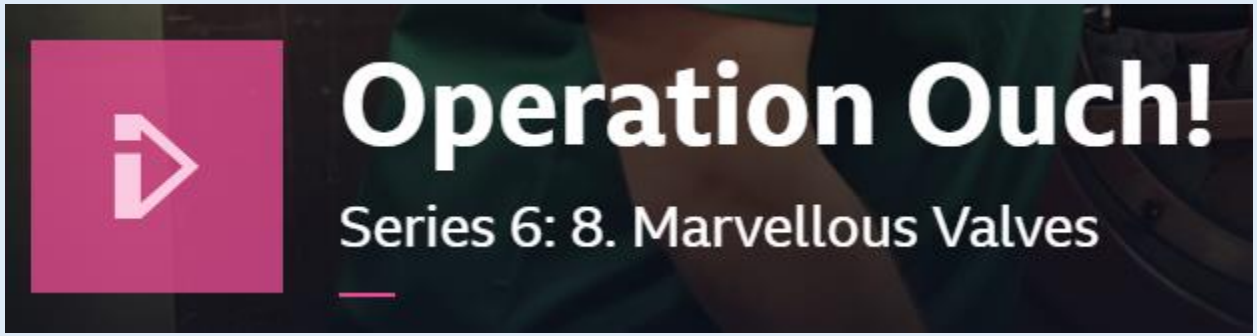
- The chambers of the heart
- The valves
- The blood vessels

Heart Dissection

Page 11

Describe what you saw in the heart dissection and draw a diagram in your booklet.





https://www.bbc.co.uk/iplayer/episode/b09d4vx2/operation-ouch-series-6-8-marvellous-valves

28 mins

04/02/2025

Blood Vessels - Extra

Page 12

Starter

Use the word bank to complete the sentences below.

Word bank: blood, lower, upper, contracts

Blood enters the _____ chambers of the heart. The muscle tissue in the upper chambers _____ and pushes the blood into the _____ chambers. The lower chambers then contract and push the _____ out of the heart.

- Optional lesson

Blood Vessels

04/02/2025

Page 12

Learning Intentions:

- I am learning about the structure and function of blood vessels.

Blood Vessels

04/02/2025

Page 12

Success Criteria

- ❑I can describe the structure of blood vessels.
- ❑I can describe the fuction of blood vessels.

The Path of Blood Round the Body

Can you correct this?

- Blood comes back from the body into the right atrium, up into the right ventricle which pumps it to the body to pick up oxygen and drop off carbon dioxide.

- It comes back into the right atrium, down into the left ventricle which pumps it round the body to all the cells. The right ventricle wall is much thicker as it has to pump blood much further.

The Path of Blood Round the Body

The corrected version!

- Blood comes back from the body into the right atrium, **down** into the right ventricle which pumps it to the **lungs** to pick up oxygen and drop off carbon dioxide.

- It comes back into the **left** atrium, down into the left ventricle which pumps it round the body to all the cells. The **left** ventricle wall is much thicker as it has to pump blood much further.

Blood Vessels

Arteries carry blood away from the heart.

Veins carry blood to (in to) the heart.

Capillaries connect veins to arteries. They are also very thin which allows materials to pass between the blood into tissues.

Blood Vessels

Complete the table below in your booklet.

Blood Vessel	Function	Example
Artery	Carry blood **AWAY** from the heart	Aorta, pulmonary artery
Vein		
Capillary		

Blood Vessels

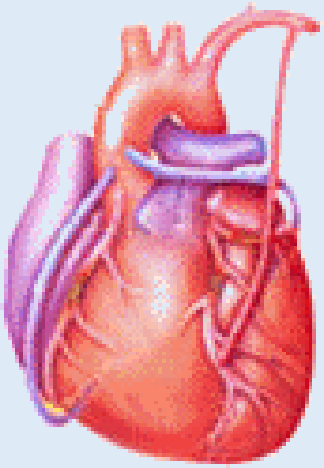
Complete the table below in your booklet.

Blood Vessel	Function	Example
Artery	Carry blood **AWAY** from the heart	Aorta, pulmonary artery
Vein	Carry blood back **IN** to the heart	Vena cava, pulmonary vein
Capillary		

Blood Vessels

Complete the table below in your booklet.

Blood Vessel	Function	Example
Artery	Carry blood **AWAY** from the heart	Aorta, pulmonary artery
Vein	Carry blood back **IN** to the heart	Vena cava, pulmonary vein
Capillary	Connects arteries to veins, and exchange of materials between the blood and tissue cells	



For children of ages 6 to 15,
the **normal** resting **heart rate** is between 70 and 100 beats per minute (bpm) and for adults it is between 60 and 100 bpm.

If someone's average heart beat was 80 bpm for their whole life and they lived to be 85, how many times would their heart beat in their lifetime?

Beats per minute = 80
beats per hour = 80 x 60 = 4800
beats per day = 4800 x 24 = 115 200
beats per year = 115 200 x 365 = 42 048 000
beats over 85 years = 42 048 000 x 85 = 3 574 080 000

Over 3.5 billion times in their lifetime!!

Heart Rate Investigation

What do you think happens to your heart rate when you exercise?

Why?

When you exercise your muscle cells need lots of **energy**.

