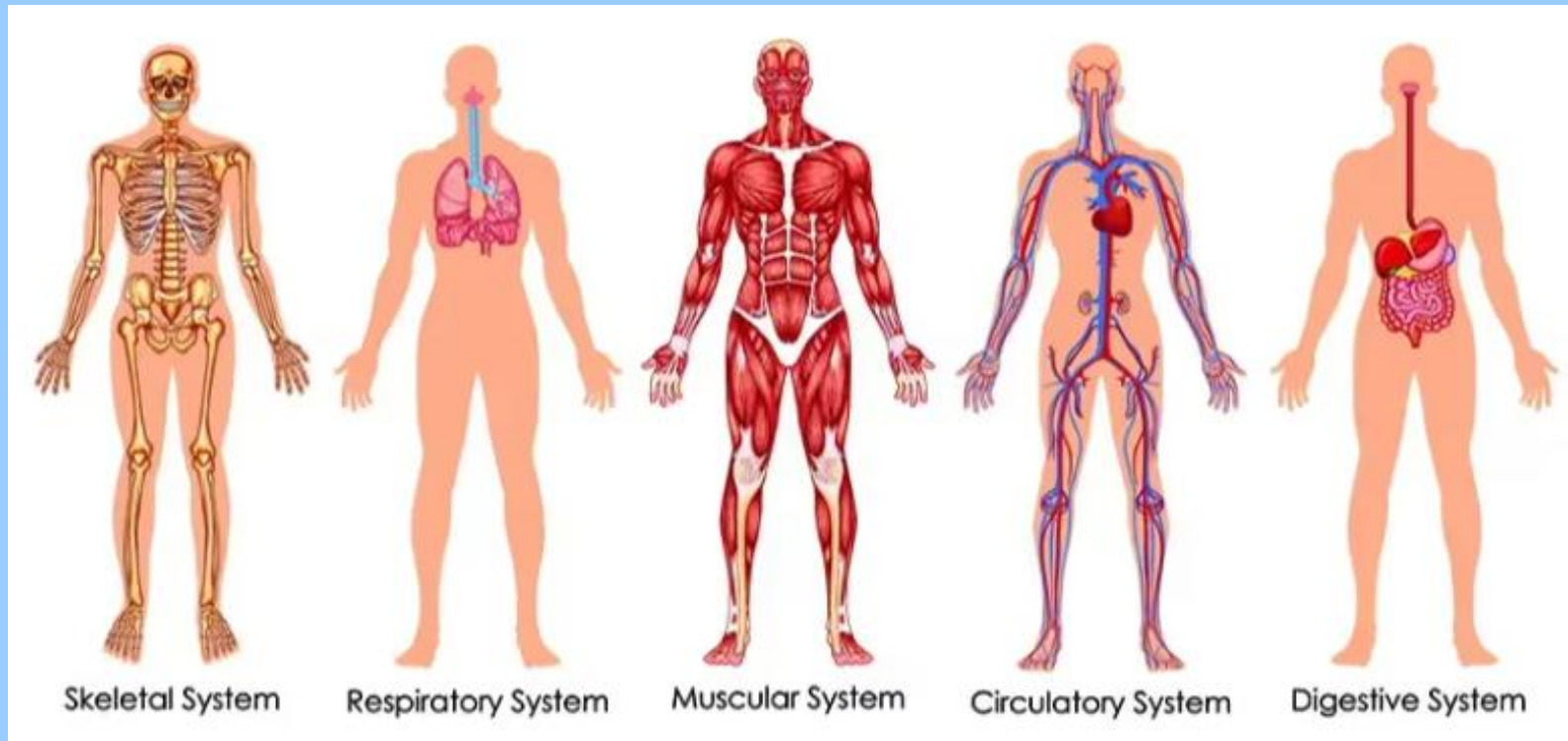
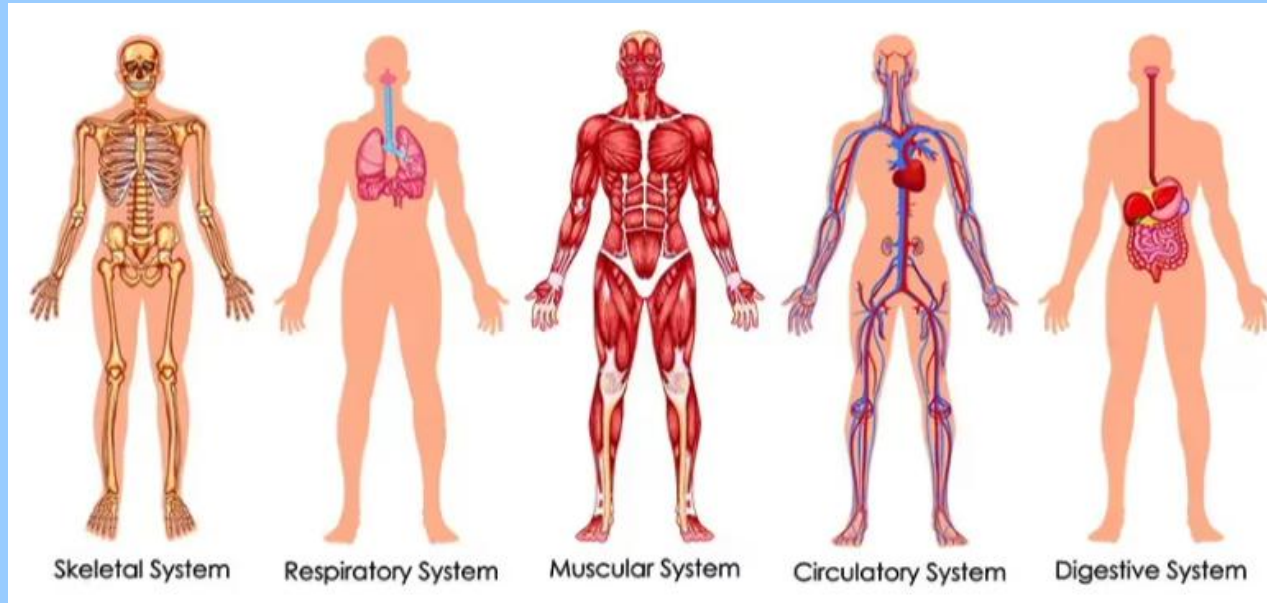


# Body Systems



# KHS S2 Science

# Body Systems - SHANARRI



## HEALTHY

- Keeping fit
- Have a good diet
- Healthy lifestyle
- Healthy friendships
- Being hygienic
- Keeping the environment clean
- Protect your mental health
- Find happiness
- Talk about your feelings



SHANARRI BY KIRKCALDY HIGH SCHOOL

## ACHIEVING

- Reaching your goals
- Trying hard
- Be your best
- Never give up
- Succeeding
- Improving
- Push yourself
- Believing in yourself



SHANARRI BY KIRKCALDY HIGH SCHOOL

## RESPONSIBLE

- Take responsibility for my mistakes
- Admit when you've done something wrong
- Keep yourself and others safe
- Be mature
- Don't judge others
- Follow the rules



SHANARRI BY KIRKCALDY HIGH SCHOOL

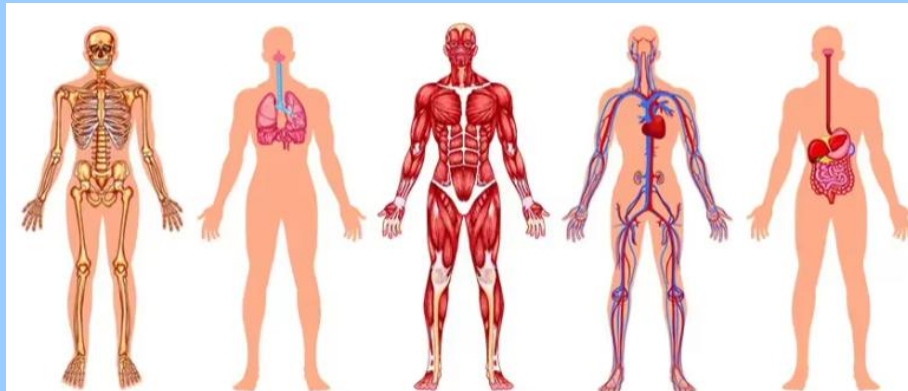
# Cell Organisation

06/10/2026

Page 4

## Starter

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



# Cell Organisation

06/10/2026

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

06/10/2026

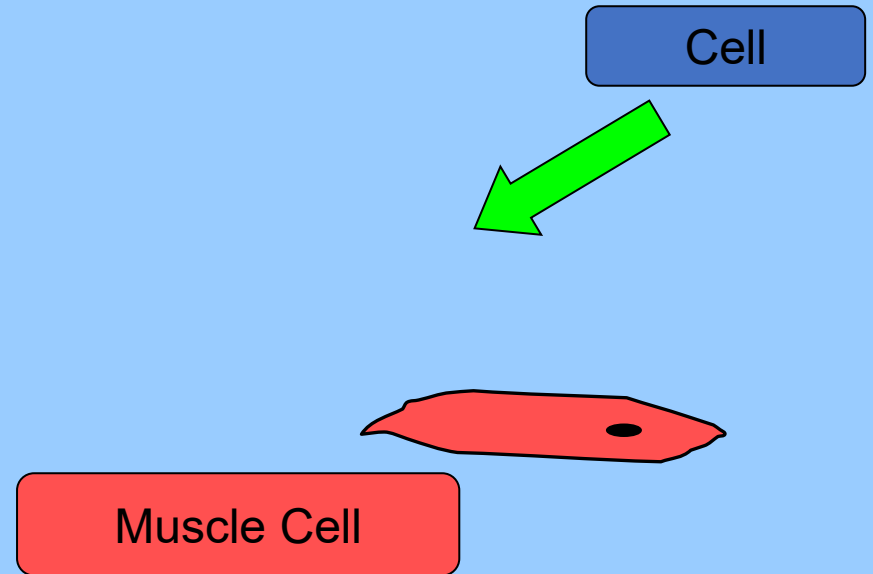
Page 4

## Success Criteria

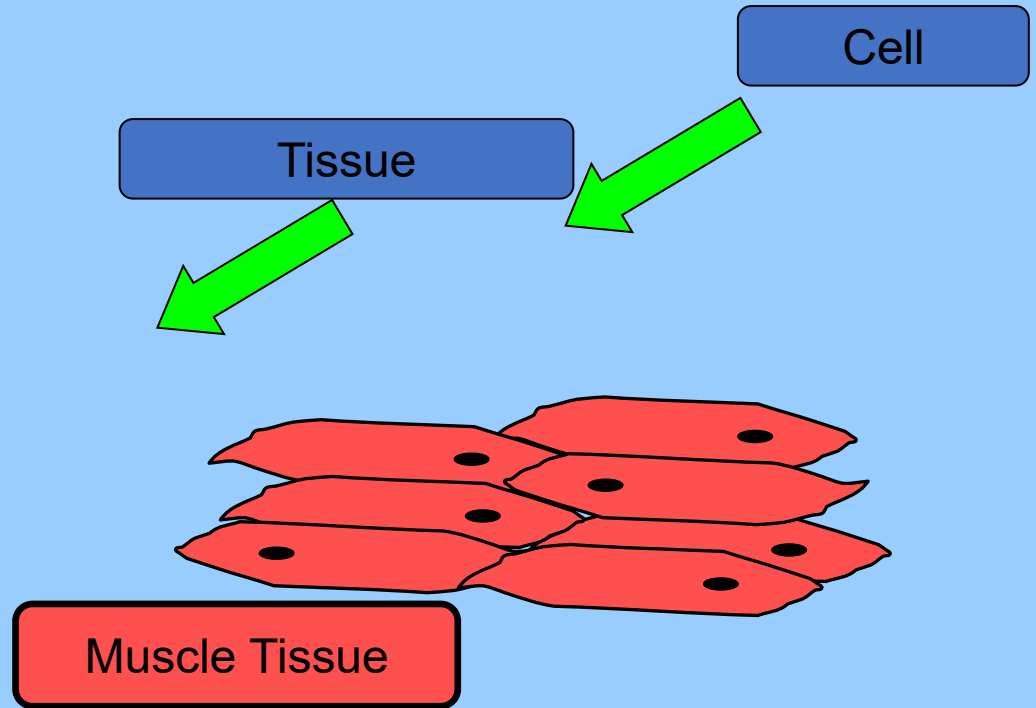
- ☐ I can describe how the body is organised.
- ☐ I can give examples of the main organs and systems of the body.

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

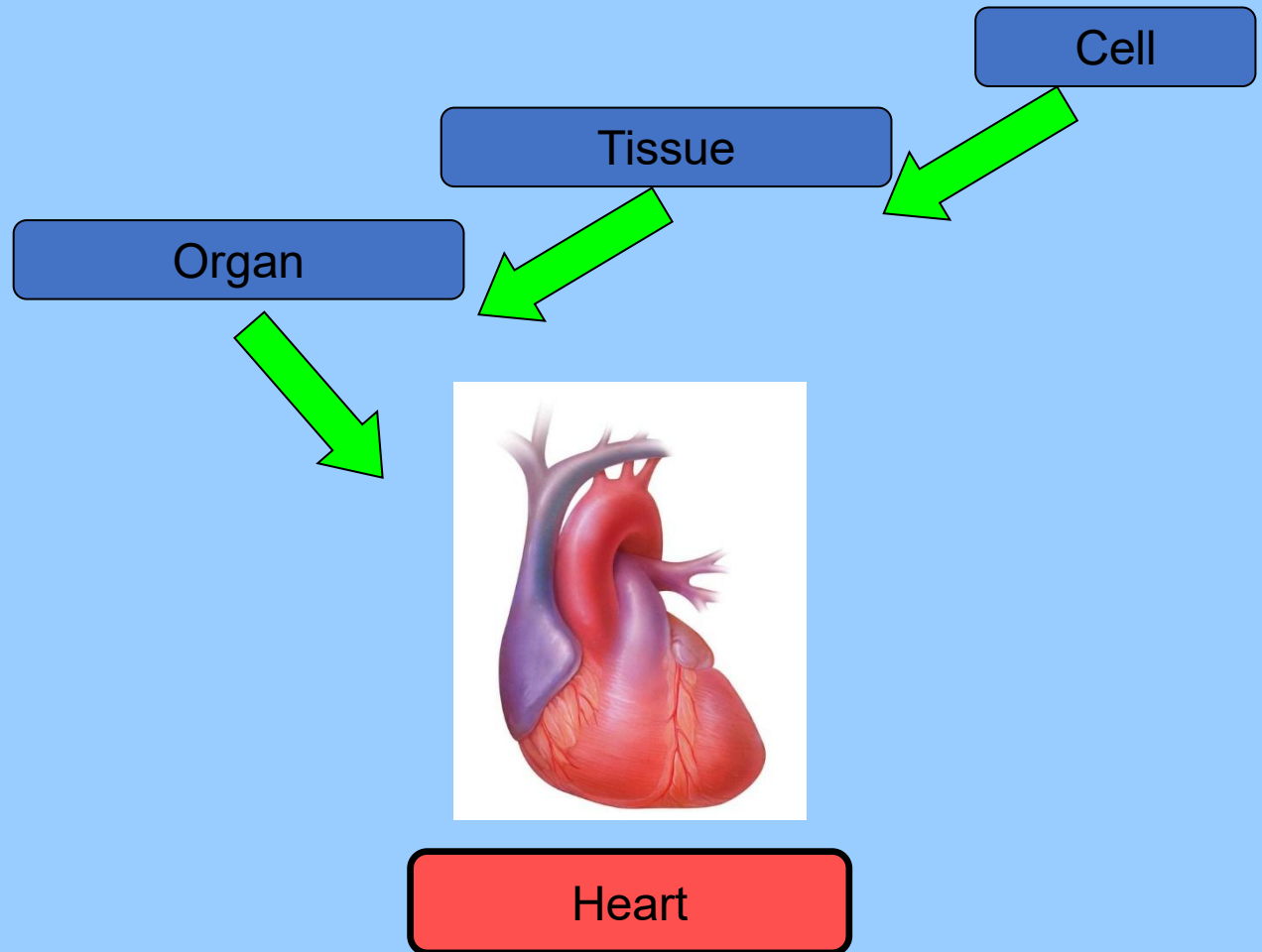
These living things are made up of a variety of different cell types - **specialised cells** that have a particular jobs.



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.



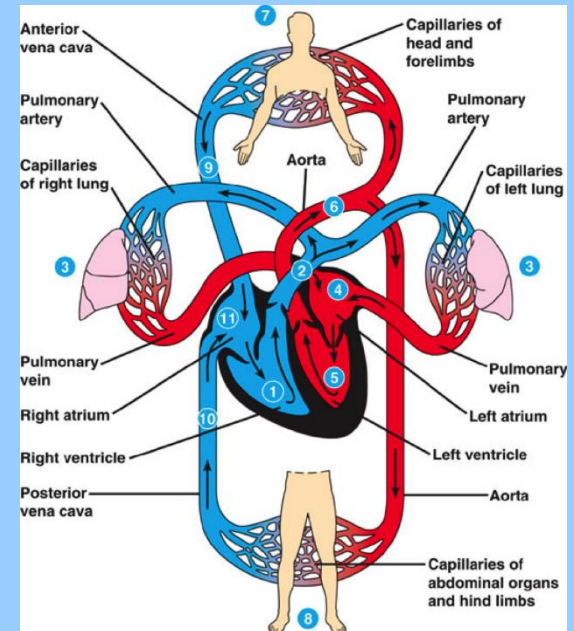
Cell

Tissue

Organ

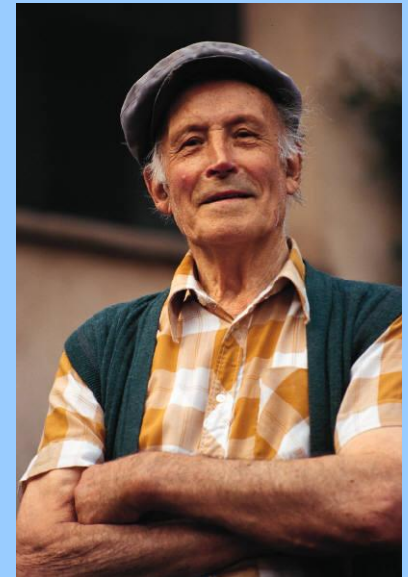
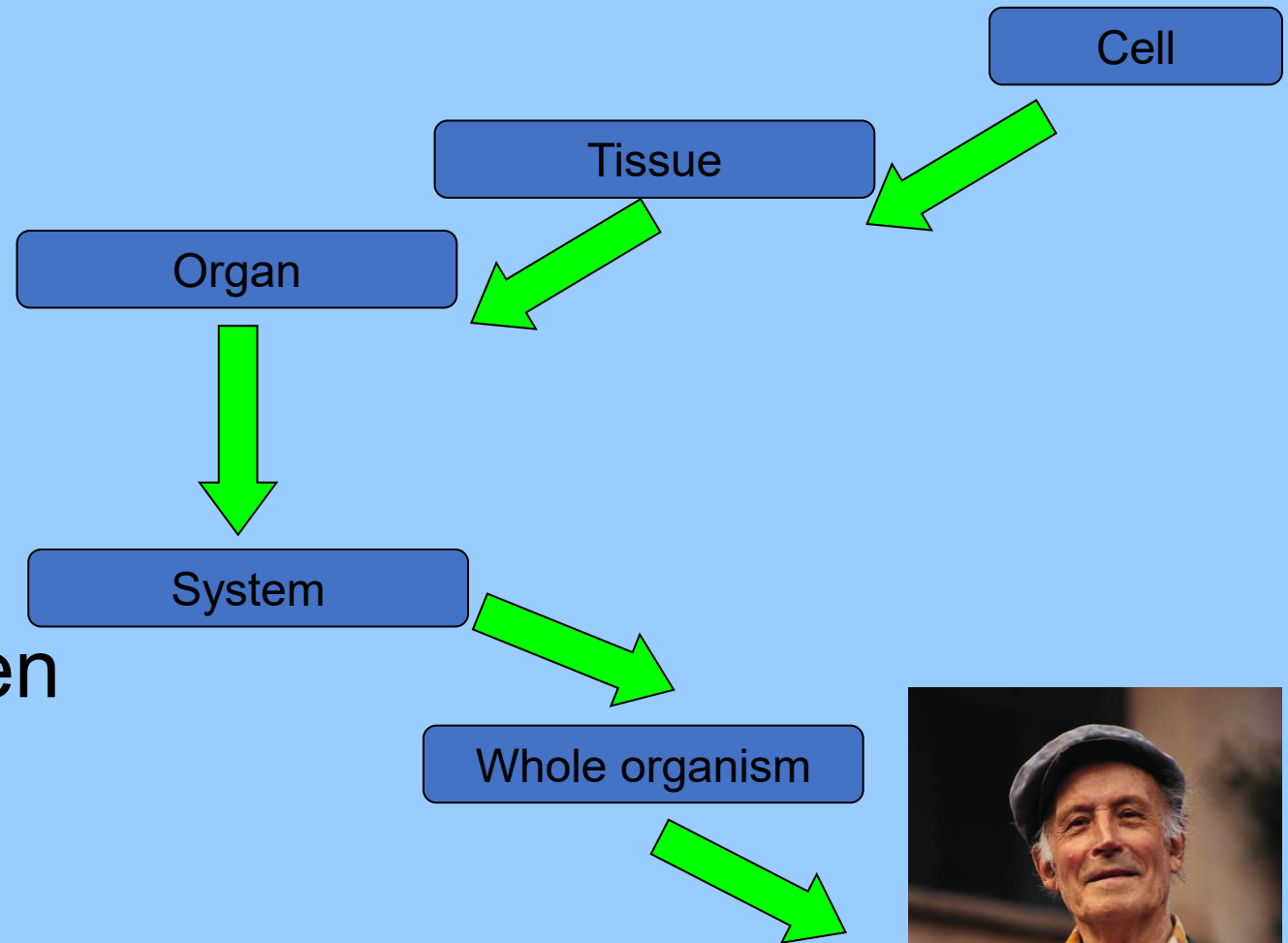
System

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



Circulatory System

All systems  
form the  
complete  
**organism** when  
working  
together.

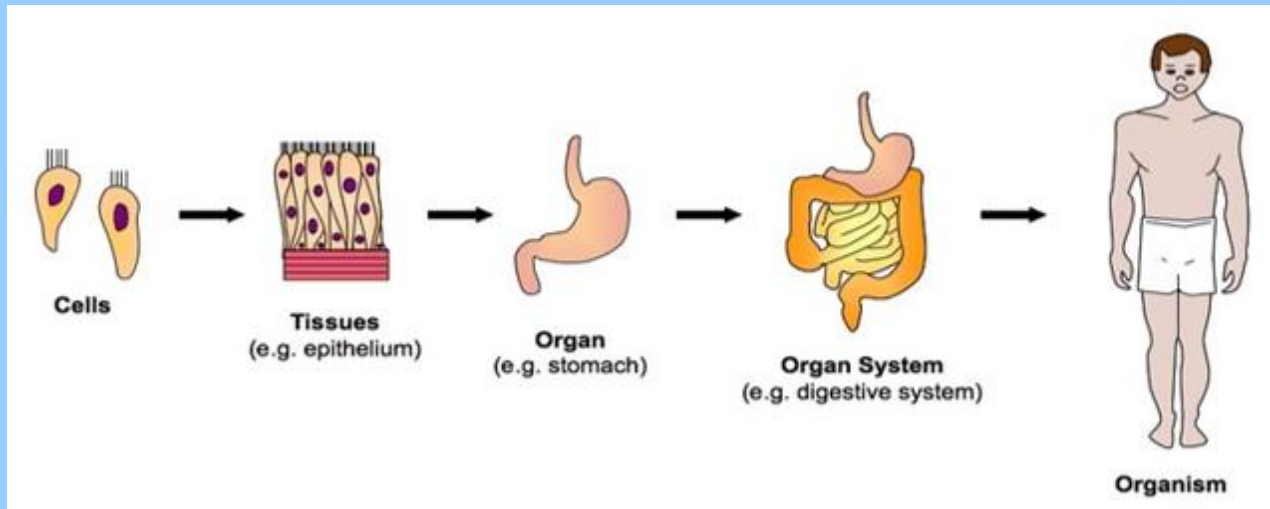


# Cell organisation

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

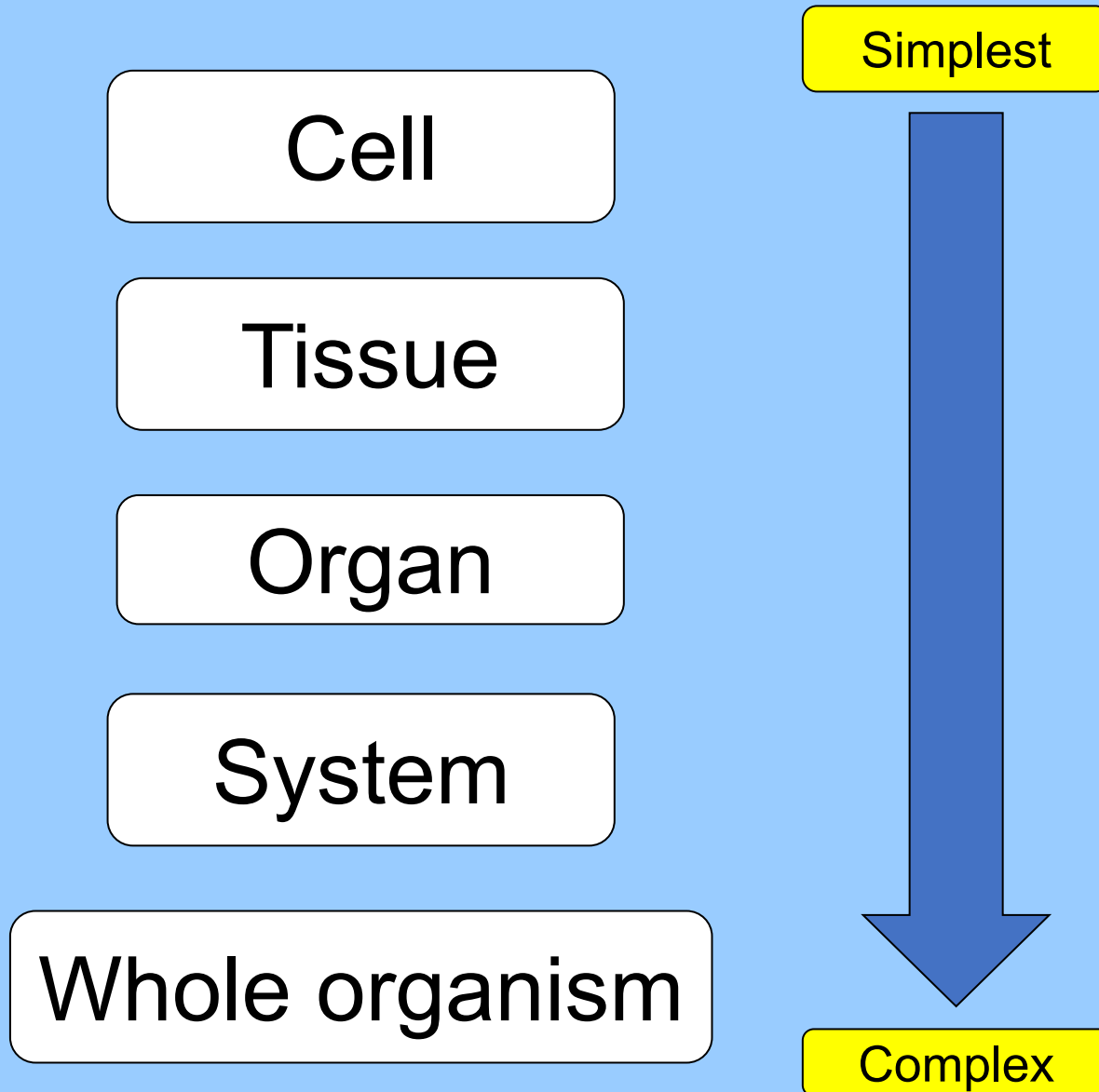
Whole organism

Organ

Sort these from  
simplest structure  
to most  
complicated

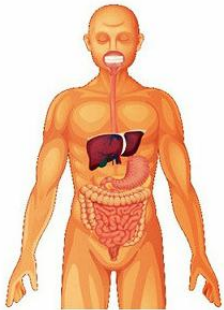
Cell

# Learning Check

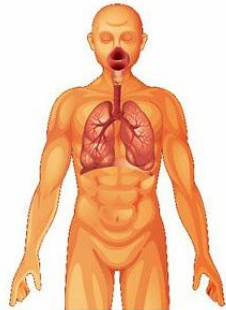


# Body Systems

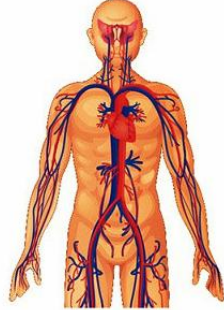
- Examples of **body systems** are circulatory, respiratory, digestive, skeletal, nervous and reproductive.
- Later in this unit you will learn more about some of these systems.