The heart and lungs therefore work more to get the oxygen and glucose to the muscles.

You are going to investigate the effect of **exercise** on **heart rate**.

How can you measure how fast your heart is beating?

How to measure heart rate (**pulse**):

Find the position on your neck or wrist where you can feel your pulse.

Count the number of times you feel the pulse in 20 seconds and multiply this by 3.

This will give you the value for beats per minute (bpm)

e.g. 26 (in 20 seconds) x 3 = 78 bpm

Heart Rate Investigation

Heart Rate Investigation

Aim (What do you hope to find out?):

_____

_____

Materials & method:

- What will you do?

_____

_____

_____

- What equipment will you need?

_____

_____

- What is the independent variable? (The variable you are changing)

_____

- What is the dependent variable? (The variable you are measuring)

_____

- What variables will you keep the same?

_____

Heart Rate Investigation

Hypothesis (What do you predict will happen?):

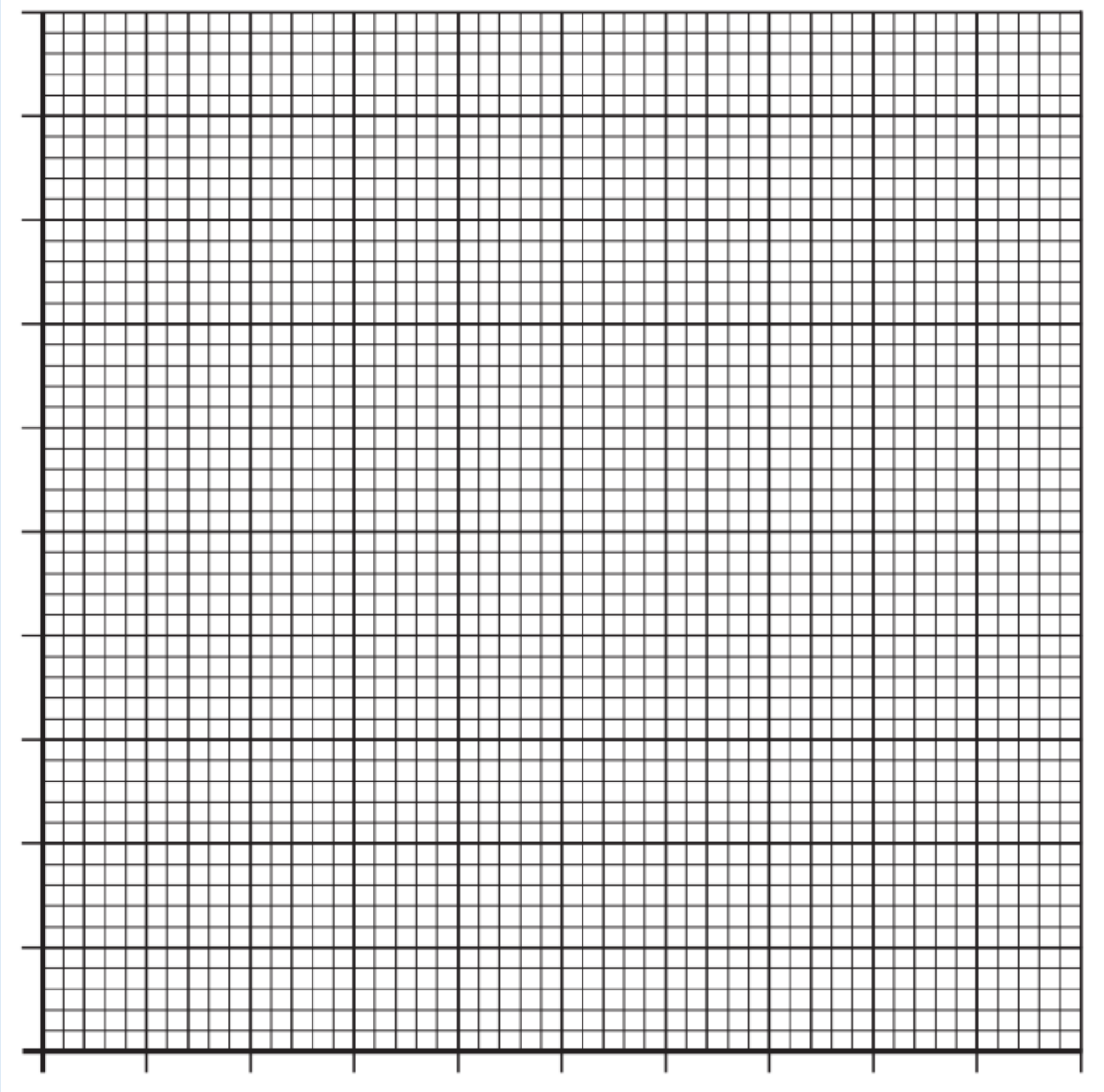
_____

_____

Results:

Type of Exercise	Heart Rate (Beats in 20 seconds)	Heart Rate (Beats per minute)

Graph:
Draw a bar chart to show how the type of exercise affects your heart rate (bpm).



Heart Rate Investigation

Conclusion:

_____

_____

Evaluation (If you were to do the investigation again, how could you improve your results?):

_____

_____

Plenary

- Write on a post-it note 3 things you have learned today about the heart.