**Digestive system**  
*breaks down food and  
absorbs its nutrients*



**Respiratory system**  
*takes in oxygen and  
releases waste gases*



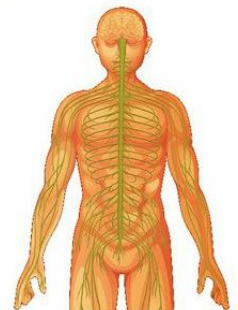
**Circulatory system**  
*transports oxygen, nu-  
trients, and other sub-  
stances to cells and  
carries away wastes*



**Skeletal system**  
*provides structure to  
the body and protects  
internal organs*



**Muscular system**  
*supports the body and  
allows it to move*



**Nervous system**  
*controls sensation,  
thought, movement,  
and virtually all other  
body activities*

# Build a Body Game

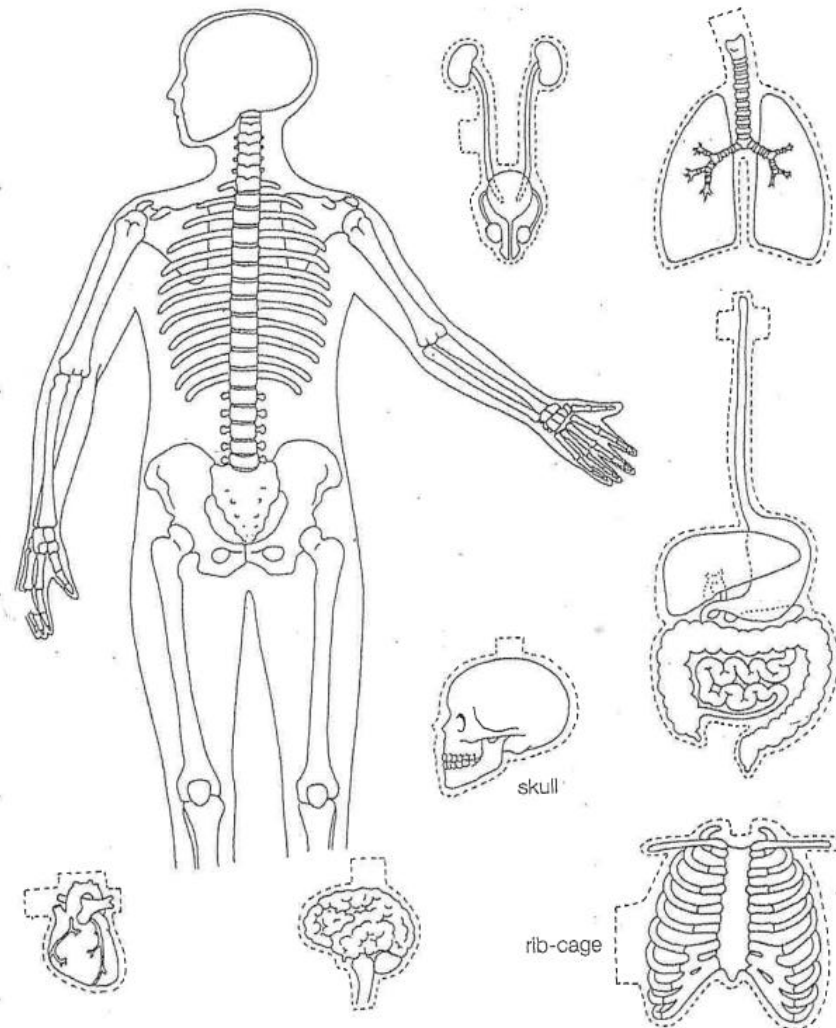
- Arrange yourselves into teams of 4.
- Collect a Pupil Game Sheet per player, a dice and a team set of Build a Body Game Cards.
- The youngest player rolls the dice first, each number represents a different body system:
  1. Digestive system
  2. Respiratory system
  3. Circulatory system
  4. Skeletal system
  5. Muscular system
  6. Nervous system
- Add the correct system to your game sheet, the first person to build a complete organism wins!

# Extension Task

## Body building

Read the instructions right through before you start

Stick the outline of the human body in your best books. Carefully cut around the dotted lines and decide on the best order in which to add the various organs and systems. Using a variety of coloured pencils, colour in all the organs you can name. You may use reference books. Now stick on the various parts by glueing the tabs only. Finally, construct a colour coded key alongside your human, naming as many organs as you can.



# Plenary

Can you name 5 keywords from today's lesson?



# Blood

06/10/2026

Page 6

## **Starter**

Write down three different cell types and describe their structure.

# Blood

06/10/2026

Page 6

## **Learning Intentions:**

- I am learning about blood.

# Cell Organisation

06/10/2026

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.

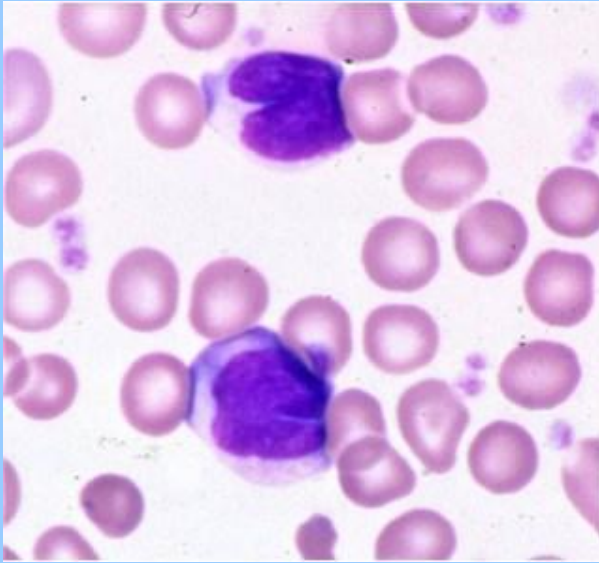
Red blood cells  
carry oxygen  
around your body.



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

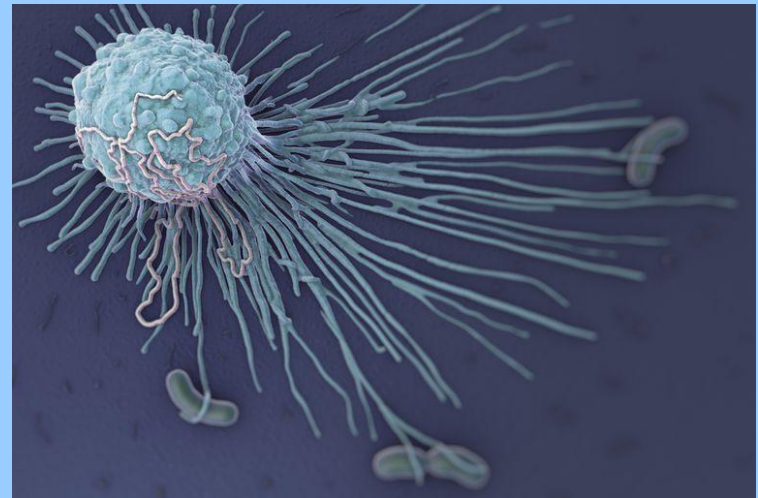


# Blood

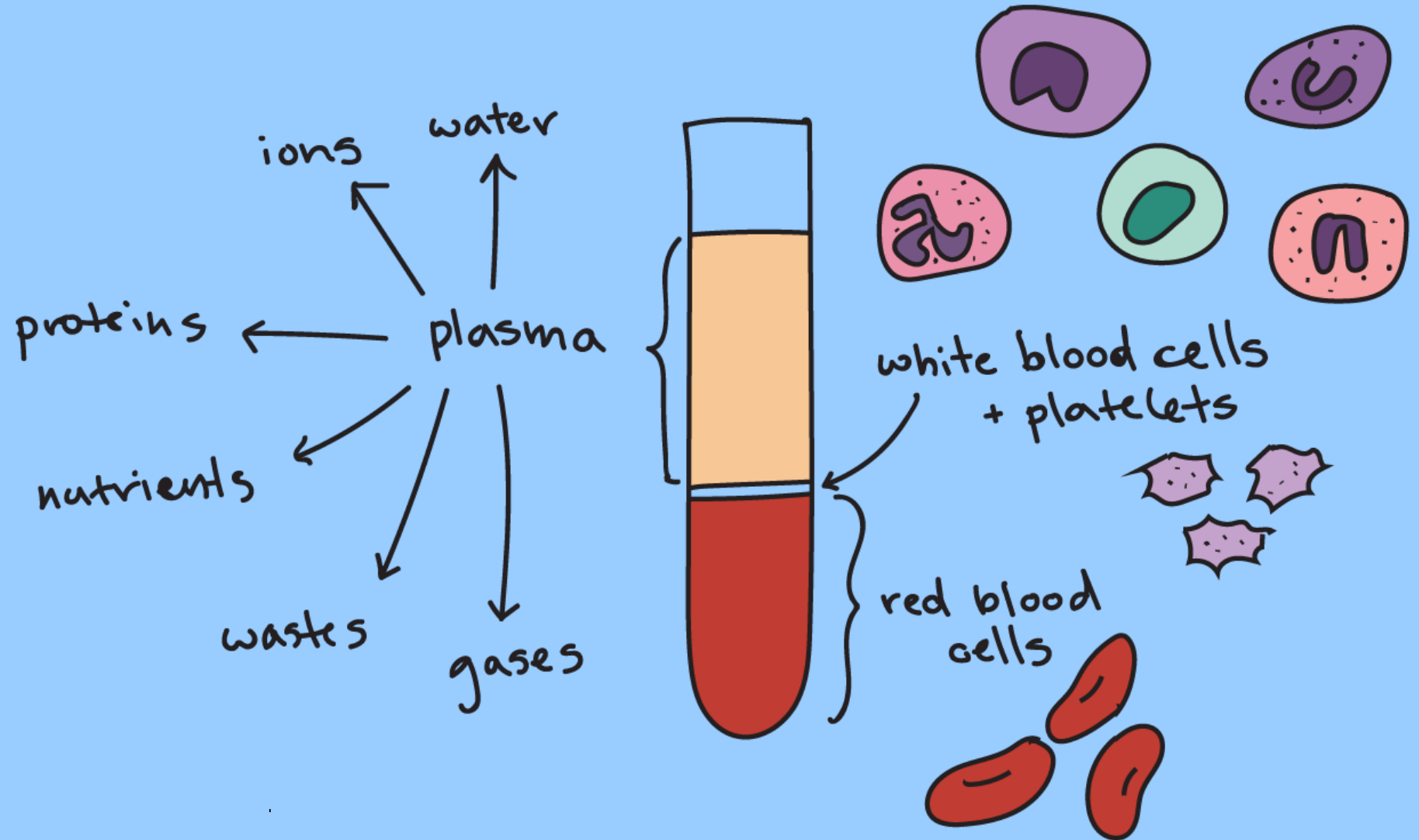


Some of your white blood cells produce 'antibodies' which stick to **antigens** on microbes and stop them from working and making you ill.

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



# Blood



# Blood



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.

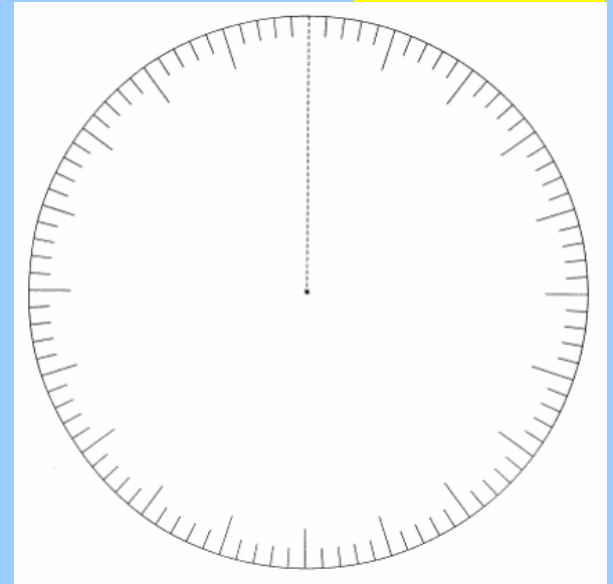


# Blood Cell Basics - Activity

Remember that blood is made up of 4 different components:

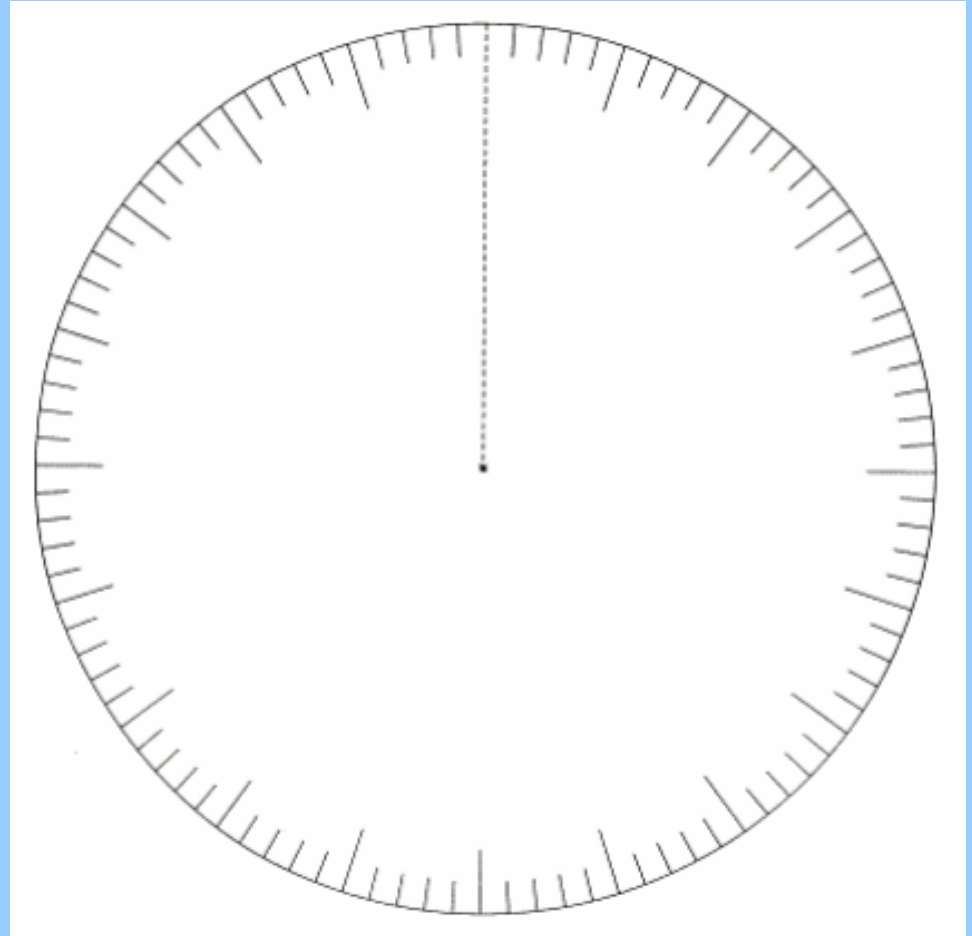
Page 7

- 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%



# 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

## 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

# The Heart

06/10/2026

Page 8

**Corbel Dolled →  
Red blood cell**

→ carries oxygen  
around the body  
using haemoglobin

**Decibel Howl Lot  
→ White blood cell**  
→ helps defend the  
body against  
infection and  
disease

**A Lamps →  
Plasma**

→ the liquid part of  
blood that transports  
cells, nutrients,  
hormones, and  
waste products

06/10/2026

# The Heart

Page 8

## **Learning Intentions:**

- I am learning about the heart.

# The Heart

06/10/2026

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

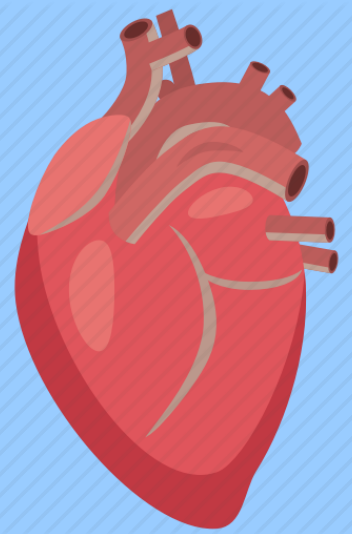
Can you think which components of the body make up the circulatory system?

The heart and blood vessels containing blood



**THINK. PAIR. SHARE.**

# 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.

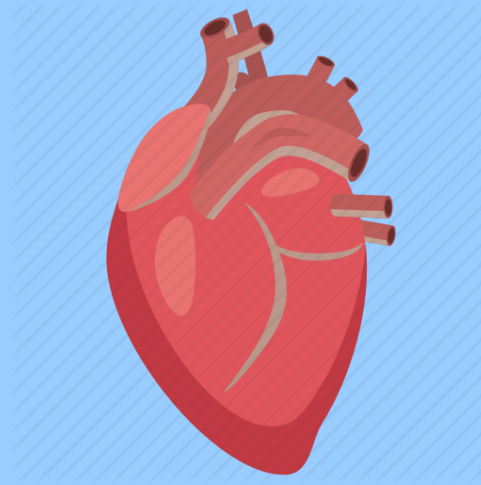
# The Heart

- [Video](#)

Page 8

## **Video**

Write down three things that you 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.

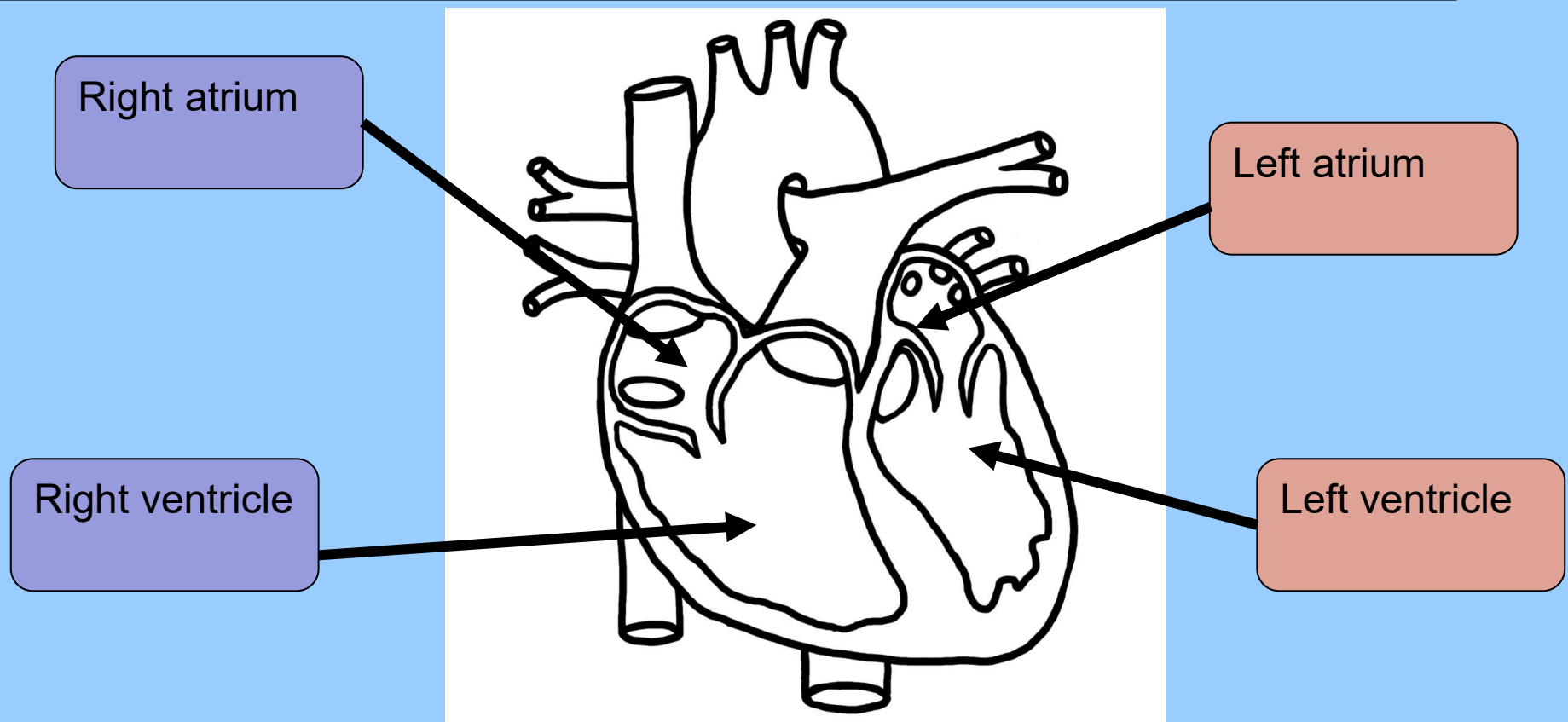
It contains four chambers and is connected to the rest of the body via blood vessels called arteries and veins.

# The Heart Diagram



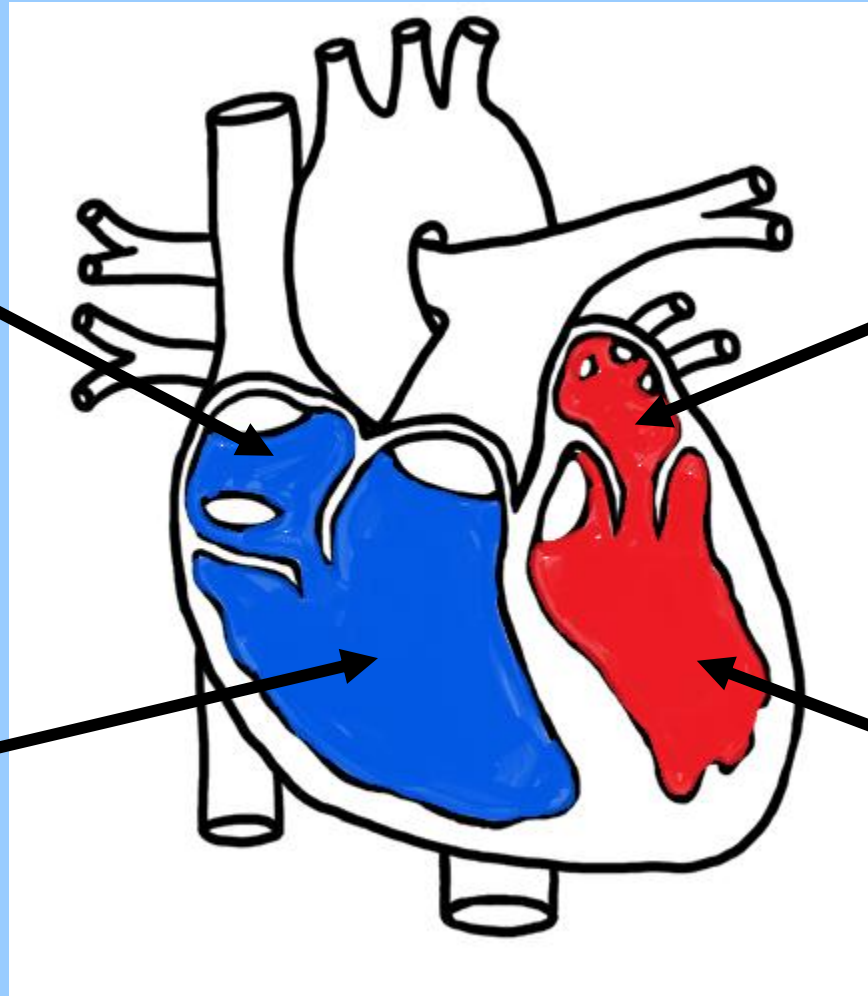
On the diagram:

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





# Heart Diagram



Right atrium

Left atrium

Right ventricle

Left ventricle



# Heart Diagram

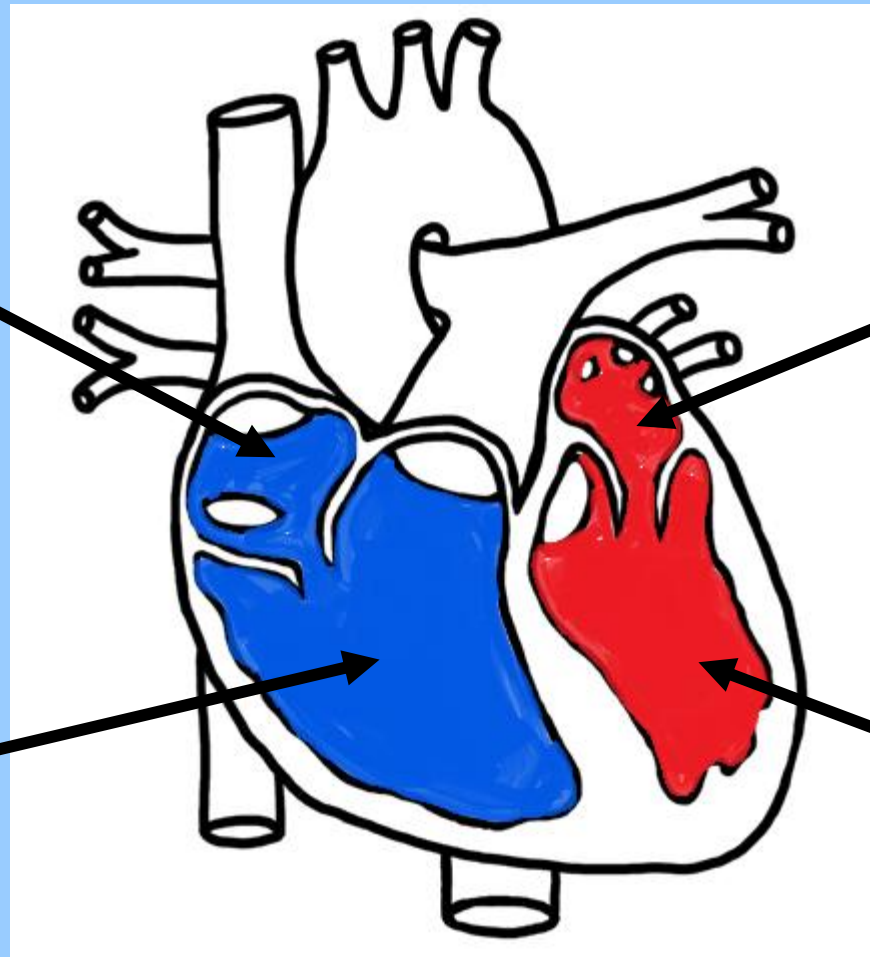
Key:



= high oxygen



= low oxygen



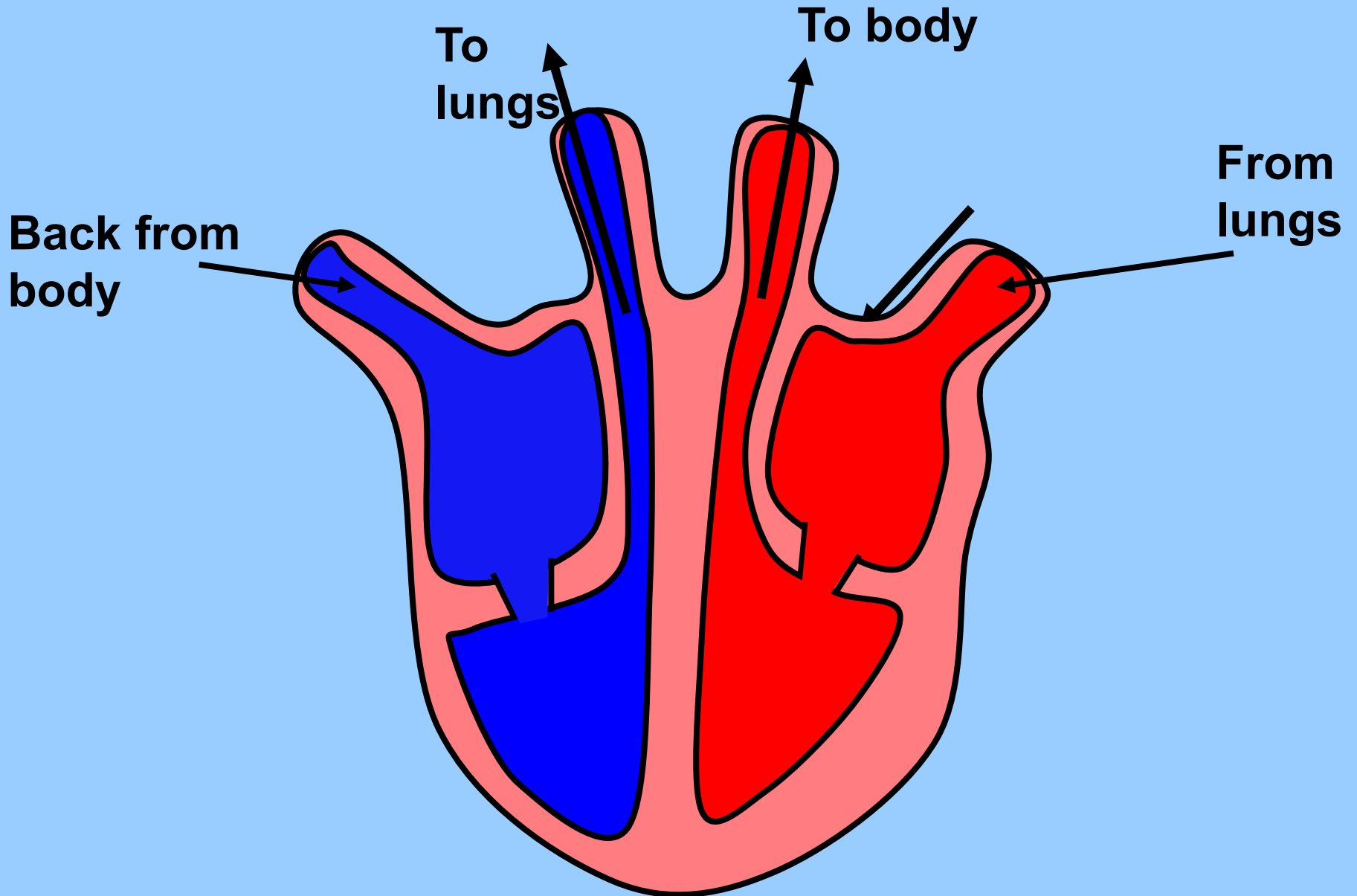
Right atrium

Left atrium

Right ventricle

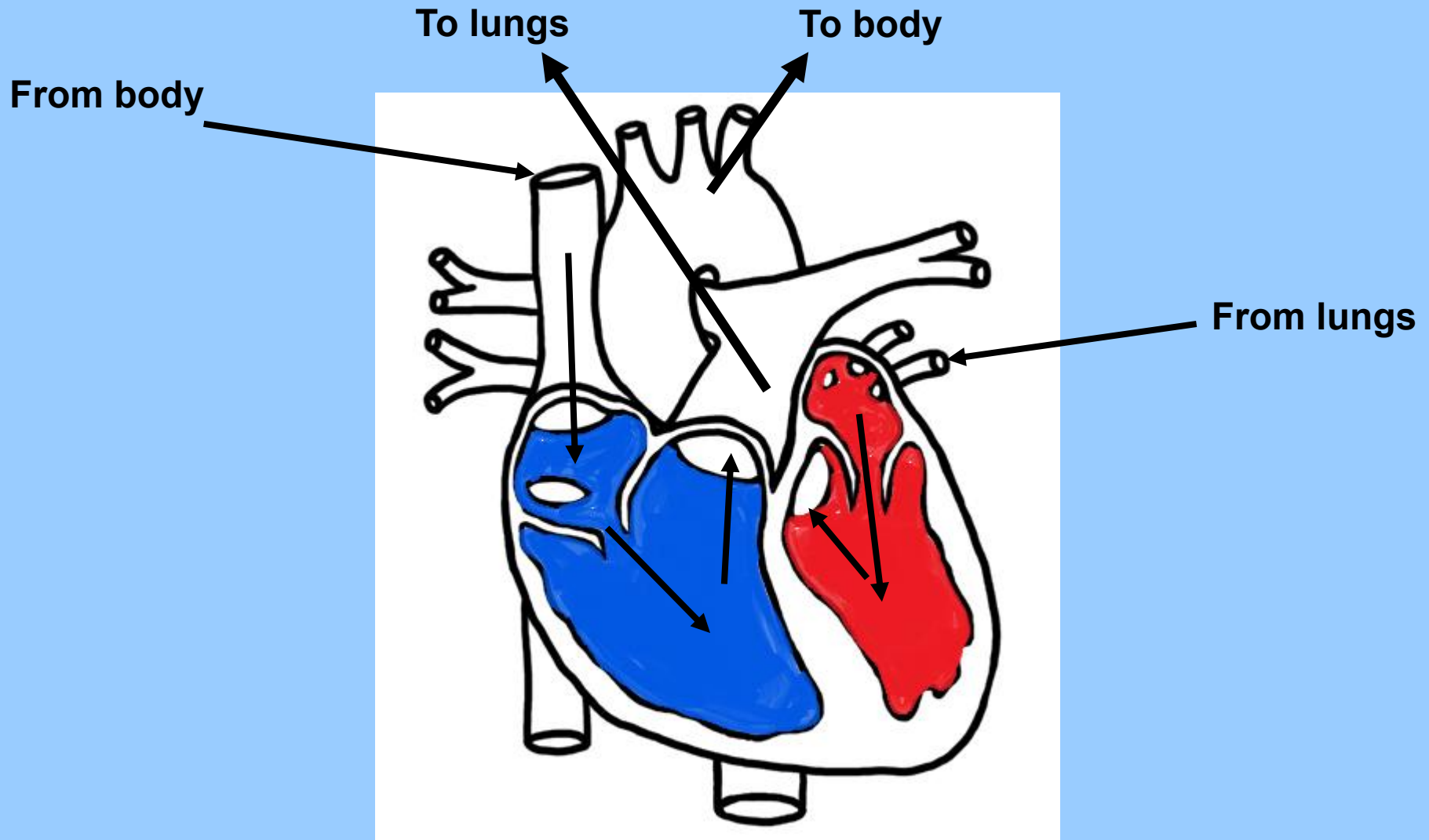
Left ventricle

# Direction of blood flow



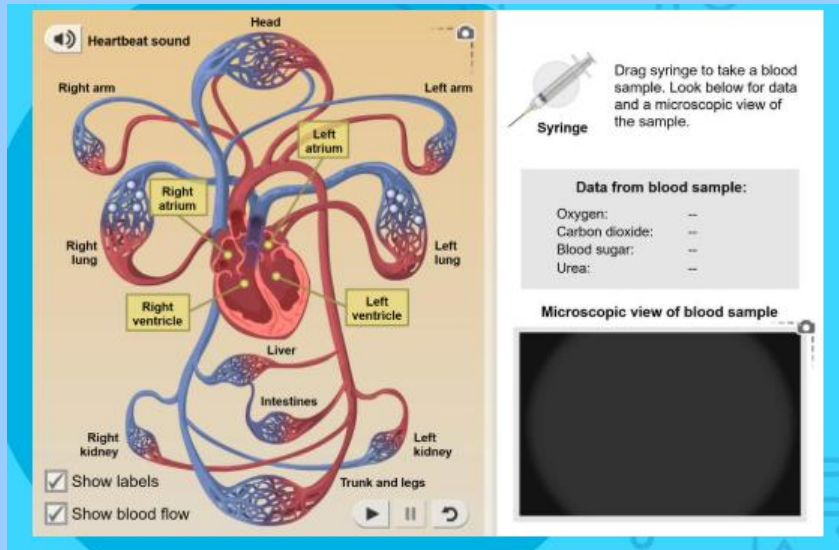
# Extension

Add labels to show the direction of blood flow.



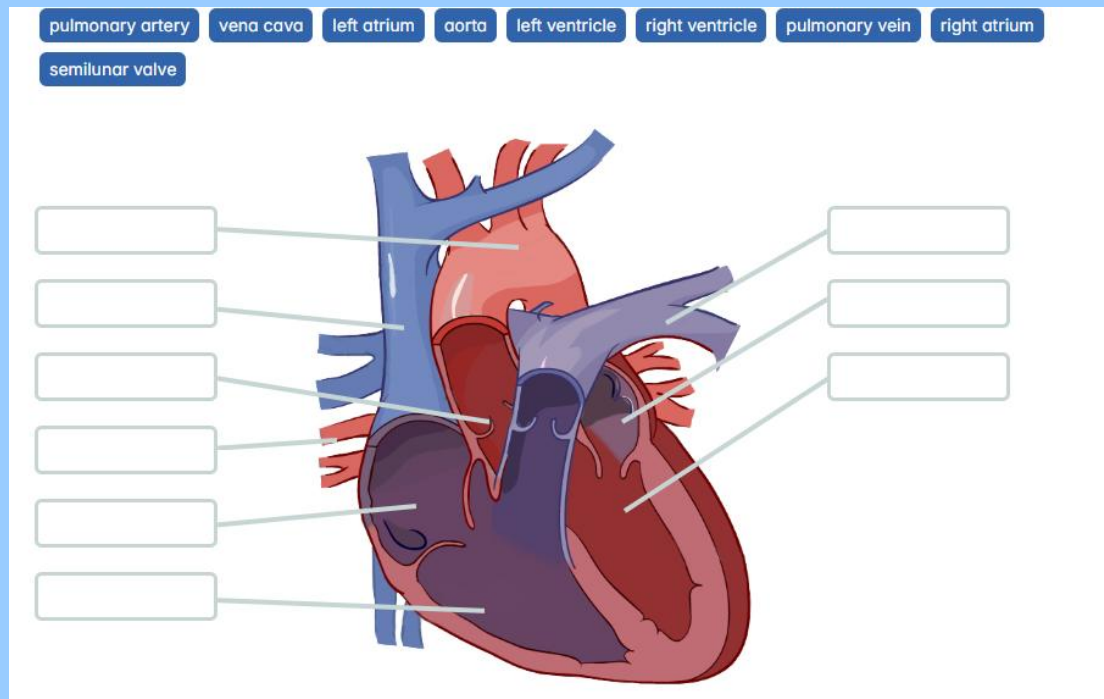
# Extension: Flow of Blood – Virtual Lab

- <https://gizmos.explorelearning.com/find-gizmos/lesson-info?resourceId=662>



# Let's look at other structures in the heart!

- [https://www.sciencelearn.org.nz/labelling\\_interactives/1-label-the-heart](https://www.sciencelearn.org.nz/labelling_interactives/1-label-the-heart)



# 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!

## **Starter**

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

# The Flow of Blood

06/10/2026

Page 10

## **Learning Intentions:**

- I am learning about the flow of blood.

# The Flow of Blood

06/10/2026

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



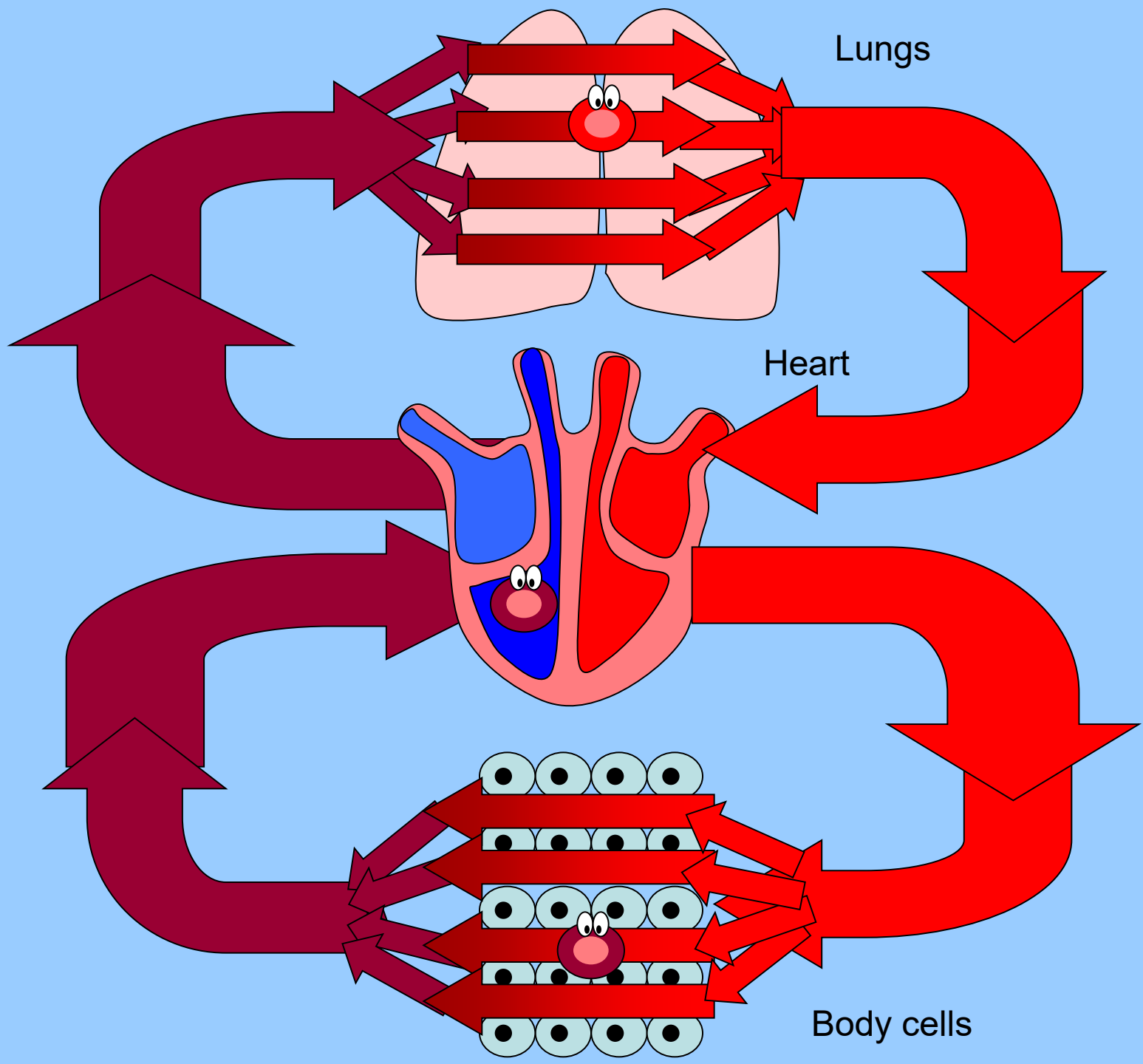
It then flows back into the left side of the heart where it is pumped out again to the rest of the body.

# Flow of Blood Through the Body

Page 10



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

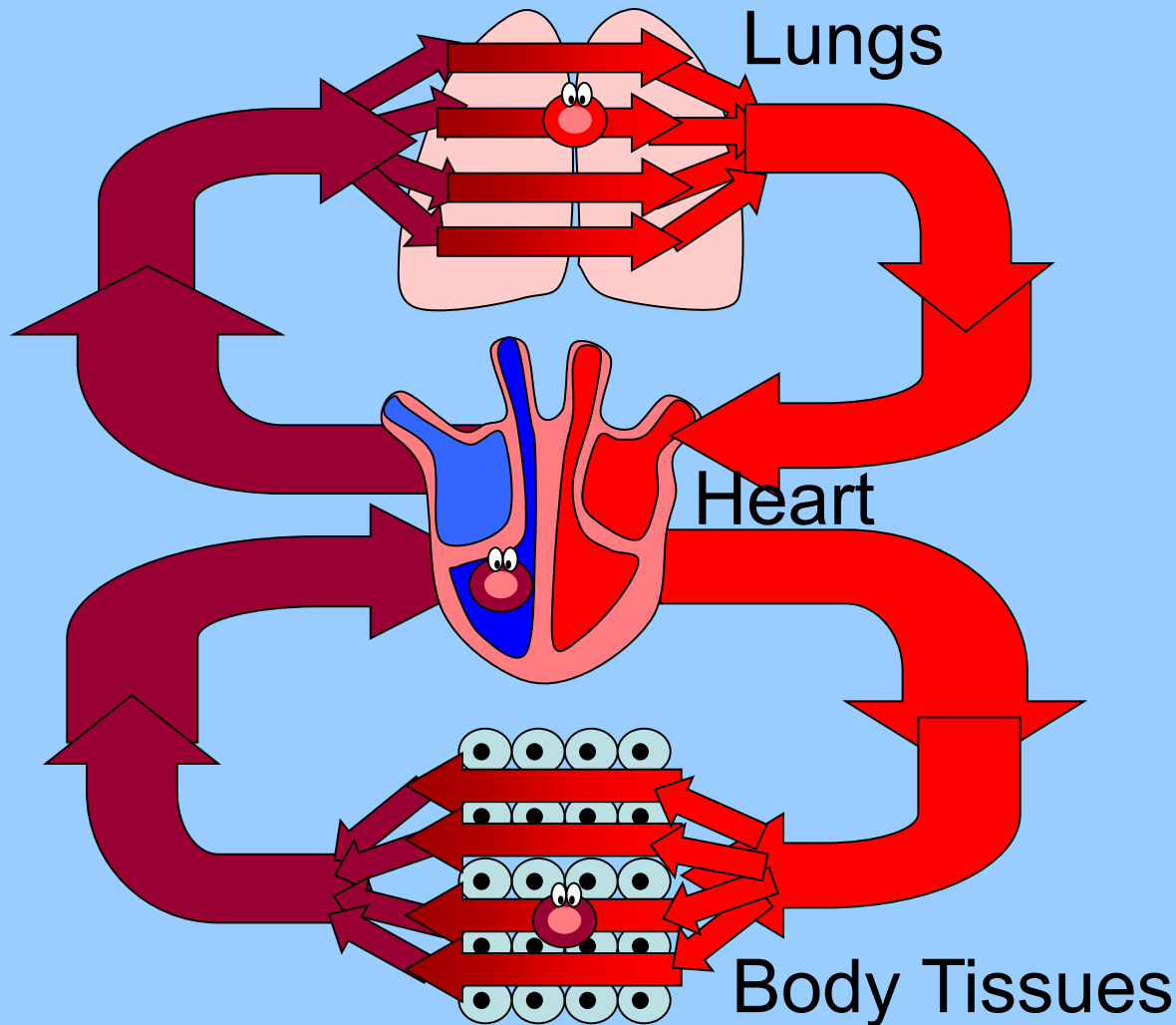


# Flow of Blood

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

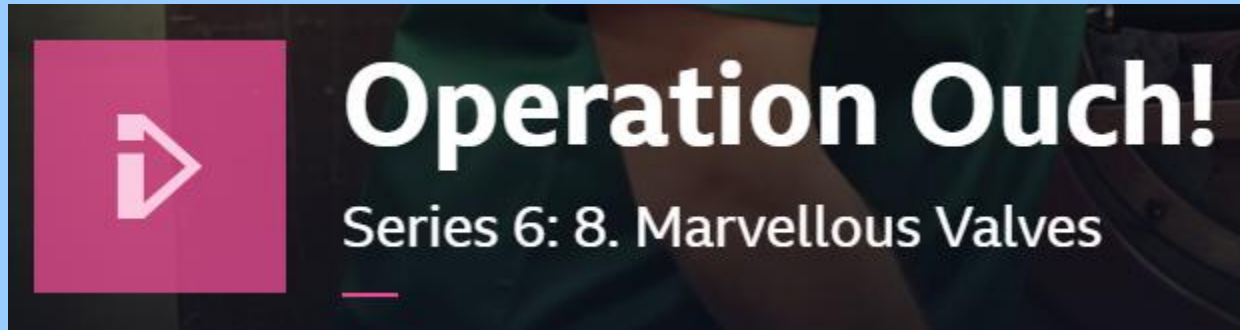
Page 11



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

Heart Dissection





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

28 mins

# Blood Vessels - Extra

## Starter

Use the word bank to complete the sentences below:

**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.

# Blood Vessels

06/10/2026

Page 12

## **Learning Intentions:**

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

# Blood Vessels

06/10/2026

Page 12

## Success Criteria

- ☐ I can describe the structure of blood vessels.
- ☐ I can describe the function 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 <b><u>A</u>WAY</b> from the heart | Aorta, pulmonary artery |
| Vein         |                                               |                         |
| Capillary    |                                               |                         |

# Blood Vessels



Complete the table below in your booklet.

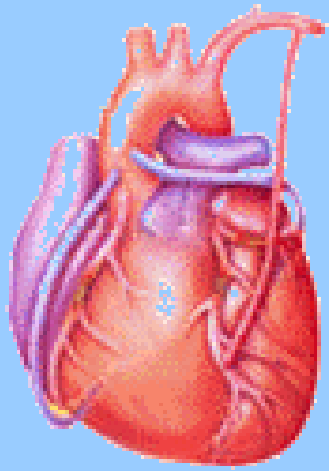
| Blood Vessel | Function                                       | Example                   |
|--------------|------------------------------------------------|---------------------------|
| Artery       | Carry blood <b><u>AWAY</u></b> from the heart  | Aorta, pulmonary artery   |
| Vein         | Carry blood back <b><u>IN</u></b> to the heart | Vena cava, pulmonary vein |
| Capillary    |                                                |                           |

# Blood Vessels



Complete the table below in your booklet.

| Blood Vessel | Function                                                                                 | Example                   |
|--------------|------------------------------------------------------------------------------------------|---------------------------|
| Artery       | Carry blood <b><u>AWAY</u></b> from the heart                                            | Aorta, pulmonary artery   |
| Vein         | Carry blood back <b><u>IN</u></b> 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 =  $80 \times 60 = 4800$

beats per day =  $4800 \times 24 = 115\,200$

beats per year =  $115\,200 \times 365 = 42\,048\,000$

beats over 85 years =  $42\,048\,000 \times 85 = 3\,574\,080\,000$

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)  $\times 3 = 78$  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?):

---

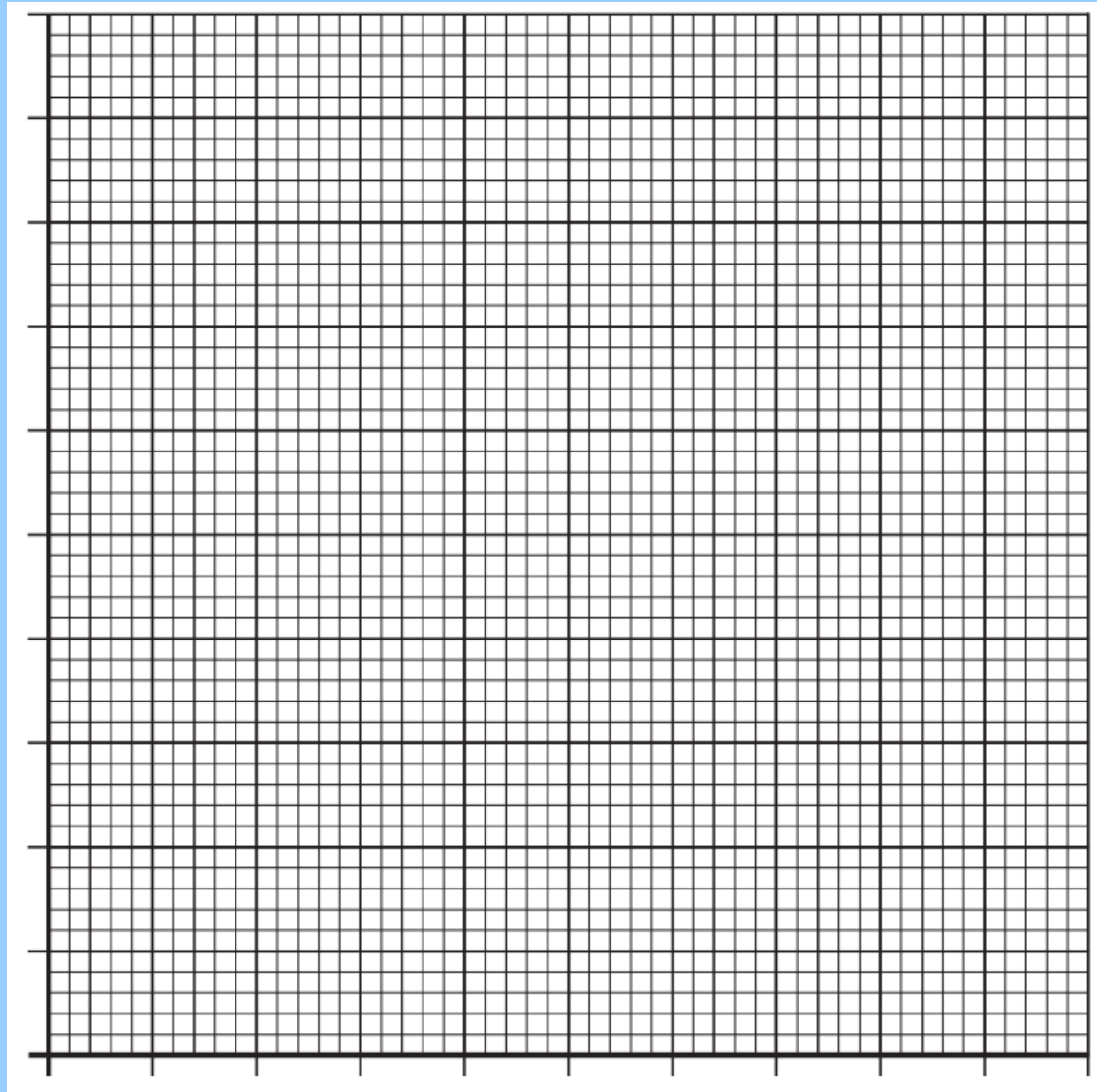
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**Results:**

| Type of Exercise | Heart Rate<br>(Beats in 20 seconds) | Heart Rate (Beats per<br>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.

# The Lungs

Page 16

**Starter**

Did you know... your nostrils take turns breathing air in and out?

Prove it!

Did you know...your nostrils take turns taking breathing air in and out?

- **Prove it!** - breathe down gently once onto a small mirror placed just above your upper lip.
- The moist breath will cloud up the mirror making an area of condensation for each nostril.
- Amazingly, one area will be larger than the other, indicating that more air is coming out of one nostril than the other.
- If you were to repeat this exercise in several hours you will find that the nostrils have reversed themselves.



# The Lungs

## **Learning Intentions:**

- To learn about the respiratory system
- To learn about how we breathe

# The Lungs

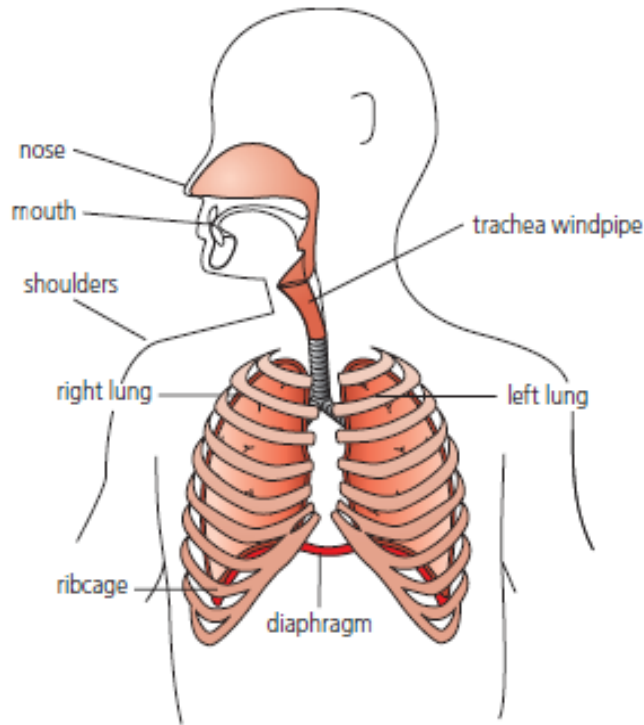
06/10/2026

Page 16

## Success Criteria

- ☐ I can state the parts of the respiratory system.
- ☐ I can explain how air enters the lungs.
- ☐ I can explain how oxygen enters the blood.
- ☐ I can describe the function of each part of the respiratory system.

## Something about the respiratory system



### *What does it do?*

The respiratory system allows you to breathe.

### *What is in it?*

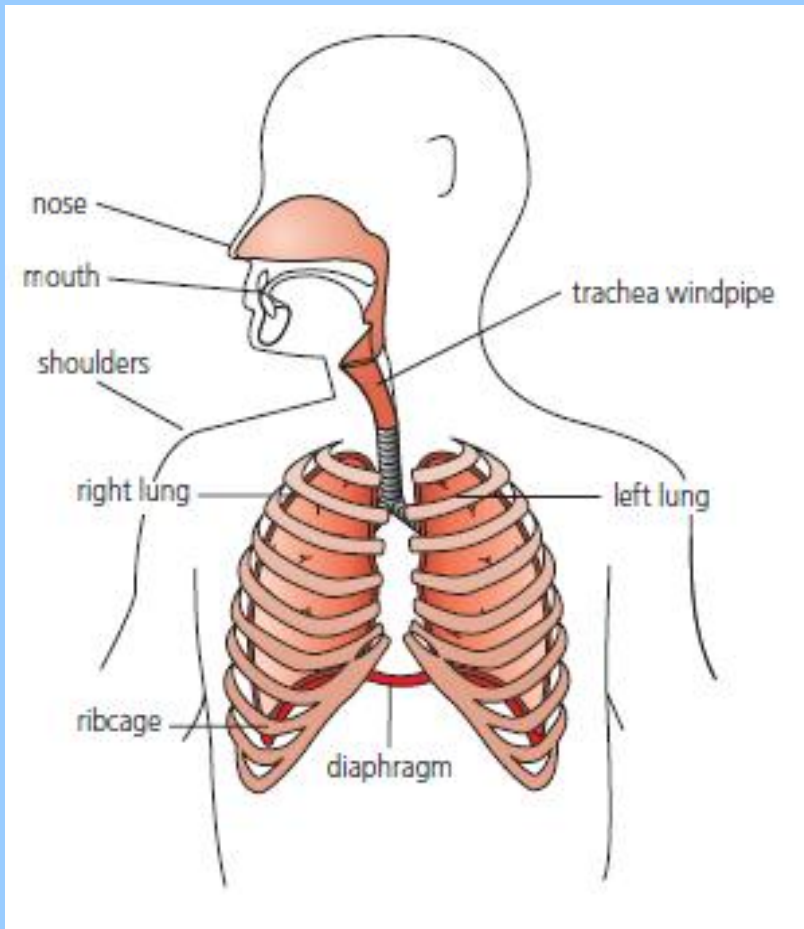
The respiratory system includes your nose, mouth and windpipe. This system carries air in and out of your lungs. The respiratory system also includes the muscles that surround your lungs – the diaphragm on the chest floor and the shoulders and ribs that surround it.

### *What other systems does it work with?*

The respiratory system helps oxygen to enter your bloodstream as well as removing carbon dioxide from your lungs (carbon dioxide removal is essential to prevent the blood pH changing). The muscular system makes the chest move air in and out of the lungs. The skeleton protects the chest.

# The Respiratory System

Page 16

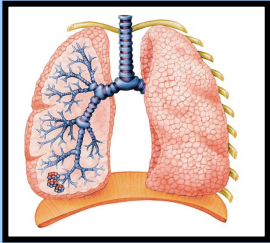


The lungs are the organs of gas exchange.

Our cells need the oxygen from the air and we must get rid of the waste product carbon dioxide.

Air enters the breathing system by the nose or mouth.

# Structure of the lungs



Click on the TV screen  
to watch the video clip  
about  
“What do the lungs  
do?”

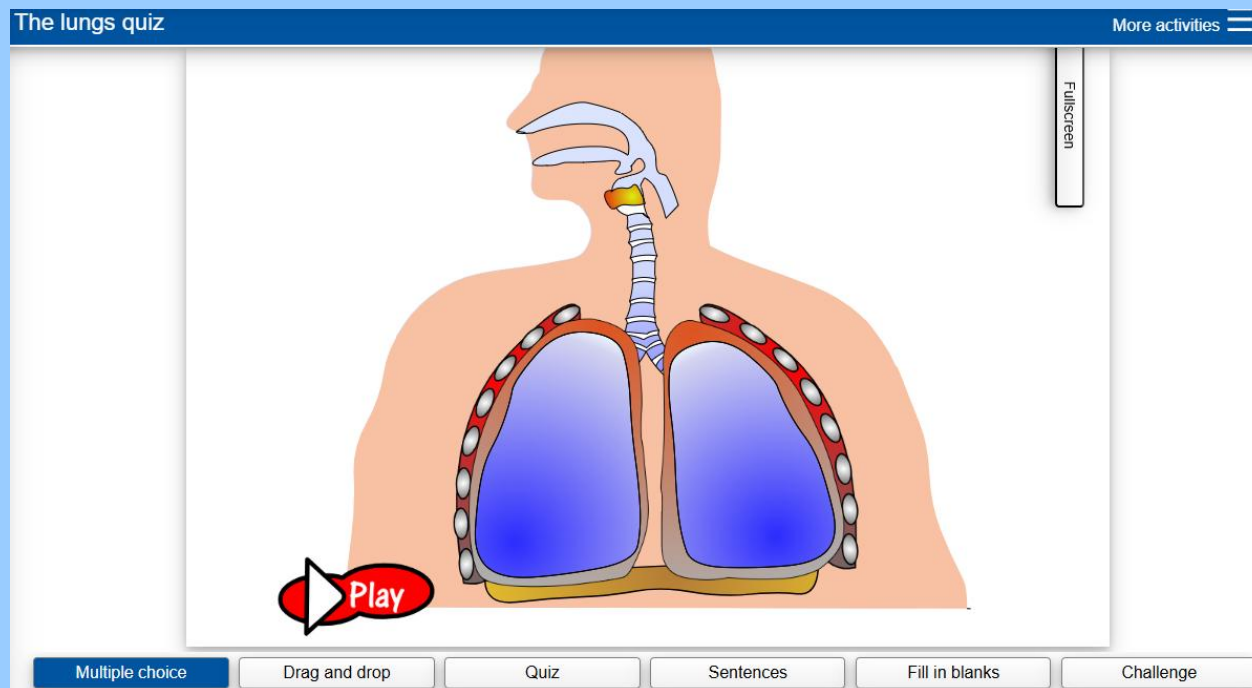


[https://www.youtube.com/watch?v=8NUxvJS-\\_0k](https://www.youtube.com/watch?v=8NUxvJS-_0k)



# The Lungs animation

1. Scan the QR code on your iPads to access the lungs animation
2. Play to watch what happens when you breathe
3. Complete the interactive quizzes and challenges



# The Lungs

The Lungs have two functions. To allow...

- 1) **1** to pass *into* the bloodstream, and
- 2) **2** to pass *out* of the bloodstream

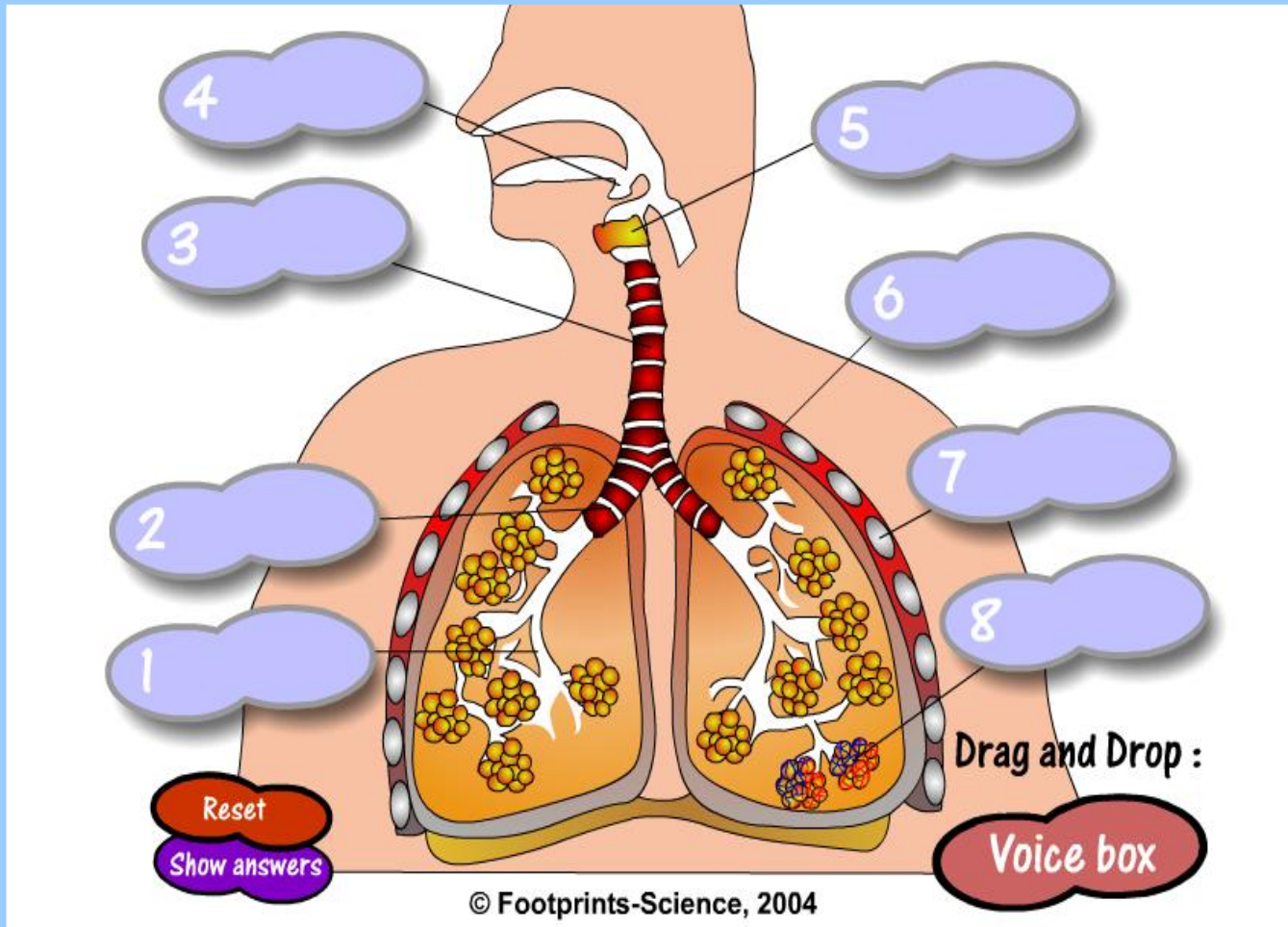
This process is called **3**

Reset

Show answers

Drag and Drop the following labels : **Gaseous exchange**

# The Lungs



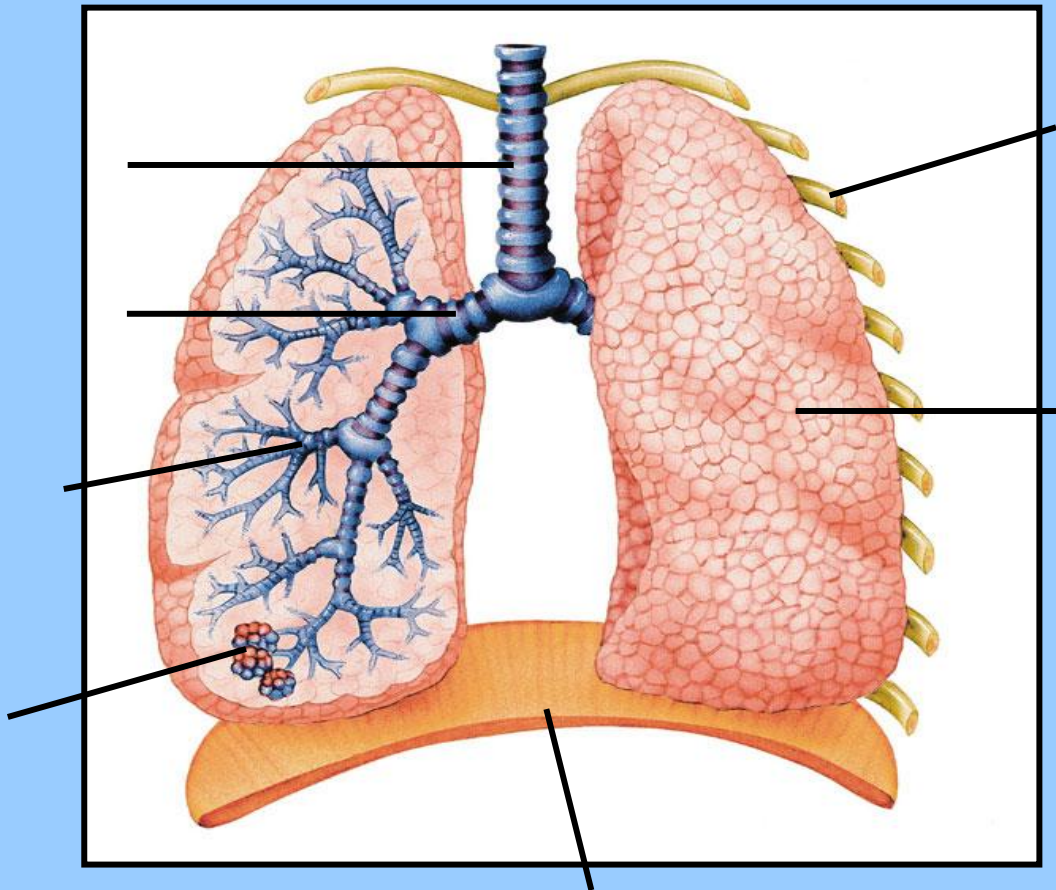
# Structure of the lungs

Page 17



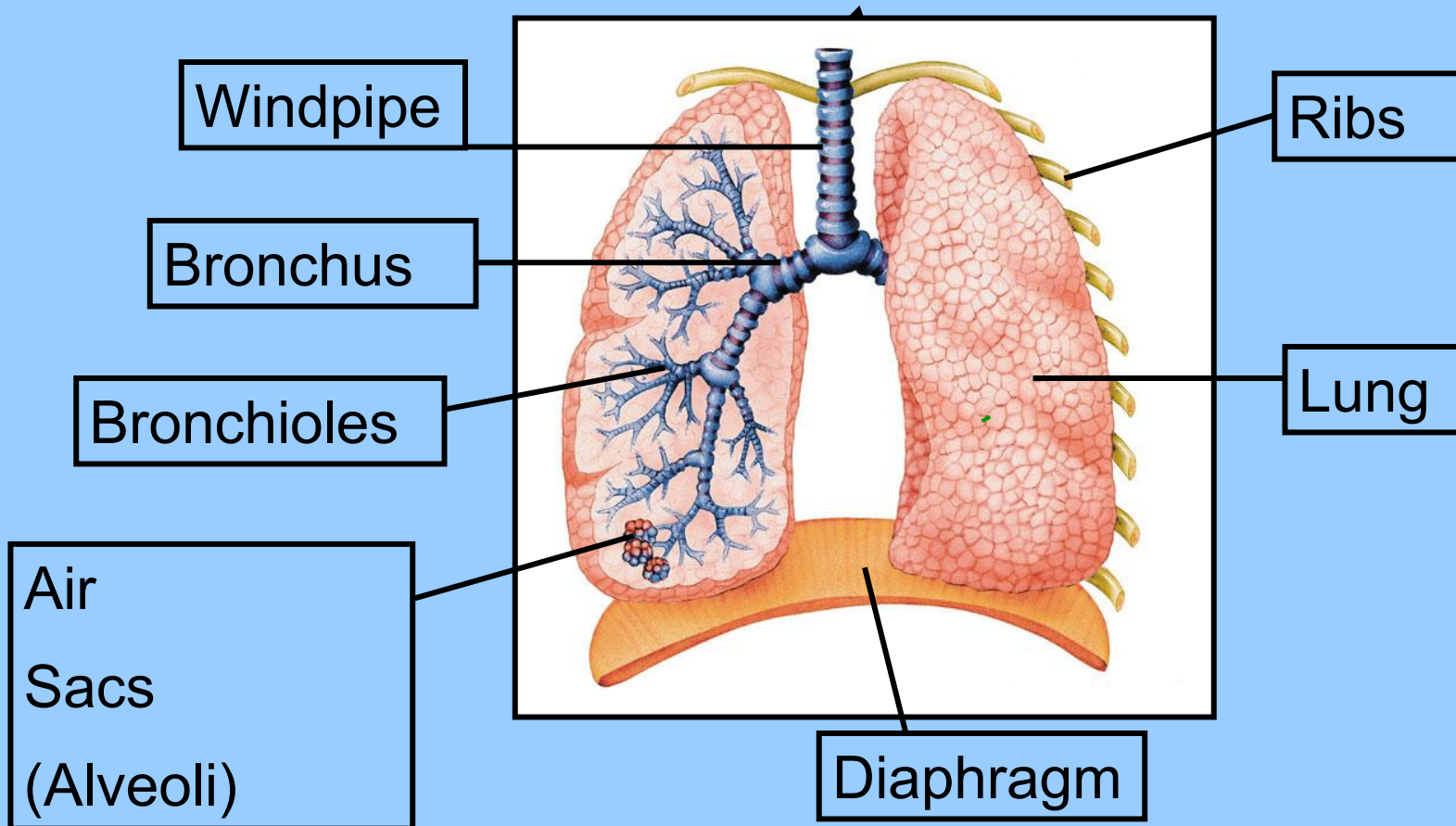
Label the diagram of the lungs in your workbook.

Your teacher will help you.



# Check your labels!

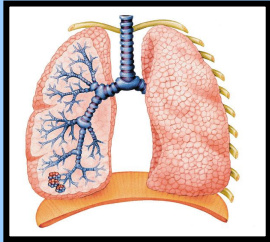
Page 17





The windpipe and the bronchi have rings of cartilage in them. This makes sure that they stay open at all times.

# Bronchoscopy



Click on the TV screen to watch the video clip where a camera is sent down into a person's lungs.

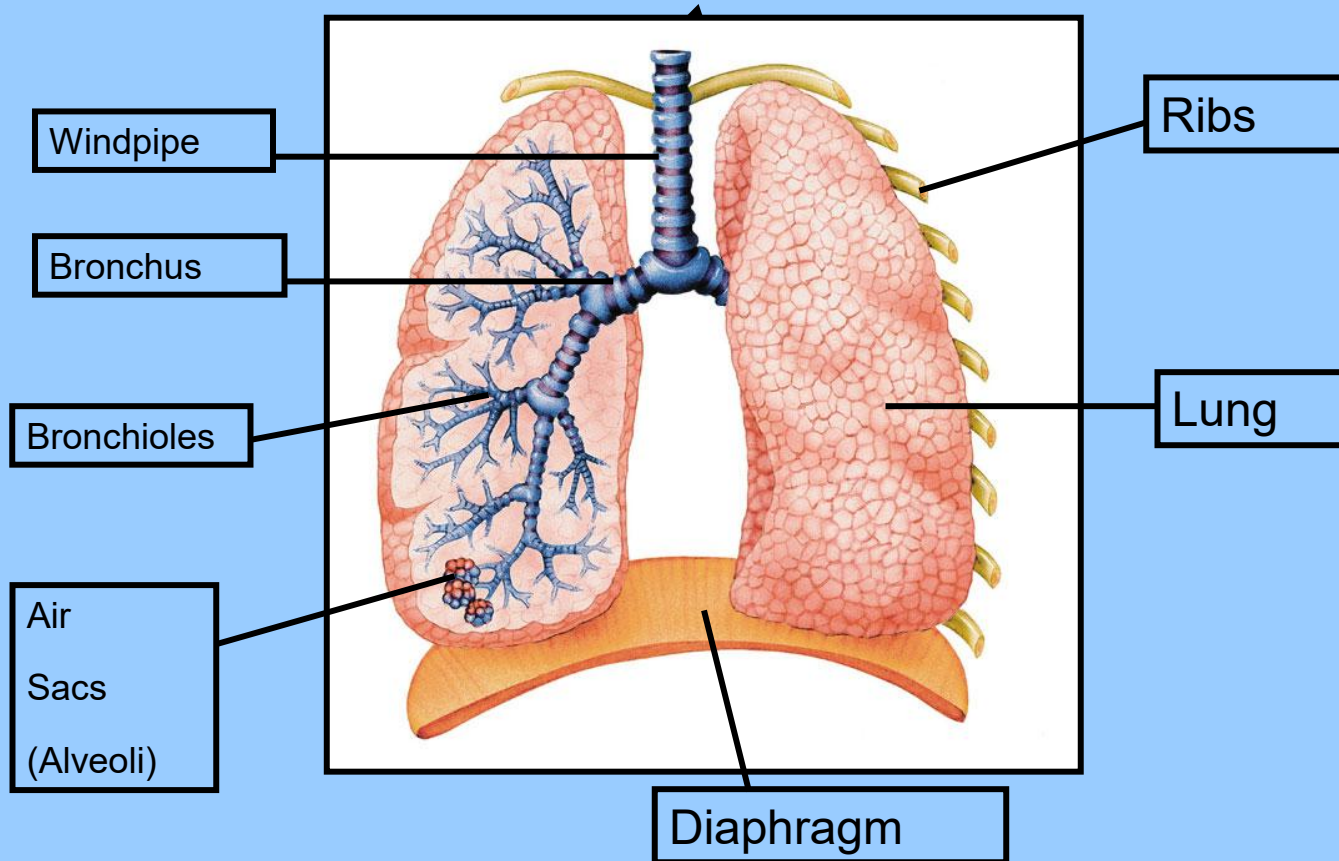


<https://www.youtube.com/watch?v=KqZc1JqArco>

Use the information on page 17 to help you answer the questions below

## Starter:

Name the structures



Why do the windpipe and the bronchi have **rings of cartilage** in them?

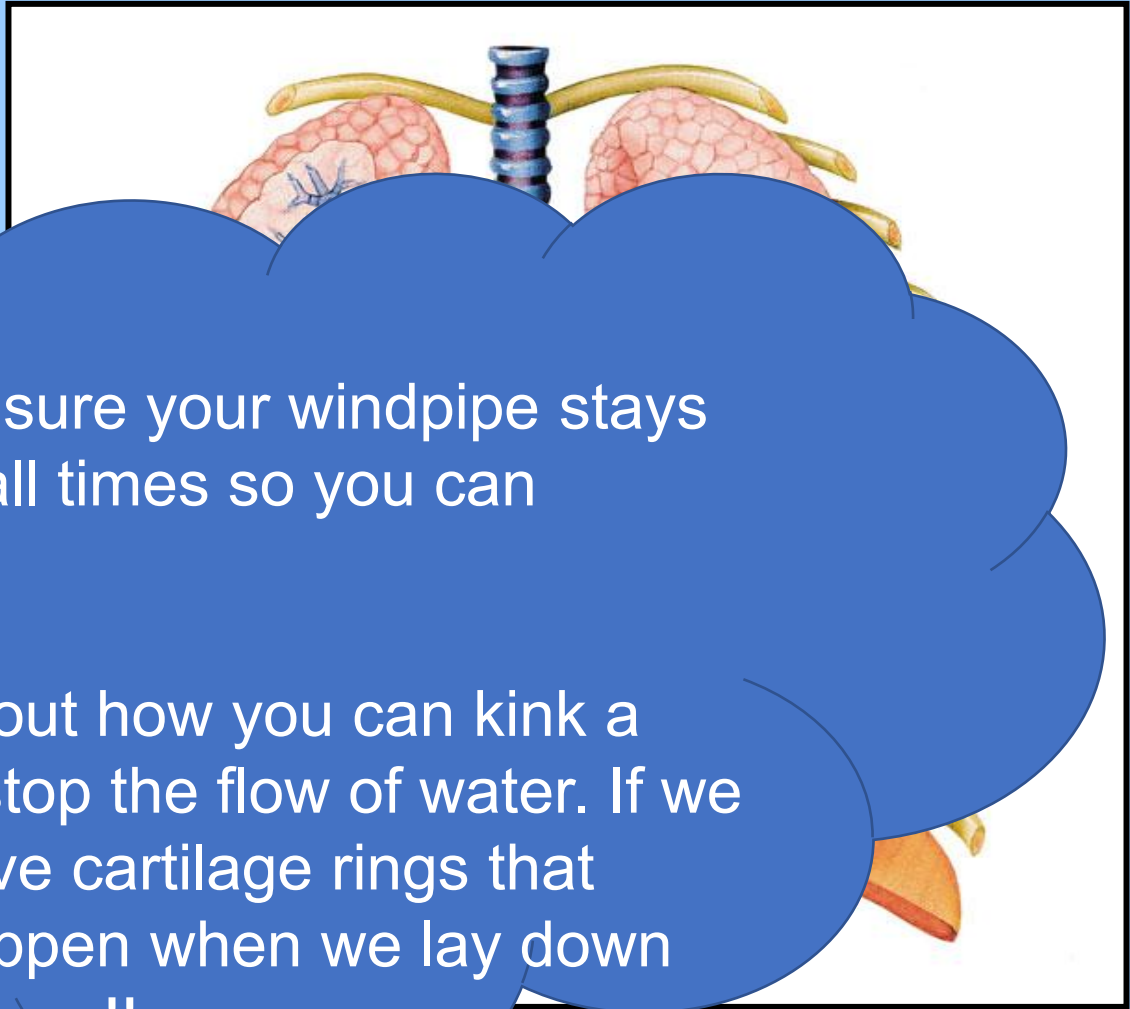
To keep them open when they bend.

# Cartilage rings

The windpipe is  
made up of  
cartilage  
think w

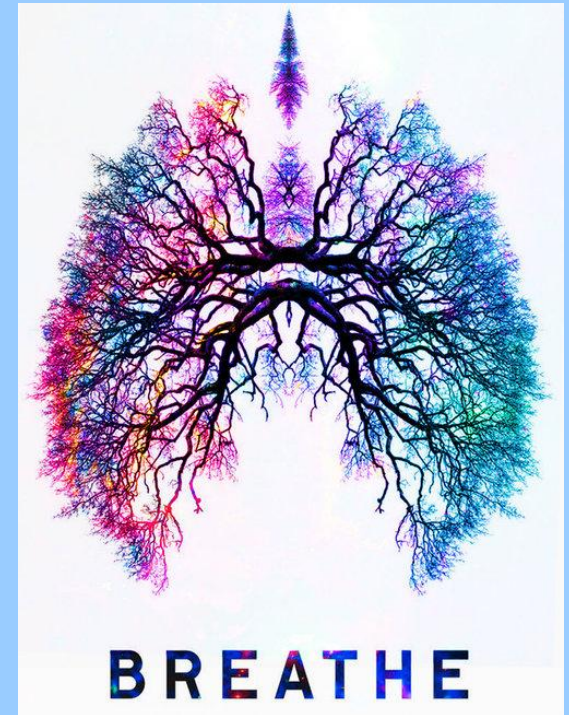
To make sure your windpipe stays  
**open** at all times so you can  
breathe.

Think about how you can kink a  
hose to stop the flow of water. If we  
didn't have cartilage rings that  
might happen when we lay down  
or bend over!!

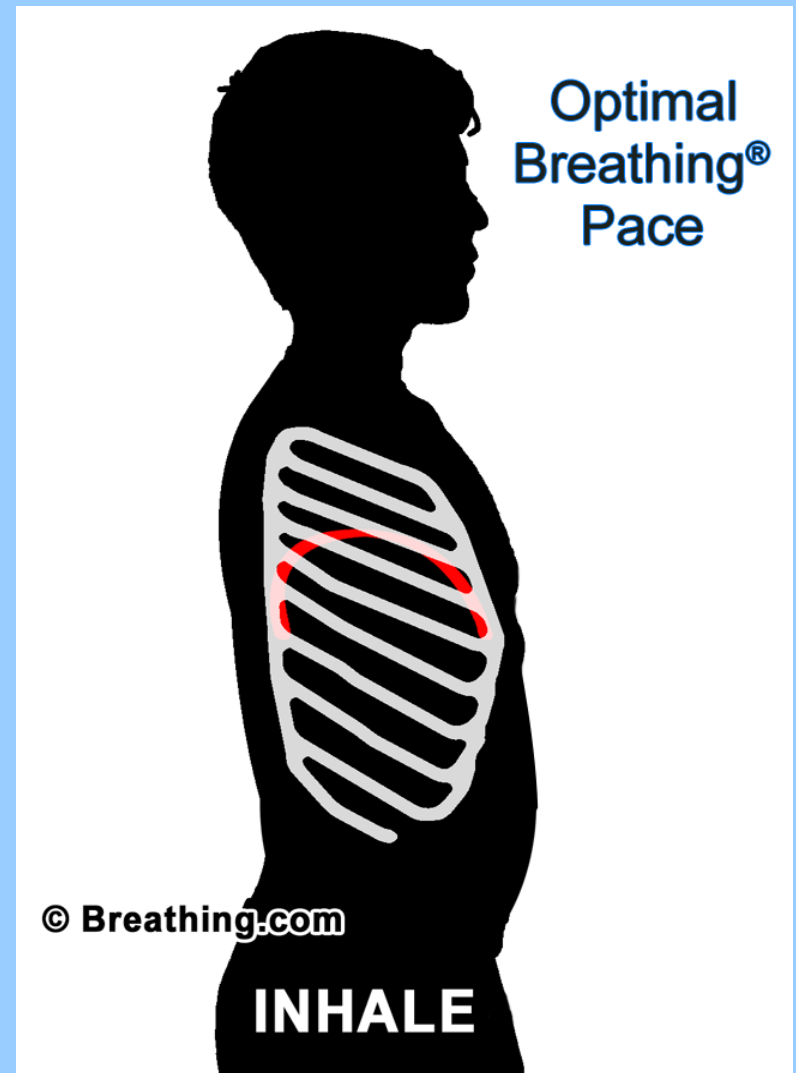


# How does the air get into and out of our lungs?

- Breathing of course!
- But what makes us breathe?



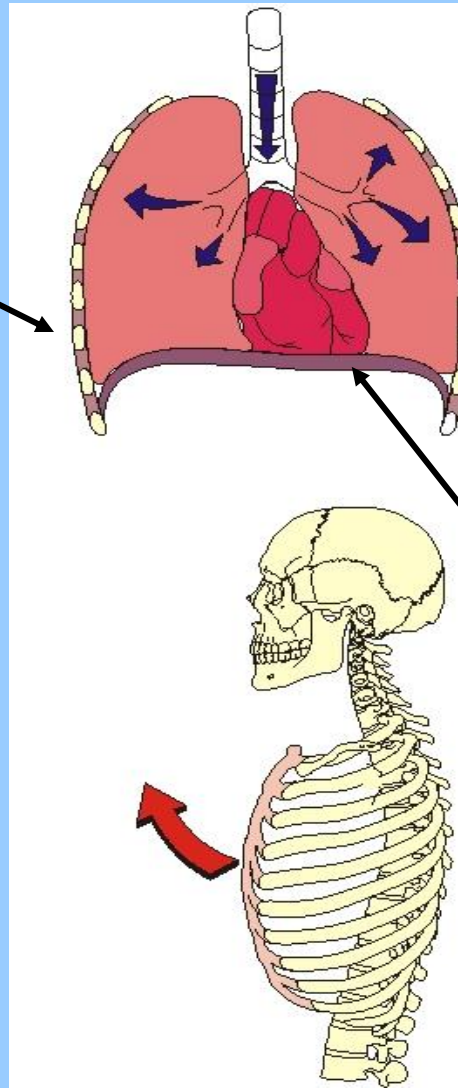
- Our intercostal muscles (muscles in between our ribs) and our diaphragm work together to cause us to breathe.
- It is a common misconception that our lungs inflate and deflate causing our chest to rise and fall.
- It is in fact the chest being made bigger or smaller that forces our lungs to inflate/deflate causes us to inhale/exhale.



# Breathing In

Chest  
Volume **increases**  
Pressure decreases  
Lungs inflate

Rib cage moves  
**up** and **out**

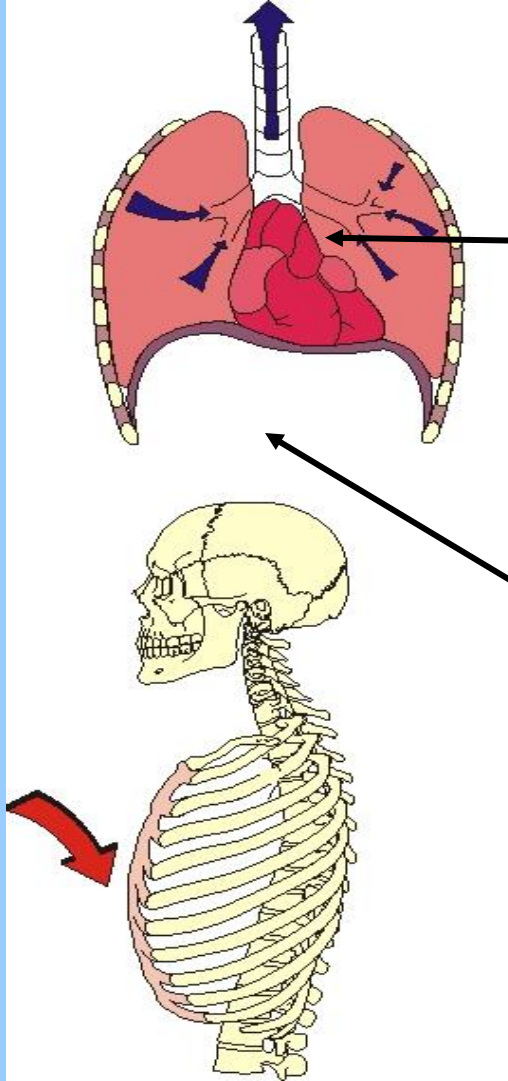


Page 17



Diaphragm  
**contracts** and the  
diaphragm  
**flattens**

# Breathing Out



Rib cage  
moves **down**  
and **in**

Chest  
Volume **decreases**  
Pressure increases  
Lungs deflate

Diaphragm  
**contracts** and the  
diaphragm  
**rises**

# Breathing

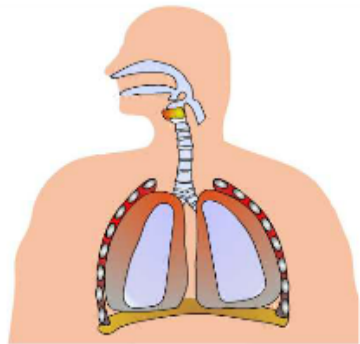
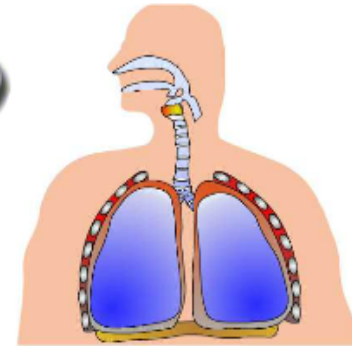
## Breathing in (Inhalation)

Ribcage muscles and diaphragm 1

The volume of the thorax 2

The pressure inside the lungs 3

Air 4 the lungs



## Breathing out (Exhalation)

Ribcage muscles and diaphragm 5

The volume of the thorax 6

The pressure inside the lungs 7

Air 8 the lungs

Reset

Show answers

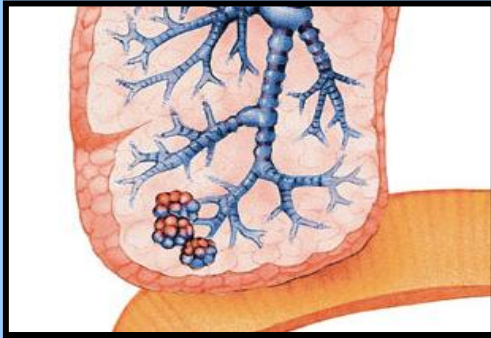
Drag and Drop :

relax

So we know how air gets in to our lungs (breathing) but how are the gases (oxygen and carbon dioxide) actually exchanged?

# The Air Sacs

Page 18

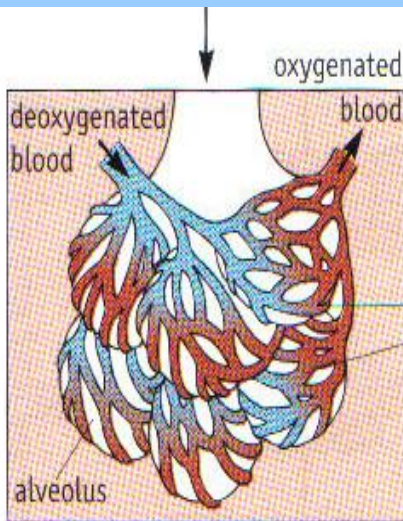


The air breathed in reaches the air sacs and is full of oxygen.

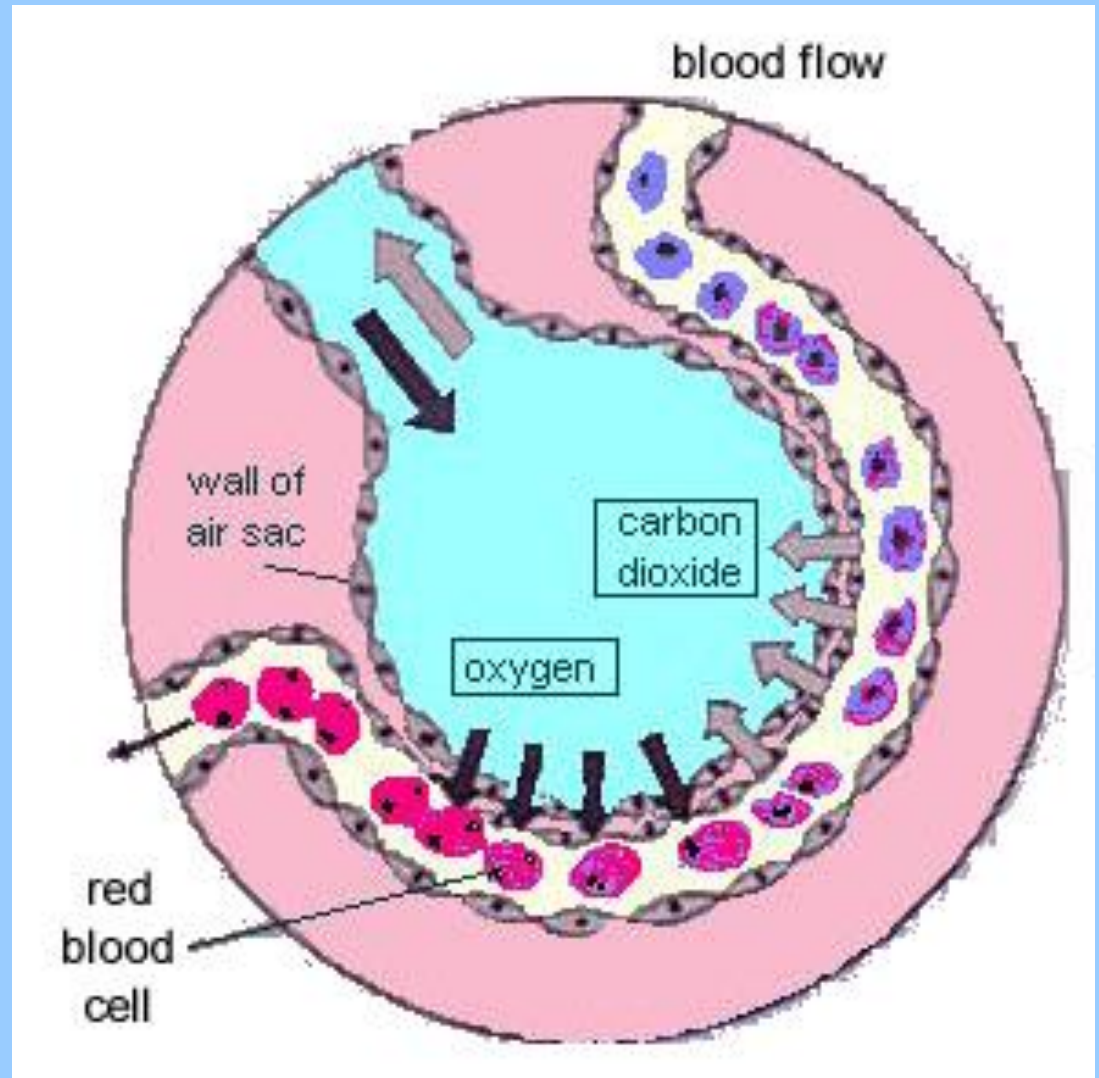
The air sacs are surrounded by blood vessels.

As the blood flows through the vessel:

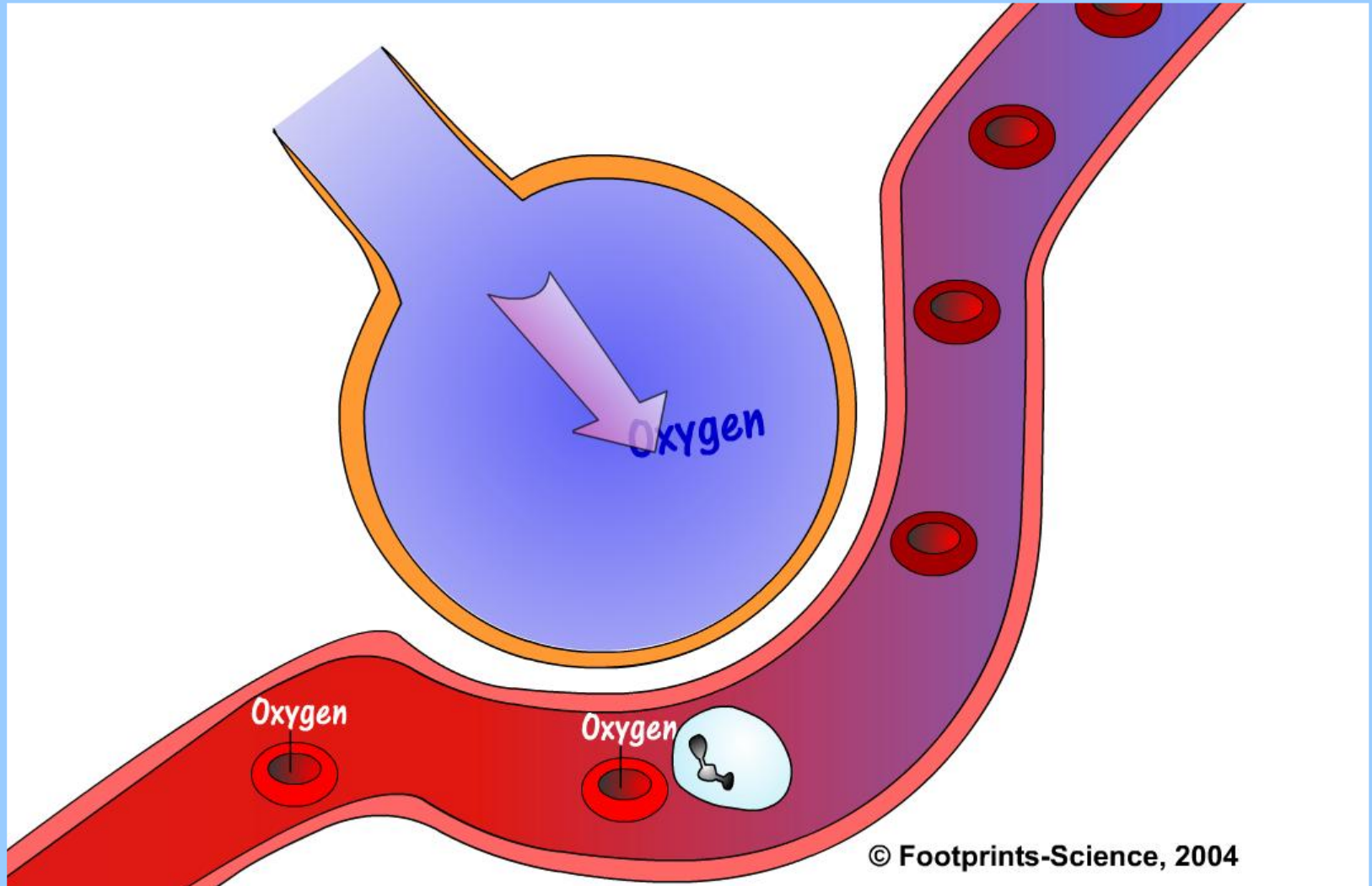
- Oxygen moves from the air sac to the blood.
- Carbon dioxide moves from the blood to the air sac( so we can breathe it out)



# A closer look!



Plenary – On the board, label the diagram and draw arrows to show the direction of movement of oxygen and carbon dioxide.





Your teacher may do a lung dissection demonstration with you.  
How many of the structures you have labelled on your diagram  
can you identify?

## **Learning Intentions:**

- To write an Outcome 1 scientific report

## **Success Criteria**

- I can plan an investigation
- I can carry out an investigation safely
- I can write a scientific report to include an Aim

# Body Systems - Outcome 1 Report

An Outcome 1 in Science is about showing that you can plan and carry out a scientific investigation.

It means you can:

- Choose a question to investigate
- Decide what things you will measure and how
- Carry out the experiment safely
- Collect and record results carefully
- Say whether your results are reliable or not



# Body Systems - Outcome 1 Report

Your Outcome 1 will allow you and your teacher to assess your learning and find out what level you are working at.

You will be working at level 2, 3 or 4 and you teacher will give you feedback about what you can do to progress to the next level.

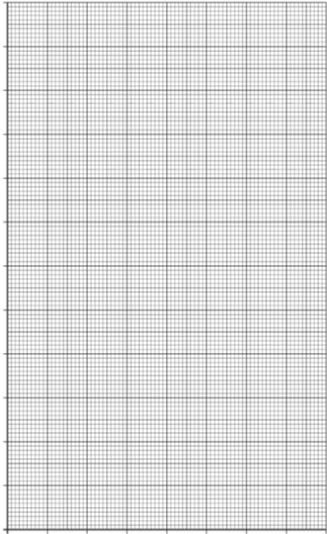
|                                                                 |    |    |    |    |    |    |    |     |     |     |
|-----------------------------------------------------------------|----|----|----|----|----|----|----|-----|-----|-----|
| L2/3/4 outcomes achieved: (circle the level you are working at) |    |    |    |    |    |    |    |     |     |     |
| I am working at level                                           | 2I | 2P | 3I | 3P | 4I | 4P | 4A | /10 | /10 | /10 |
| Teacher Feedback                                                |    |    |    |    |    |    |    |     |     |     |
| WOW                                                             |    |    |    |    |    |    |    |     |     |     |
| NOW                                                             |    |    |    |    |    |    |    |     |     |     |
| HOW?                                                            |    |    |    |    |    |    |    |     |     |     |

# Body Systems - Outcome 1 Report

- You will be using a template to write your outcome 1 report.

| Name:                                                                                                                                                                                                                                                                                                                                                                           |       | Class: |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|----|
| <b>BGE: OUTCOME 1 REPORT</b>                                                                                                                                                                                                                                                                                                                                                    |       |        |    |
| Title:                                                                                                                                                                                                                                                                                                                                                                          | Date: | L2     | L3 |
| Aim: What are you trying to find out in your investigation?                                                                                                                                                                                                                                                                                                                     |       |        |    |
| Hypothesis: What do you think will happen?                                                                                                                                                                                                                                                                                                                                      |       |        |    |
| Variables: To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.<br>Independent variable (what you change or control):<br><br>Dependent variable (what you measure):<br><br>Variable(s) to be kept constant (what you keep the same): |       |        |    |
| Measurements and observations: How are you going to get your results? What will you be looking for or measuring?                                                                                                                                                                                                                                                                |       |        |    |

|                                                                                                              | L2 | L3 | L4 |
|--------------------------------------------------------------------------------------------------------------|----|----|----|
| Method: Describe how you will carry out your experiment. Include a labelled diagram.                         |    |    |    |
| Safety: Your teacher will observe and make sure you carry out the experiment safely                          |    |    |    |
| Results: Record your observations/measurements in a table. Remember headings and units.                      |    |    |    |
| Presentation of Results: Present your findings in a different format. This could be a graph of your results. |    |    |    |



|                                                                                                                                                                                                                                                                                                                                                                                                                            |  | L2  | L3  | L4  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|-----|-----|
| Conclusion: What did you find out? This should answer your aim.                                                                                                                                                                                                                                                                                                                                                            |  |     |     |     |
| Evaluation: You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment.<br>You must then explain: <ul style="list-style-type: none"><li>what you did to minimise the effect of this factor or</li><li>what you could have done to minimise the effect of this factor or</li><li>how you know this factor had a significant effect.</li></ul> |  |     |     |     |
| L2/3/4 outcomes achieved: (circle the level you are working at)                                                                                                                                                                                                                                                                                                                                                            |  |     |     |     |
| I am working at level                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2i  | 2P  | 3i  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 3P  | 4i  | 4P  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 4A  |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  | /10 | /10 | /10 |
| <b>Teacher Feedback</b>                                                                                                                                                                                                                                                                                                                                                                                                    |  |     |     |     |
| WOW                                                                                                                                                                                                                                                                                                                                                                                                                        |  |     |     |     |
| HOW                                                                                                                                                                                                                                                                                                                                                                                                                        |  |     |     |     |
| HOW?                                                                                                                                                                                                                                                                                                                                                                                                                       |  |     |     |     |

# Investigating Lung Function

|                           |                             |
|---------------------------|-----------------------------|
| <b>Name:</b><br>Your name | <b>Class:</b><br>Your class |
|---------------------------|-----------------------------|

## BGE: OUTCOME 1 REPORT

|                                                                        |                            |           |           |           |
|------------------------------------------------------------------------|----------------------------|-----------|-----------|-----------|
| <b>Title:</b><br>Lung function and Exercise                            | <b>Date:</b><br>12/03/2026 | <b>L2</b> | <b>L3</b> | <b>L4</b> |
| <b>Aim:</b> What are you trying to find out in your investigation?<br> |                            |           |           |           |

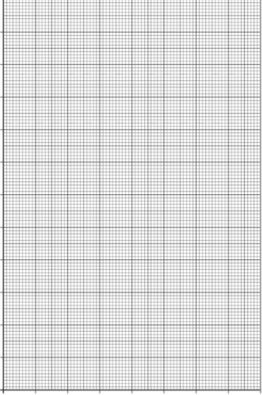
# Investigating Lung Function

Over the next 2 lessons we will be writing a full science investigation.

- Aim
- Hypothesis
- Method
- Results
- Graph
- Conclusion
- Evaluation

| Name:                                                                                                                                                                                                                                                            |       | Class: |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|----|
| <b>BGE: OUTCOME 1 REPORT</b>                                                                                                                                                                                                                                     |       |        |    |
| Title:                                                                                                                                                                                                                                                           | Date: | L2     | L3 |
| Aim: What are you trying to find out in your investigation?                                                                                                                                                                                                      |       | L4     |    |
| Hypothesis: What do you think will happen?                                                                                                                                                                                                                       |       |        |    |
| Variables: To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.<br>Independent variable (what you change or control): |       |        |    |
| Dependent variable (what you measure):                                                                                                                                                                                                                           |       |        |    |
| Variable(s) to be kept constant (what you keep the same):                                                                                                                                                                                                        |       |        |    |
| Measurements and observations: How are you going to get your results? What will you be looking for or measuring?                                                                                                                                                 |       |        |    |

| Method: Describe how you will carry out your experiment. Include a labelled diagram.                         |  | L2 | L3 | L4 |
|--------------------------------------------------------------------------------------------------------------|--|----|----|----|
|                                                                                                              |  |    |    |    |
| Safety: Your teacher will observe and make sure you carry out the experiment safely.                         |  |    |    |    |
| Results: Record your observations/measurements in a table. Remember headings and units.                      |  |    |    |    |
|                                                                                                              |  |    |    |    |
| Presentation of Results: Present your findings in a different format. This could be a graph of your results. |  |    |    |    |



| Conclusion: What did you find out? This should answer your aim.                                                                                                                                                                                                                                                                                                                                                               |  | L2 | L3 | L4 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----|----|----|
|                                                                                                                                                                                                                                                                                                                                                                                                                               |  |    |    |    |
| Evaluation: You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment. You must then explain: <ul style="list-style-type: none"><li>• what you did to minimise the effect of this factor or</li><li>• what you could have done to minimise the effect of this factor or</li><li>• how you knew this factor had a significant effect.</li></ul> |  |    |    |    |
| L2/L3/L4 outcomes achieved: (Circle the level you are working at)                                                                                                                                                                                                                                                                                                                                                             |  |    |    |    |
| I am working at level: 21 2P 31 3P 41 4P 4A                                                                                                                                                                                                                                                                                                                                                                                   |  |    |    |    |
| Teacher Feedback                                                                                                                                                                                                                                                                                                                                                                                                              |  |    |    |    |
| HOW                                                                                                                                                                                                                                                                                                                                                                                                                           |  |    |    |    |
| HOW                                                                                                                                                                                                                                                                                                                                                                                                                           |  |    |    |    |
| HOW?                                                                                                                                                                                                                                                                                                                                                                                                                          |  |    |    |    |

You will be supported throughout this investigation.

# Investigating Lung Function – Rubric

- You can read over the outcome 1 rubric to see what skills are expected at each level.

| Skill Area                             | Level 2                                                                                                                                                                                                                                       | Level 3                                                                                                                                                                                                                                                                                                                                            | Level 4                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Planning and designing investigations  | <p>I can ask questions and make simple predictions (what I think will happen) with help.</p> <p>I can spot what I'm changing, what I'm measuring, and what I'm keeping the same (with help).</p> <p>I know some risks and how to be safe.</p> | <p>I can come up with my own questions and predictions using what I already know.</p> <p>I can plan a valid investigation (making the test fair) and decide what to change, measure, and keep the same (with a bit of help).</p> <p>I can spot most risks and make safe choices.</p> <p>I <u>help</u> decide what equipment and method to use.</p> | <p>I can make predictions and questions even in tricky situations using what I already know.</p> <p>I can plan my own valid investigation clearly and carefully, choosing what to change, measure, and keep the same, and use a control if needed.</p> <p>I think ahead about risks and how to stay safe.</p> <p>I pick a good range of values to test.</p> |
| Carrying out practical activities      | <p>I use safety rules properly.</p> <p>I help carry out the steps in the experiment.</p> <p>I take measurements using the right equipment and units.</p> <p>I try to keep the test fair.</p>                                                  | <p>I follow safety rules and help keep everyone safe.</p> <p>I collect detailed information using different tools or methods.</p> <p>I include a control test (to make comparisons) if needed.</p> <p>I try hard to keep the experiment valid (a fair test).</p>                                                                                   | <p>I control big risks and work safely.</p> <p>I take accurate measurements (with correct units) using the right tools.</p> <p>I record data clearly and carefully using scientific words.</p>                                                                                                                                                              |
| Analysing, interpreting and evaluating | <p>I can choose a good way to record my results.</p> <p>I can spot patterns between what I changed and what happened.</p>                                                                                                                     | <p>I record my results neatly using the right words and scales.</p> <p>I can explain what the data shows and link it to my hypothesis (predictions).</p>                                                                                                                                                                                           | <p>I record my results neatly in a table and use graphs to look for patterns in my data.</p> <p>I explain trends in data clearly and link them to my hypothesis.</p>                                                                                                                                                                                        |

|                                |                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                          |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | <p>I link my findings back to my question.</p> <p>I can explain how it connects to the real world.</p> <p>I can say what I found out and explain my thinking.</p> <p>I can spot anything unusual and suggest why it happened.</p> <p>I can suggest one way to make it better next time.</p>            | <p>I link the results to what I already know in science.</p> <p>I can make clear conclusions based on my results.</p> <p>I think about other possible explanations or ideas for new experiments.</p> <p>I can say how reliable the experiment was and suggest at least two improvements.</p>                                          | <p>I suggest other explanations or ideas for future work.</p> <p>I link my findings to wider science knowledge.</p> <p>I make a strong conclusion using data as evidence.</p> <p>I can say how valid and reliable the experiment was and give at least two ways to improve it, with reasons.</p>         |
| Presenting scientific findings | <p>I can show my results using tables and diagrams (with help).</p> <p>I can present findings as a group or by myself in different ways.</p> <p>I can <u>organise</u> my results using headings or questions with help.</p> <p>I use science words and say where I got my information (with help).</p> | <p>I use a range of ways to show my results with the right scales such as tables, bar and line graphs (with some help).</p> <p>I can explain my findings clearly in writing or when talking.</p> <p>I use the best format for different people (like a report or poster).</p> <p>I include evidence and sources (with some help).</p> | <p>I present my results clearly using suitable graphs, tables, and diagrams without help.</p> <p>I choose the best way to present depending on the audience.</p> <p>I use data from at least two sources to back up my work.</p> <p>I give full credit to all my sources, like using full web links.</p> |

# Lung Function and Exercise

## Experiment Instructions

- Investigate the relationship between lung capacity and exercise.
- Record your lung capacity before and after a period of exercise.

## How?

- Using a peak expiratory flow meter.
- Watch the video and answer the questions opposite – be prepared to share!

[https://youtu.be/jdA8KU\\_D9JU?si=TZyW8JAswddoLWLj/](https://youtu.be/jdA8KU_D9JU?si=TZyW8JAswddoLWLj/)



What is a  
peak  
expiratory  
flow meter?

Are there any  
safety  
considerations  
?

How does it  
work?



# Investigating Lung Function

## Peak Flow Meter

- A peak expiratory flow meter measures the maximum speed of air forced out of the lungs in a single breath, known as the peak expiratory flow rate (PEFR).
- **Key Measurements and Functions:** Speed of Exhalation - It measures how quickly a person can blow air out of their lungs, usually recorded in litres per minute (L/min).



# Investigating Lung Function

## Experiment Instructions - Basics

### Method:

- Sit up straight
- Return the marker to zero
- Place a clean mouthpiece over the end of the end of the meter
- Pinch your nose
- Take a deep breath in
- Release all the air in your lungs into the meter as quickly and forcefully as you can
- Record your peak expiratory flow rate (PEFR) in L/min

Take one reading before and one reading after exercise

Each team should choose a different exercise – you decide what to do and how long for!



How could you ensure your results are reliable?

# Investigating Lung Function – The Variables

Planning your investigation. What factors could you investigate?

## **Independent variable**

**What you change or control**

- **The exercise**

## **Dependent variable**

**What you measure**

- **The peak expiratory flow rate (L/min)**  
(the maximum speed of air forced out of the lungs in a single breath)

## **Variable(s) to be kept constant**

**What you keep the same**

- **The person**
- **Same starting lung volume (full deep breath)**
- **Zero marker each start**
- **Nose pinched**

# Investigating Lung Function

**Aim:** *What are you trying to find out in your investigation?*

**Hypothesis:** *What do you think will happen?*

# Investigating Lung Function

Write your aim – What are you trying to investigate?

**Aim:**

*To investigate the effect of \_\_\_\_\_ on \_\_\_\_\_.*

## **Independent variable**

**What you change or control**

- The exercise

## **Dependent variable**

**What you measure**

- The peak expiratory flow rate (L/min)

## **Variable(s) to be kept constant**

**What you keep the same**

- The person
- Same starting lung volume (full deep breath)
- Zero marker each start
- Nose pinched

# Investigating Lung Function

Hypothesis:

*After exercise, the peak expiratory flow rate will*

---

Increase?

Decrease?

Stay the  
same?



# Investigating Lung Function

**Variables:** *To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.*

Independent variable (what you change or control):

Dependent variable (what you measure):

Variable(s) to be kept constant (what you keep the same):

# Investigating Lung Function

**Measurements and observations:** *How are you going to get your results? What will you be looking for or measuring?*

## Independent variable

**What you change or control**

- The exercise

## Dependent variable

**What you measure**

- The peak expiratory flow rate (PEFR) (L/min)

# Investigating Lung Function

**Method:** *Describe how you will carry out your experiment. Include a labelled diagram.*

# Investigating Lung Function

**Safety:** *Your teacher will observe and make sure you carry out the experiment safely*

# Investigating Lung Function

**Results:** *Record your observations/measurements in a table. Remember headings and units.*

# Investigating Lung Function

**Results:** *Record your observations/measurements in a table. Remember headings and units.*

| Timing of measurement | Peak flow      |                | ? |
|-----------------------|----------------|----------------|---|
|                       | PEFR 1 (L/min) | PEFR 2 (L/min) |   |
| Before Exercise       |                |                |   |
| After Exercise        |                |                |   |

# Starter

Calculate the average peak flow for both rows of data

| Timing of measurement | PEFR 1 (L/min) | PEFR 2 (L/min) | Calculate Average PEFR (L/min)? |
|-----------------------|----------------|----------------|---------------------------------|
| Before Exercise       | 332            | 345            |                                 |
| After Exercise        | 411            | 425            |                                 |

# Investigating Lung Capacity

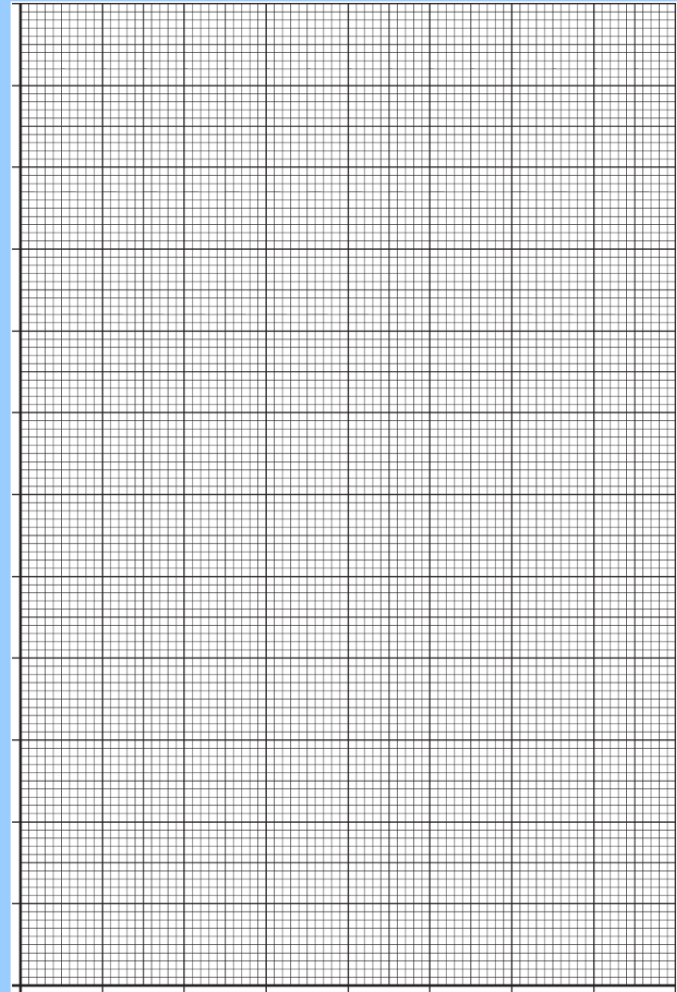
## Presentation of Results:

*Present your findings in a different format. This could be a graph of your results.*

Bar  
graph

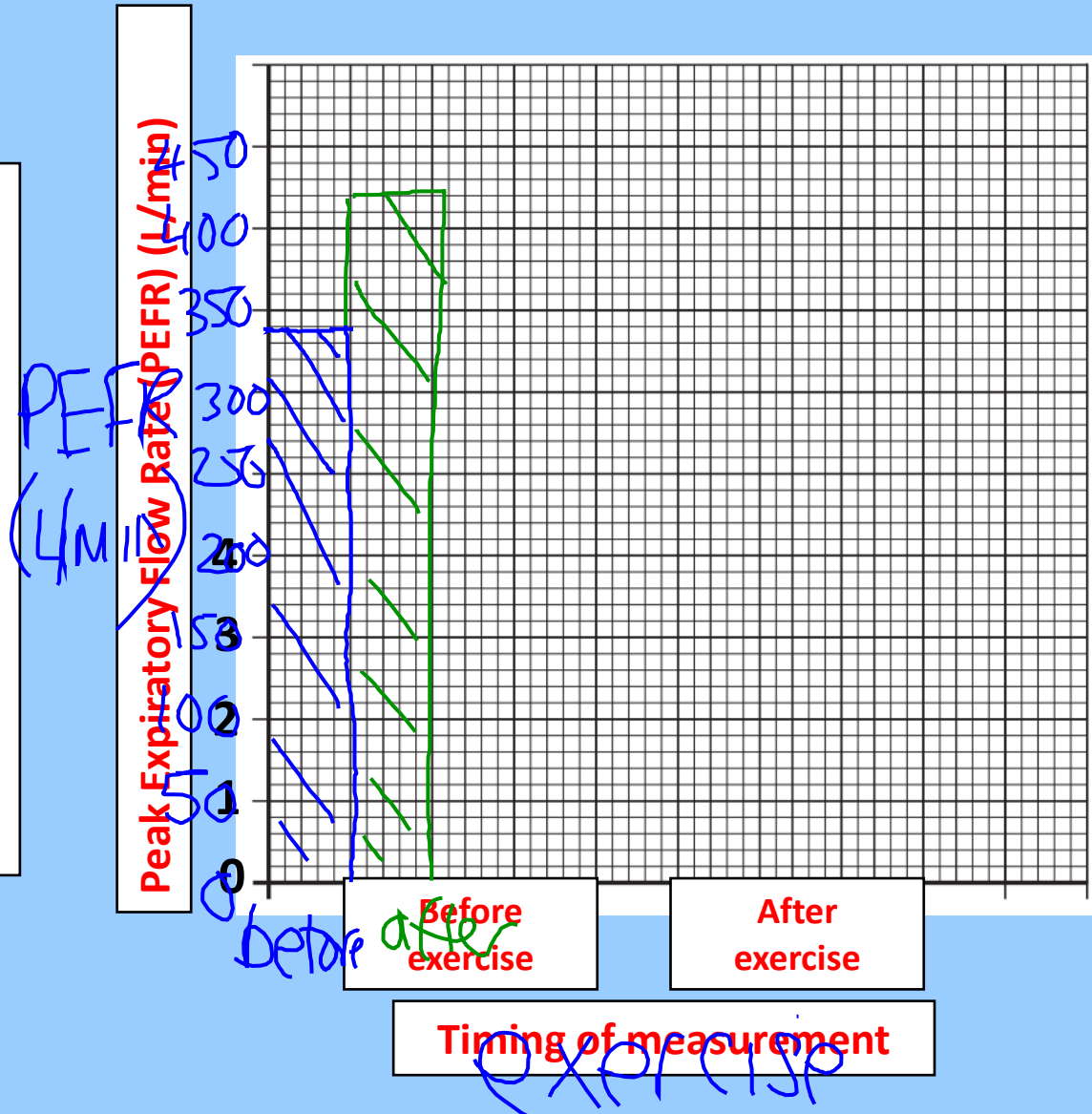
Scatter  
graph

Line  
graph



## Graph:

Plot a bar graph  
comparing PEFR (L/min)  
before and after exercise.



# Investigating Lung Capacity

**Conclusion:** *What did you find out? This should answer your aim.*

# Investigating Lung Capacity

**Evaluation:** *You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment.*

- *You must then explain:*
- *what you did to minimise the effect of this factor or*
- *what you could have done to minimise the effect of this factor or*
- *how you know this factor had a significant effect.*

## **Learning Intentions:**

- To write an Outcome 1 scientific report

## **Success Criteria**

- I can plan an investigation
- I can carry out an investigation safely
- I can write a scientific report to include an Aim

# Investigating Lung Capacity

**Success Criteria – see pupil rubric**

Instructions:

- Carefully read their science report.
- Fill in the NOW WOW HOW feedback sheet
- Return the feedback to your classmate
- Collect and read your peer feedback



**Praise – What is good about this piece of work?**

**Next steps – What needs to be improved?**

**How can this be improved?**



**Praise – What is good about this piece of work?**

**Next steps – What needs to be improved?**

**How can this be improved?**

## **Plenary:**

Read over your feedback carefully.

1. WOW, what is good about this piece of work?
2. NOW what needs to be improved?
3. HOW can this be improved?

# The Skeleton

Page 19

## **Starter:**

We all have a skeleton, what do you think the job of the skeleton is?



# The Skeleton

Page 19

## Learning Intentions:

- To find out what the main functions of the skeleton are
- To be able to name some of the main bones of the skeleton

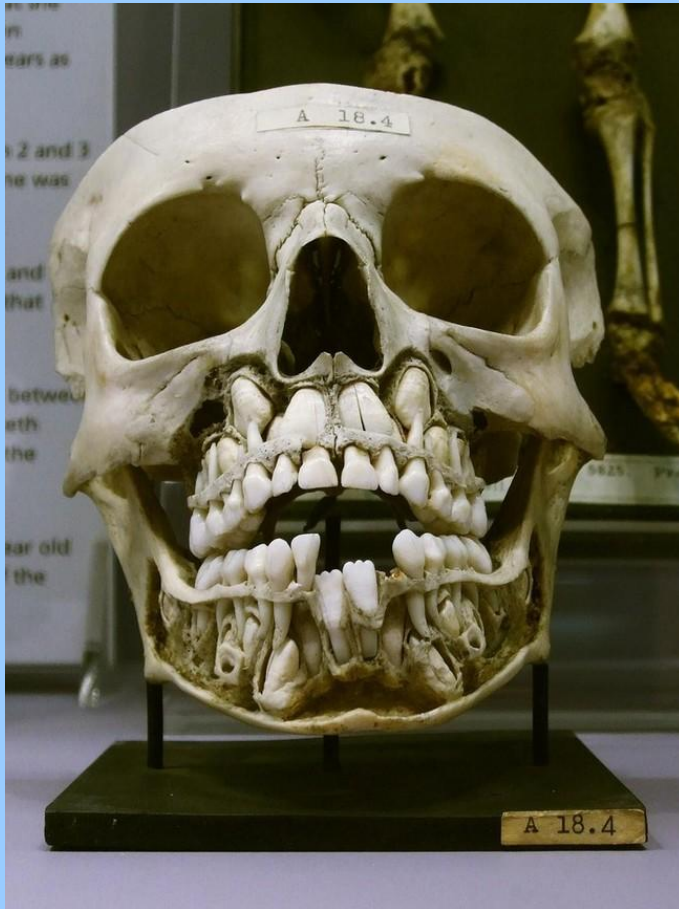
# The Skeleton

Page 19

## Success Criteria

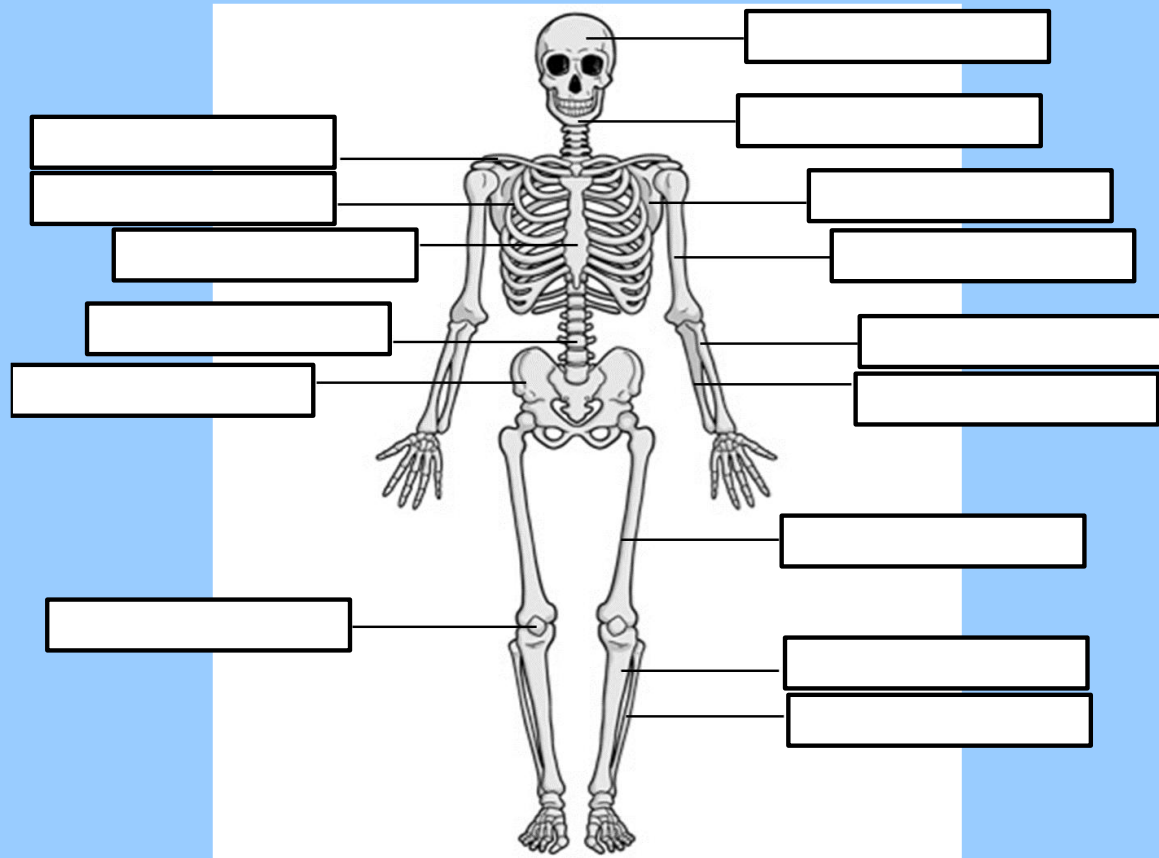
- ☐ I can state the main functions of the skeleton.
- ☐ I can name some of the main bones of the skeleton.

# The Skeleton



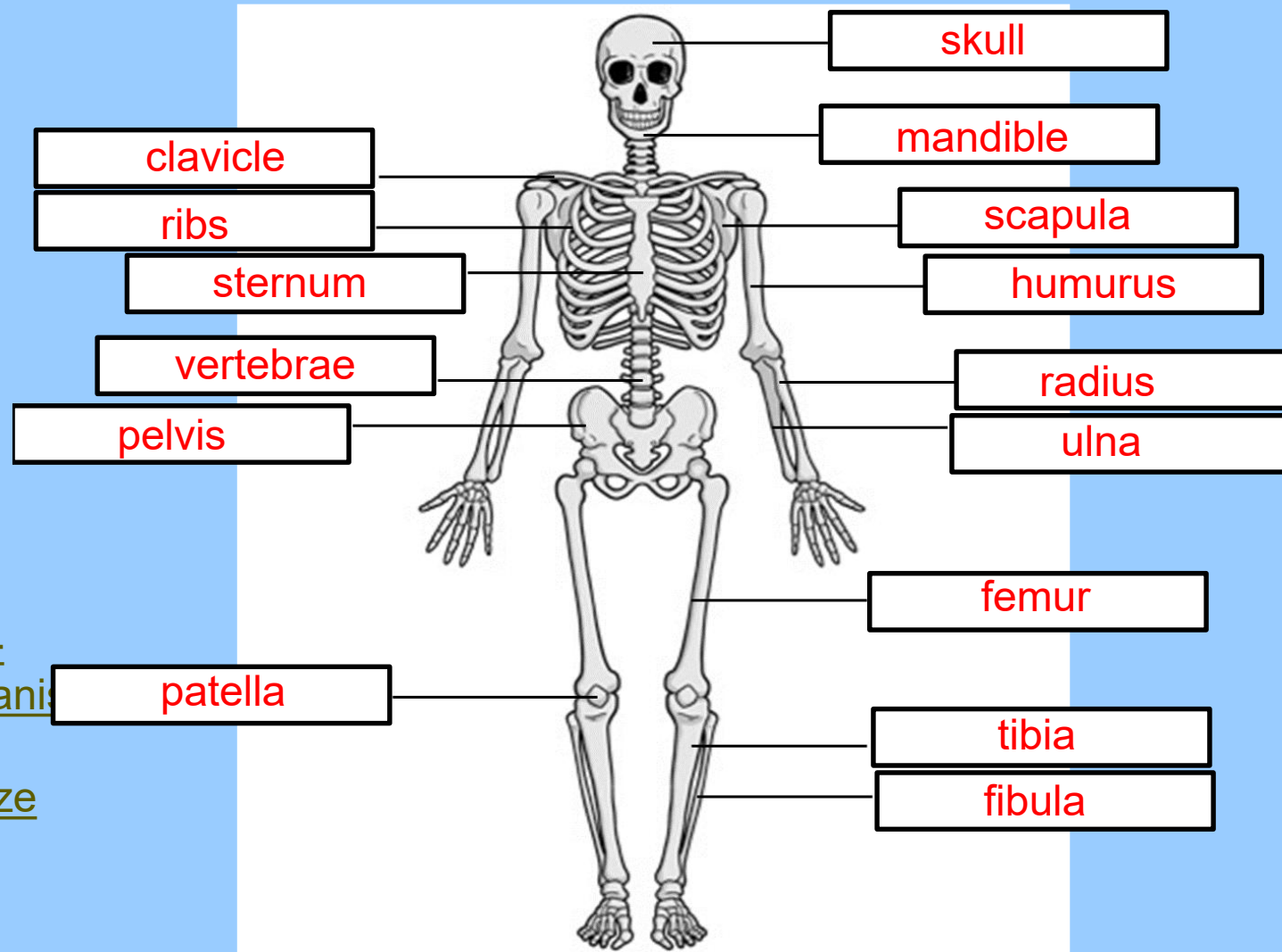
# The Skeleton

- Add the names of as many of the bones that you know...
- Check your answers against the names of the bones in the **next** slide.



A picture to  
check yours  
against...

How many did  
you get?



The skeletal system -  
Skeleton - Living organi  
- KS3 Biology - BBC  
Bitesize - BBC Bitesize

# FACTS

There are over 200 bones in the human skeleton

Humans are vertebrates – our skeleton is covered by skin and tissues

Bones are strong, but teeth are stronger

The stirrup is the smallest bone in the body

The hyoid bone (which holds your tongue in place) doesn't connect to any other bones

The femur is the longest, largest and strongest of all the bones

More than half your bones are in your hands and feet

# Skeleton

Page 20



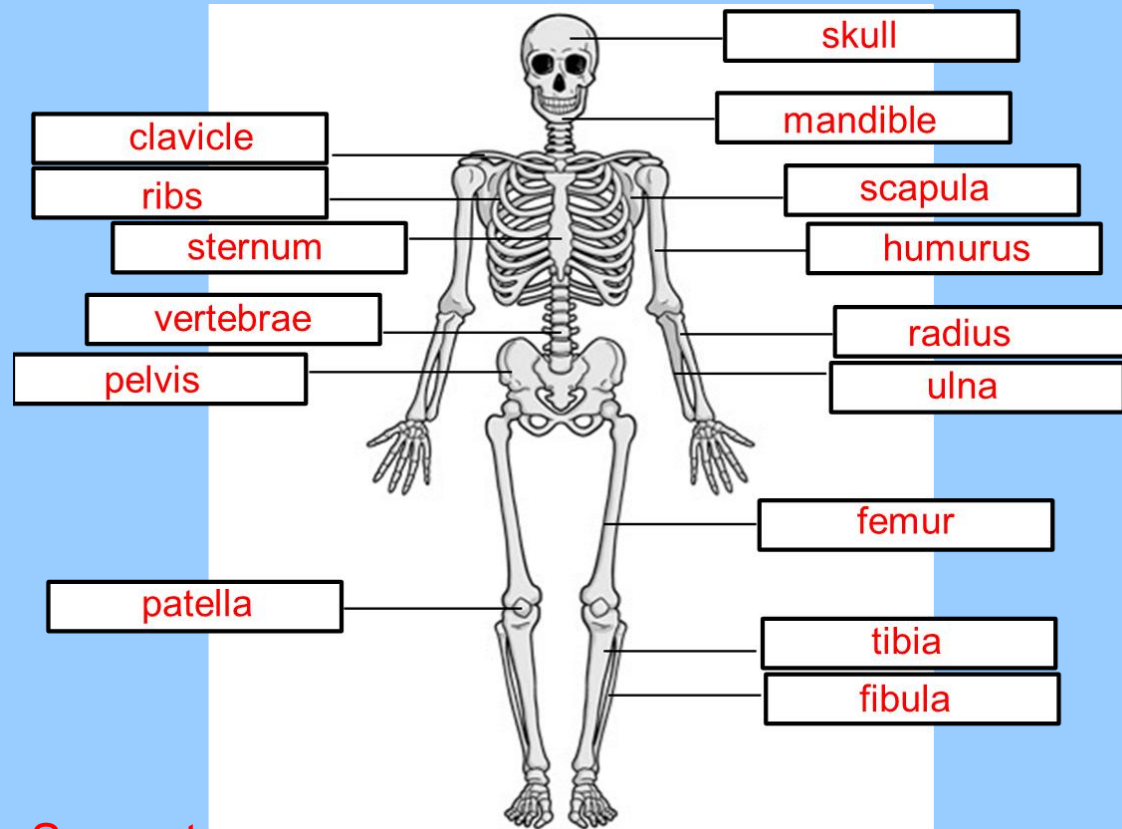
The three main functions of the Skeleton are Support, Movement and Protection.

# Skeleton

Page 20

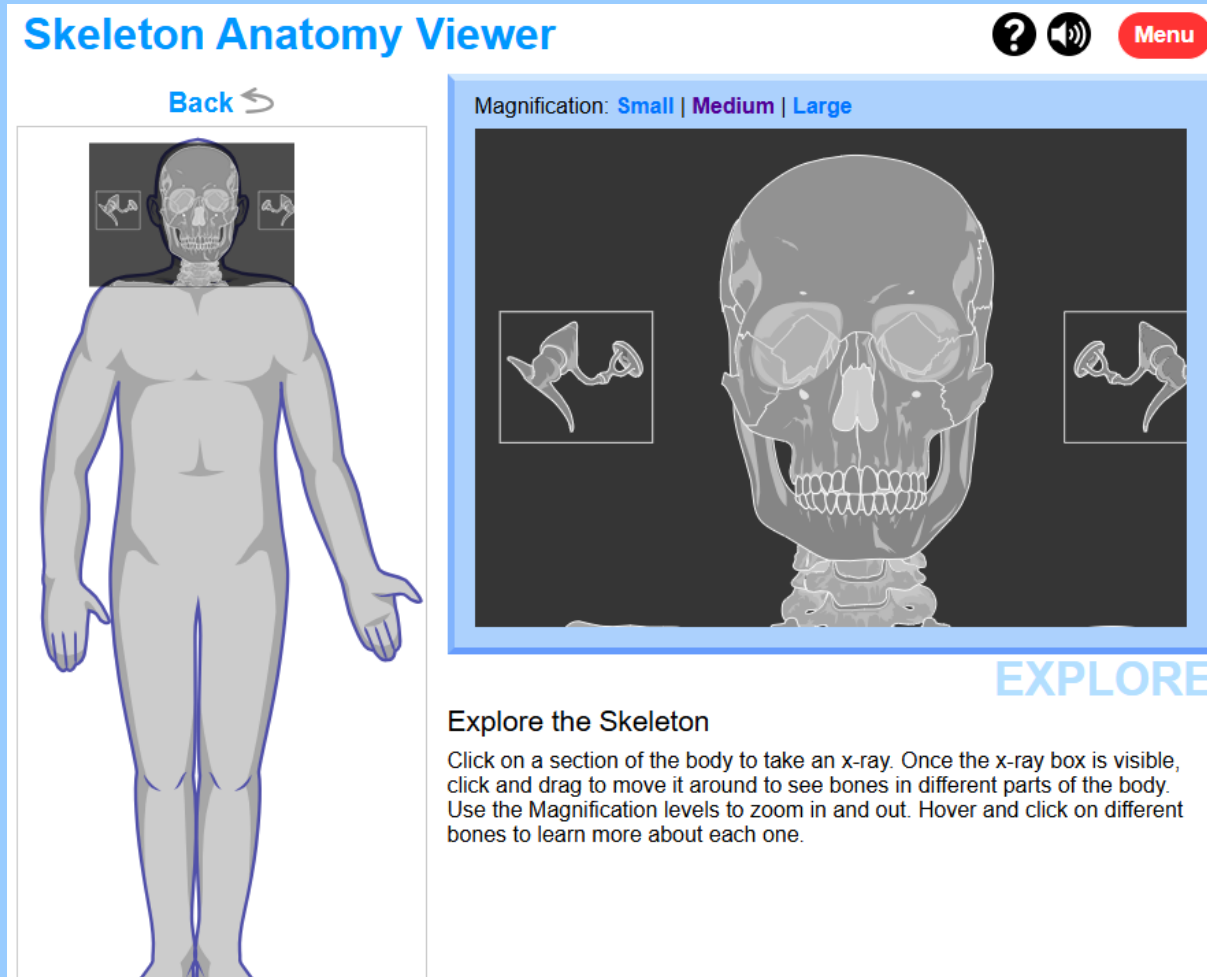
- Now choose 3 colours and shade the bones in our body which provide...

- Support
- Protection
- Movement



Support  
Protection  
Attachment = SPAMM  
Muscles  
Movement

# Skeleton Anatomy Viewer



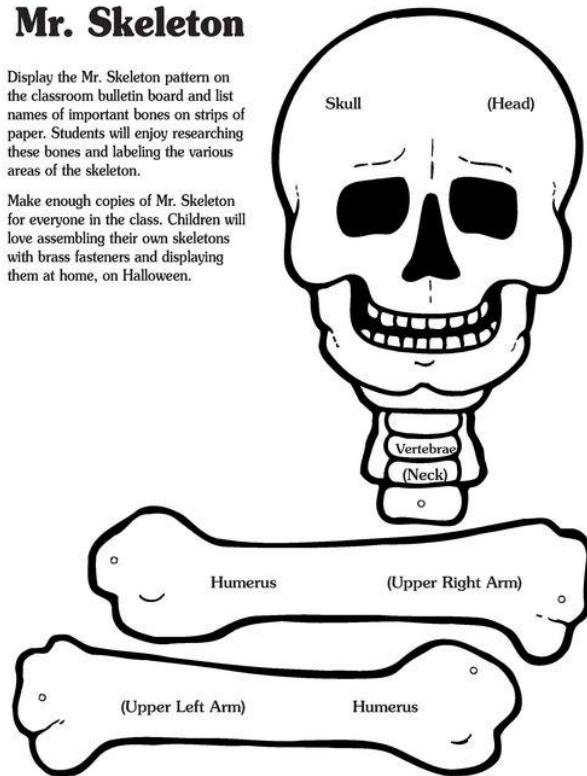
<https://askabiologist.asu.edu/games-sims/skeleton-viewer-game/play.html>

# EXTRA - Time to move....

## Mr. Skeleton

Display the Mr. Skeleton pattern on the classroom bulletin board and list names of important bones on strips of paper. Students will enjoy researching these bones and labeling the various areas of the skeleton.

Make enough copies of Mr. Skeleton for everyone in the class. Children will love assembling their own skeletons with brass fasteners and displaying them at home, on Halloween.



## ■ Mr Skeleton Activity

Now choose 3 colours and shade the bones in our body which provide...

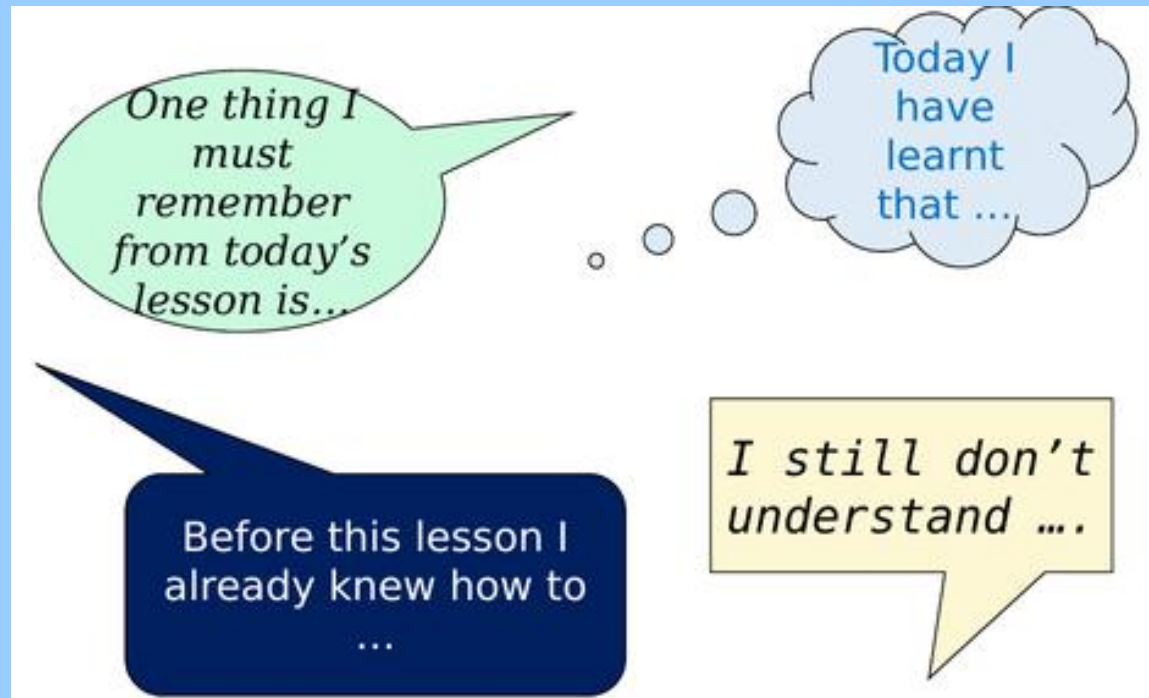
Support

Protection

Movement

# Plenary

Copy and complete one of the following sentences...



# Joints

**Starter:**

Can you think of any joints in the body?



# Joints

Page 21

## Learning Intentions:

- To find out what a joint is
- To find out the different types of joint in the body

# Joints

Page 21

## Success Criteria

- ☐ I can state the names of joints in the body.
- ☐ I can state the types of joints in the body.
- ☐ I can explain how the types of joints move.

# Joints

Page 21



The meeting point between two bones is called a joint.

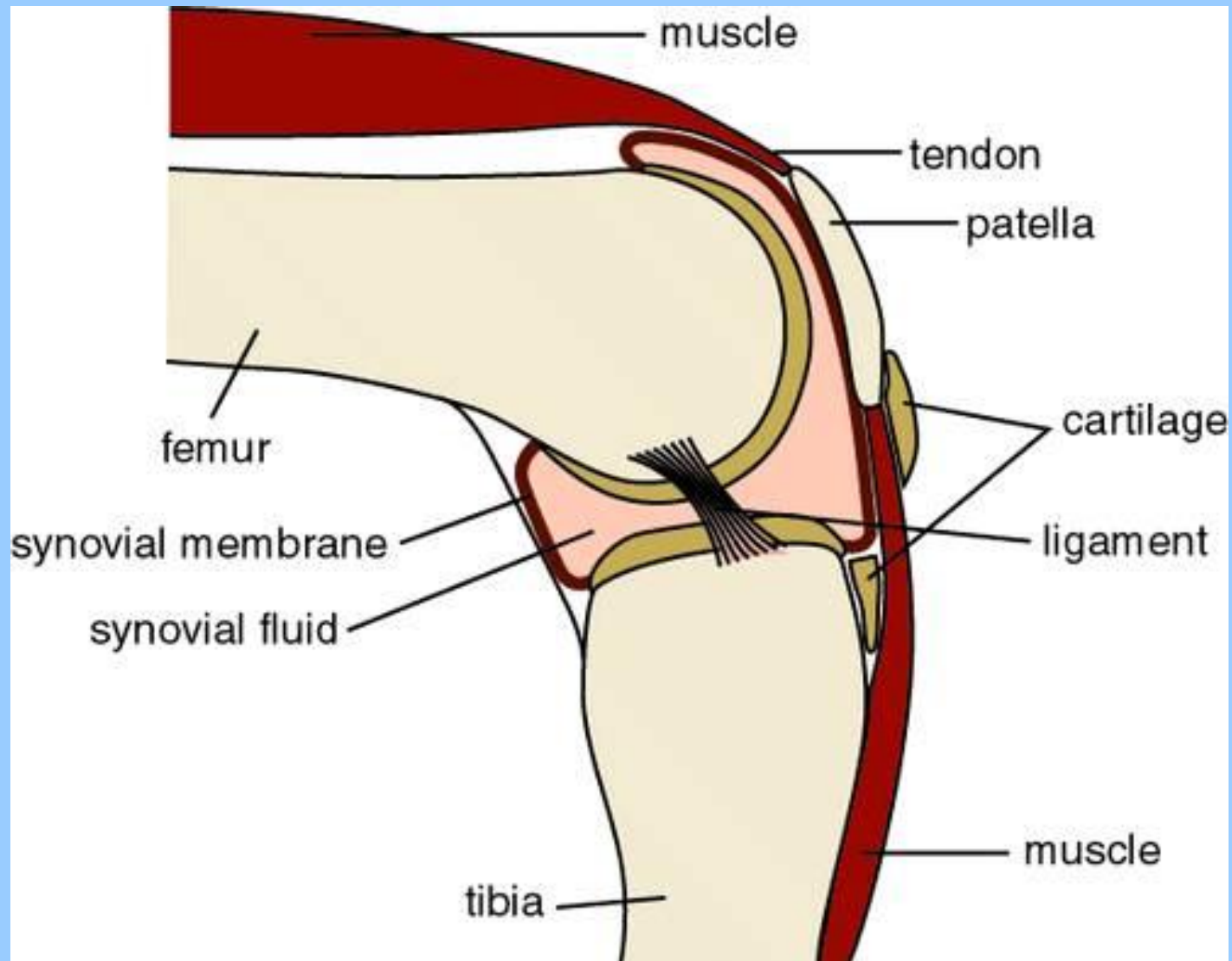
There are two different types of joint

- Hinge Joint
- Ball and Socket

<https://www.youtube.com/watch?v=ihTmABgLqV4>

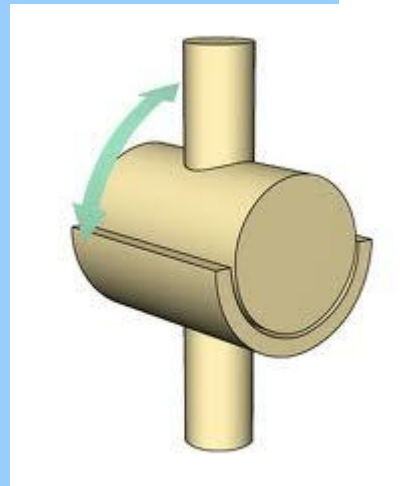


# Hinge Joint

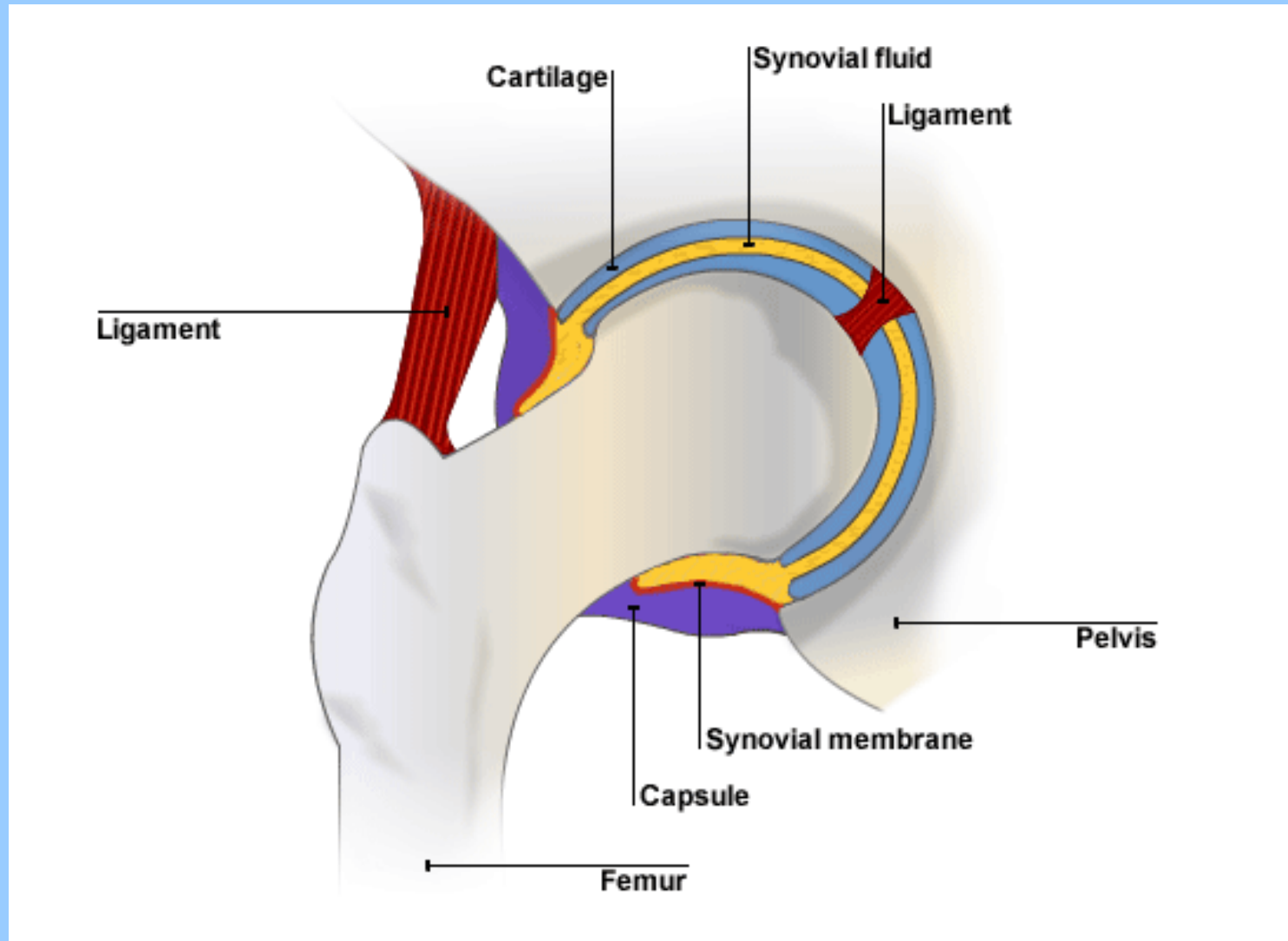


# Hinge Joint

- Bones meet together like a hinge and movement is restricted to one plane.
- Examples – elbow, knee and ankle

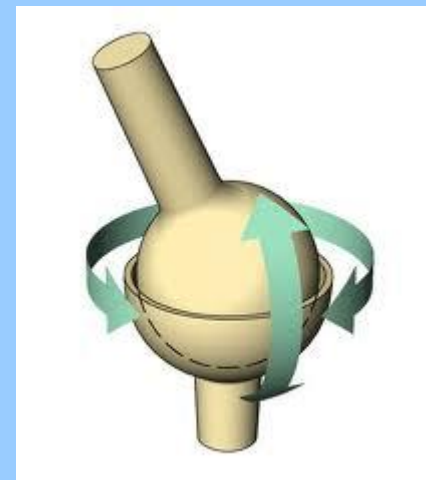
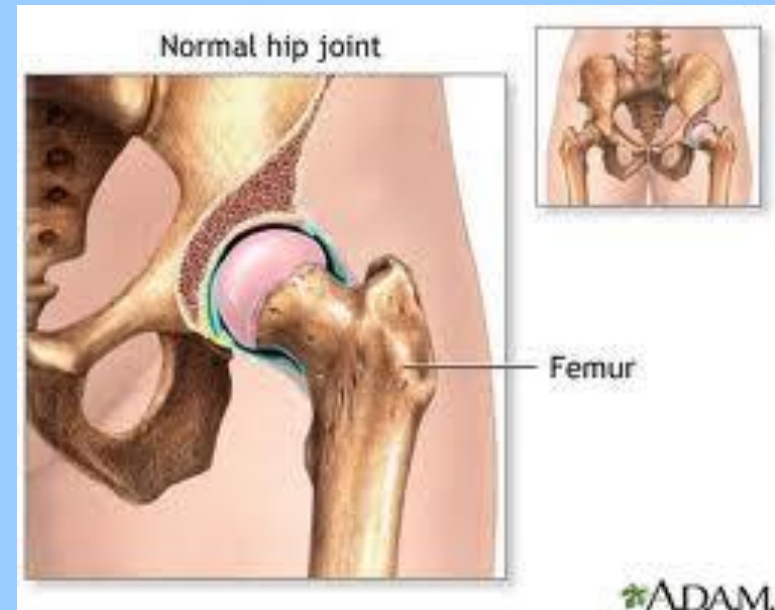


# Ball and Socket Joint



# Ball and Socket Joint

- At the hip and shoulder, the rounded head (ball) of one bone fits into the socket of another allowing movement in three different planes.
- Examples – shoulder and hip



# Joints

Page 22



| Type of Joint   | Movement of Joint | Examples of Joint |
|-----------------|-------------------|-------------------|
| Ball and Socket |                   |                   |
|                 |                   |                   |

# Joints

Page 22



Cartilage – covers the ends of bones. It has two functions:

- Acts as a shock absorber in joints
- It is smooth so reduces friction when the joints move.

# Joints

Page 22



Ligaments – hold bones together at a joint (connects bone to bone).

They hold the joint in place yet allow movement because they are slightly elastic.



# Tendon vs Ligament

Page 22

**Tendon**

*Binds Muscle  
to Bone*

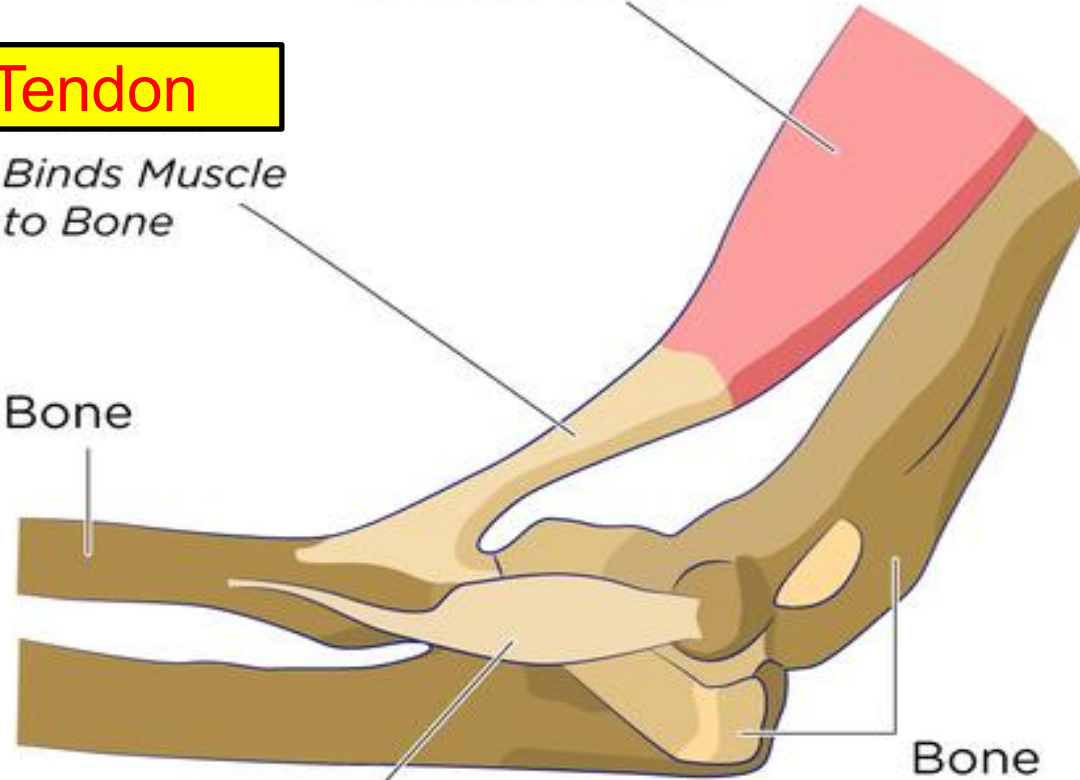
Bone

Skeletal Muscle

Bone

**Ligament**

*Binds Bone  
to Bone*

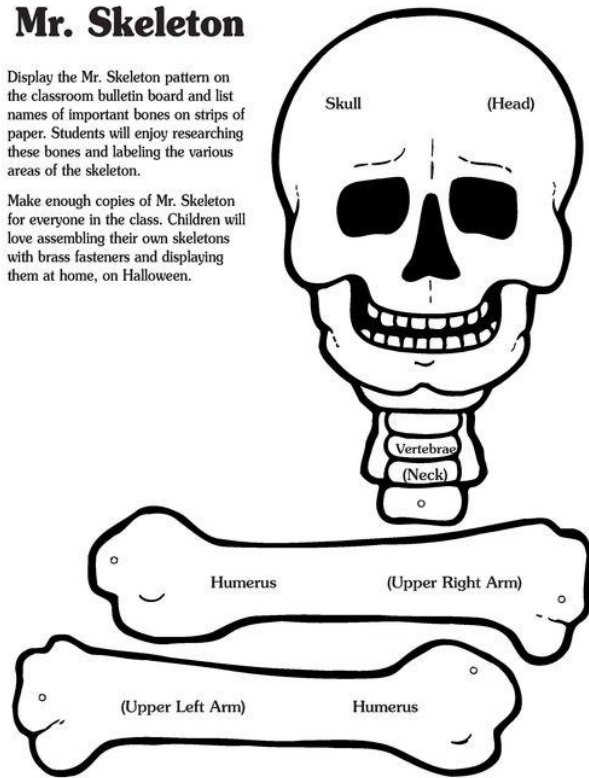


# COMPLETE - Time to move....

## Mr. Skeleton

Display the Mr. Skeleton pattern on the classroom bulletin board and list names of important bones on strips of paper. Students will enjoy researching these bones and labeling the various areas of the skeleton.

Make enough copies of Mr. Skeleton for everyone in the class. Children will love assembling their own skeletons with brass fasteners and displaying them at home, on Halloween.



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66

October Idea Book

## ■ Mr Skeleton Activity

Now choose 3 colours and shade the bones in our body which provide...

Support

Protection

Movement

Can you identify the different types of joint on your skeleton?

# Plenary

- Write on a post-it 2 things you have learnt from today

<https://www.bbc.co.uk/bitesize/topics/znyycdm/articles/zgbddp3#zt3bydm10> QUIZ (10)



# Reproduction

Page 24

- Starter
  1. List the three parts of an animal cell.
  2. What is the name of the **male** reproductive cell?
  3. What is the name of the **female** reproductive cell?

# Reproduction

Page 24

## Learning Intentions:

- I am learning about the parts of the body used in reproduction.

# Joints

Page

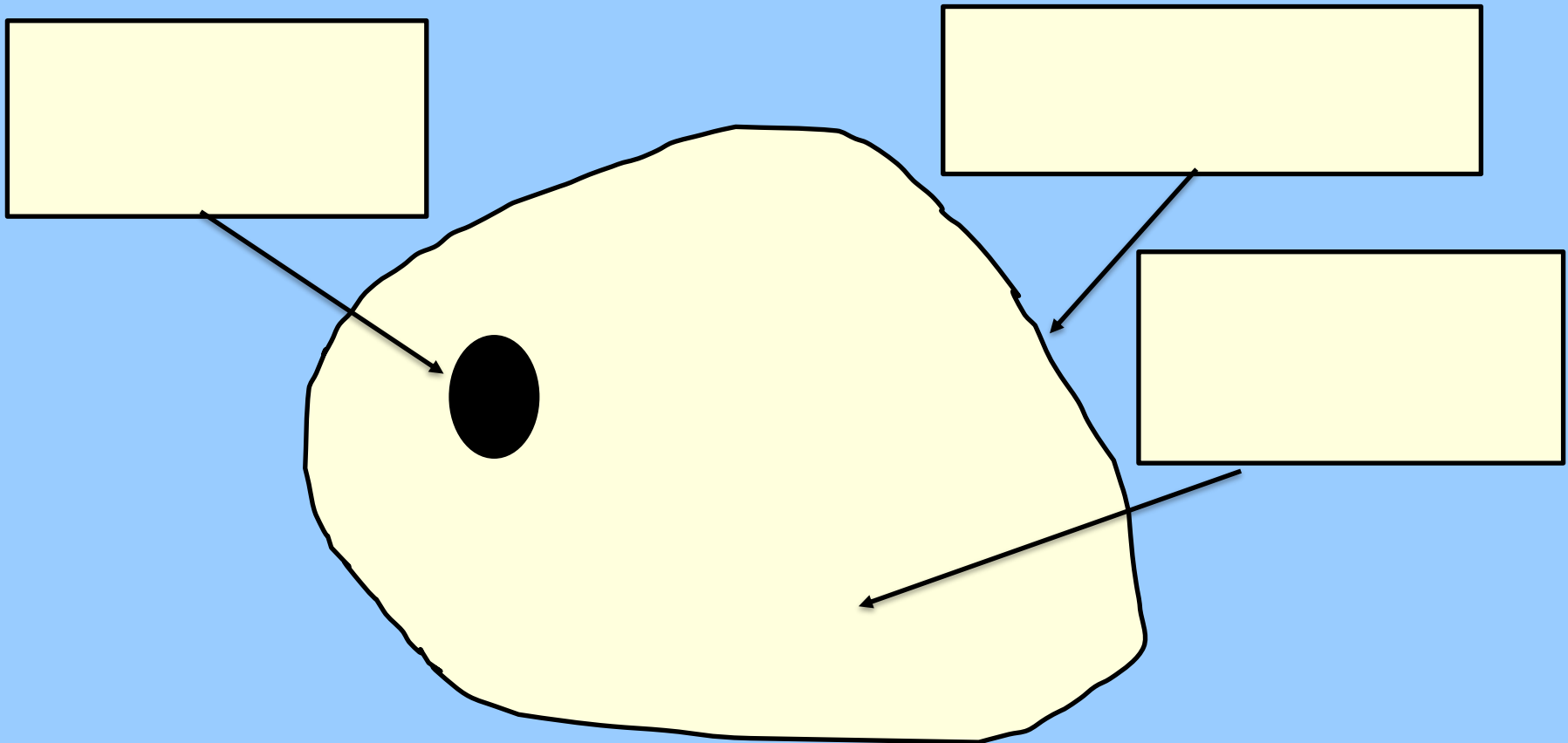
## Success Criteria

- ☐ I can state the name of the main parts of the male and female reproductive systems.
- ☐ I can describe the functions of the main parts of the male and female reproductive systems

# Revision: Animal Cells

Use your knowledge of animal cells from the 'Body Systems' topic to complete the boxes in your booklet, labelling each part of a basic animal cell.

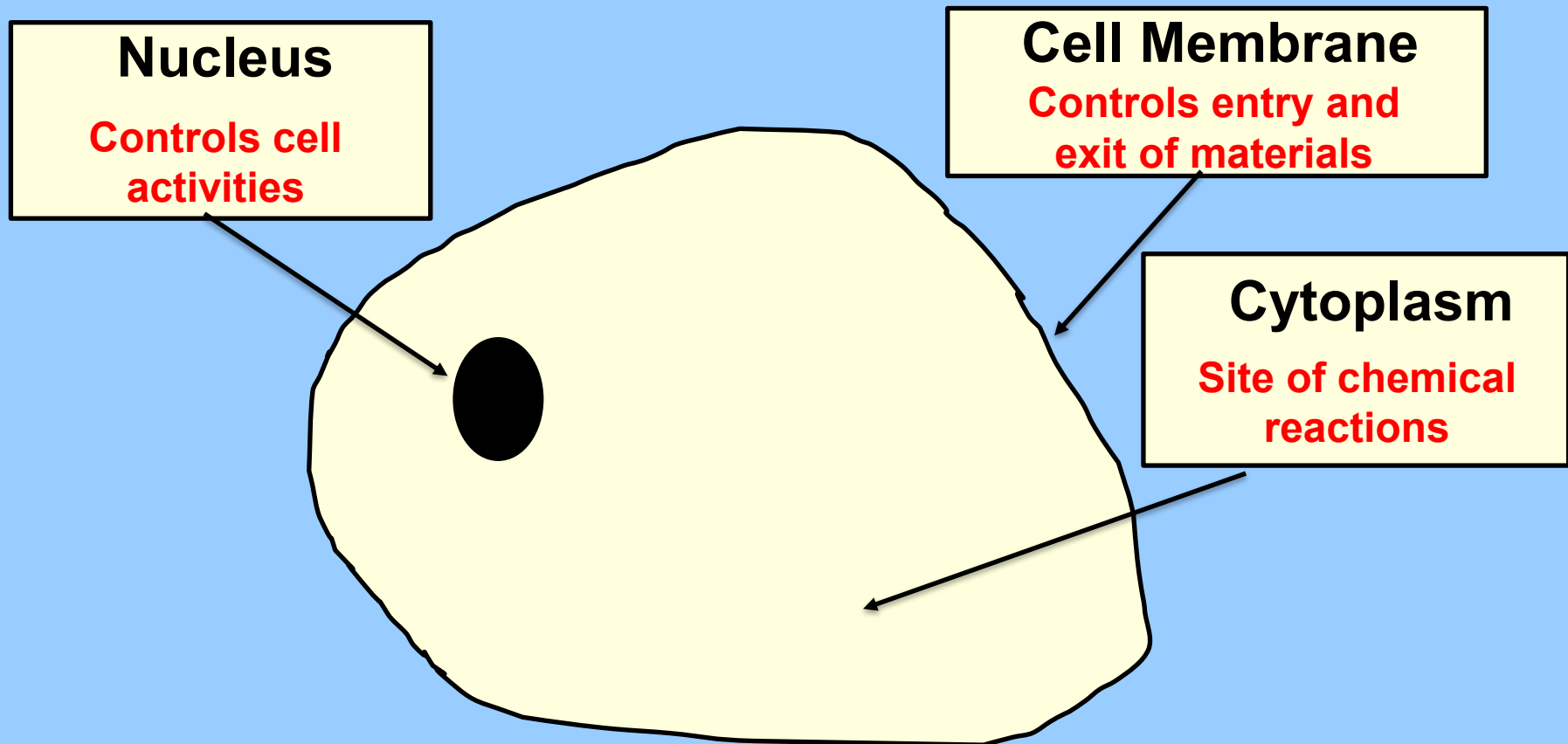
*Extension task: write down the job of each part of the animal cell.*



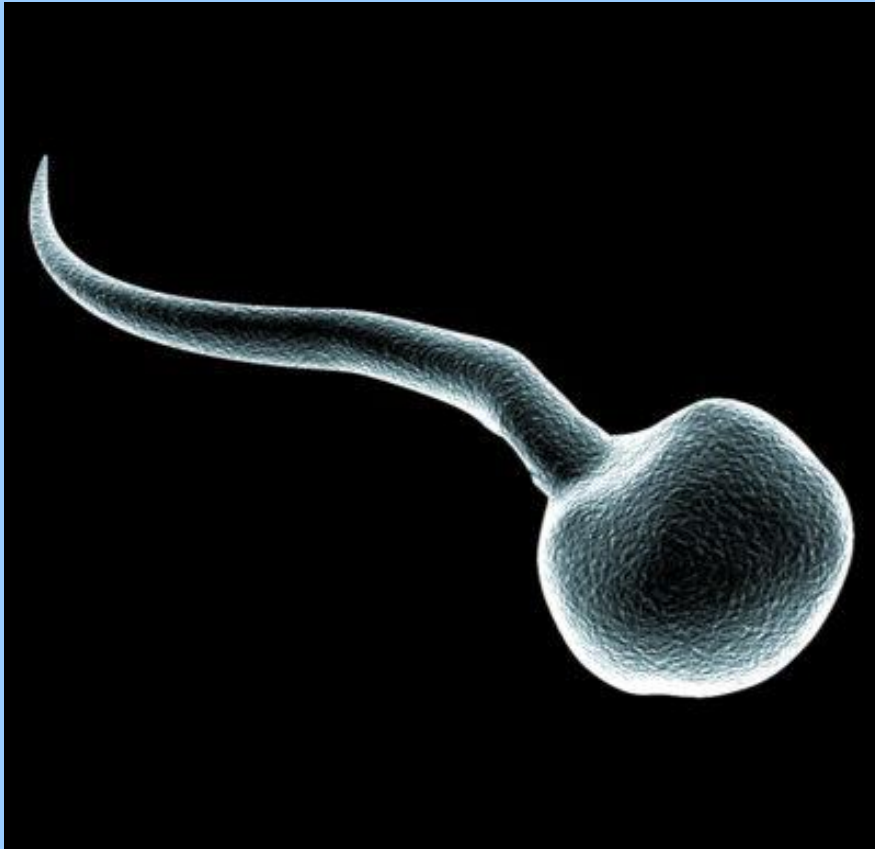
# Learning Check

Use your knowledge of animal cells from the 'Body Systems' topic to complete the boxes in your booklet, labelling each part of a basic animal cell.

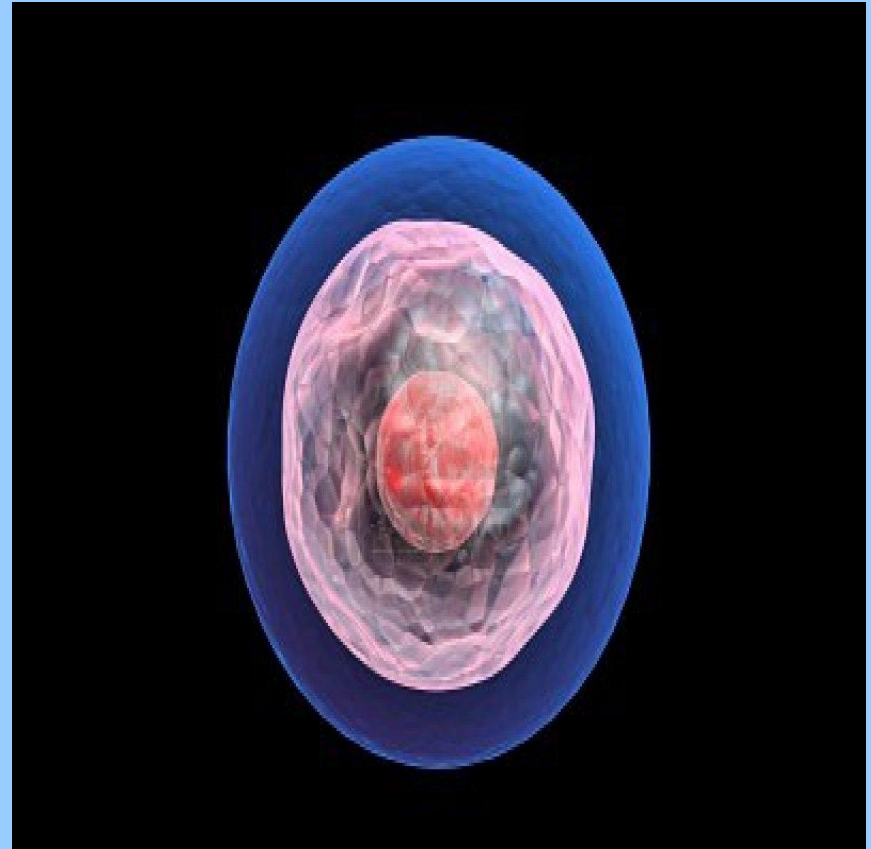
*Extension task: write down the job of each part of the animal cell.*



# Male and Female Sex Cells



**Male Sex Cell**  
**Sperm**



**Female Sex Cell**  
**Egg**

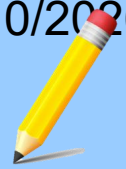
# Male and Female Sex Cells



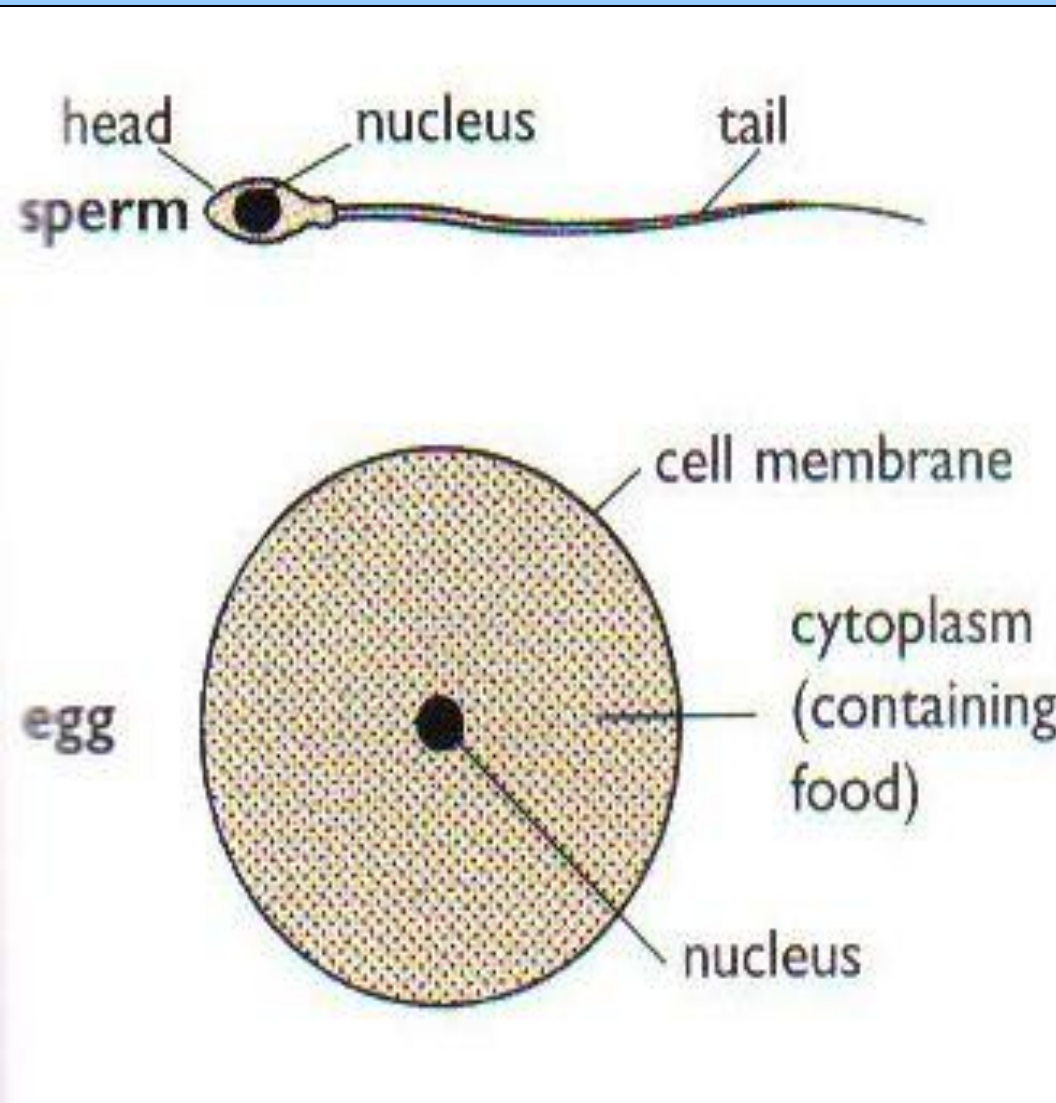
During **sexual reproduction** the sperm joins with the egg.

The sperm contains **half** the information for the new organism while the egg contains the other half.

The information is carried on special structures called **chromosomes** found in the nucleus of each cell.

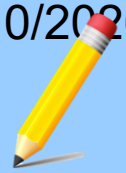


# Sperm and Egg

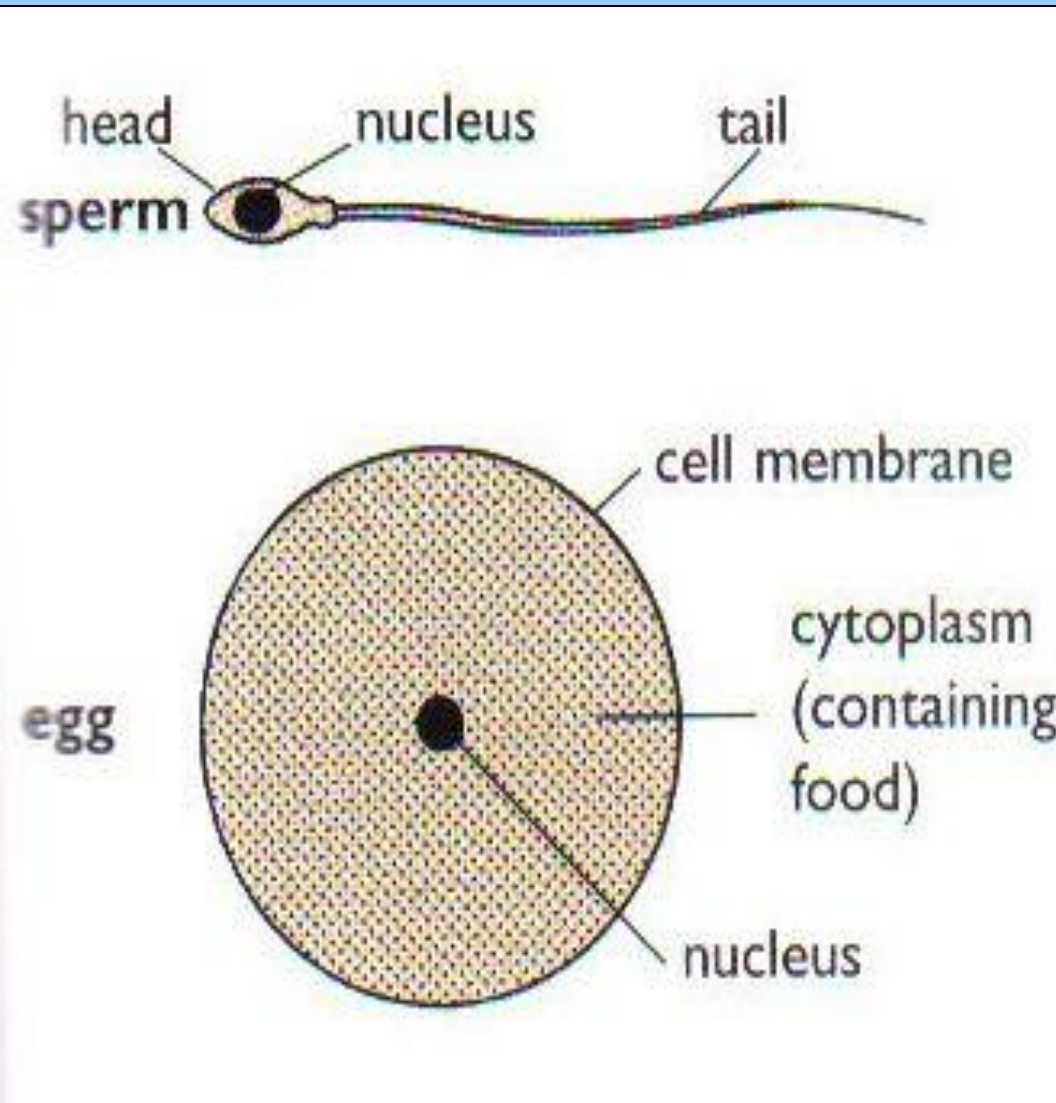


In your booklet, draw labelled diagrams of a sperm and egg cell then answer the following questions:

1. Why does a sperm cell have a tail?
2. Why is an egg cell larger than a sperm cell?



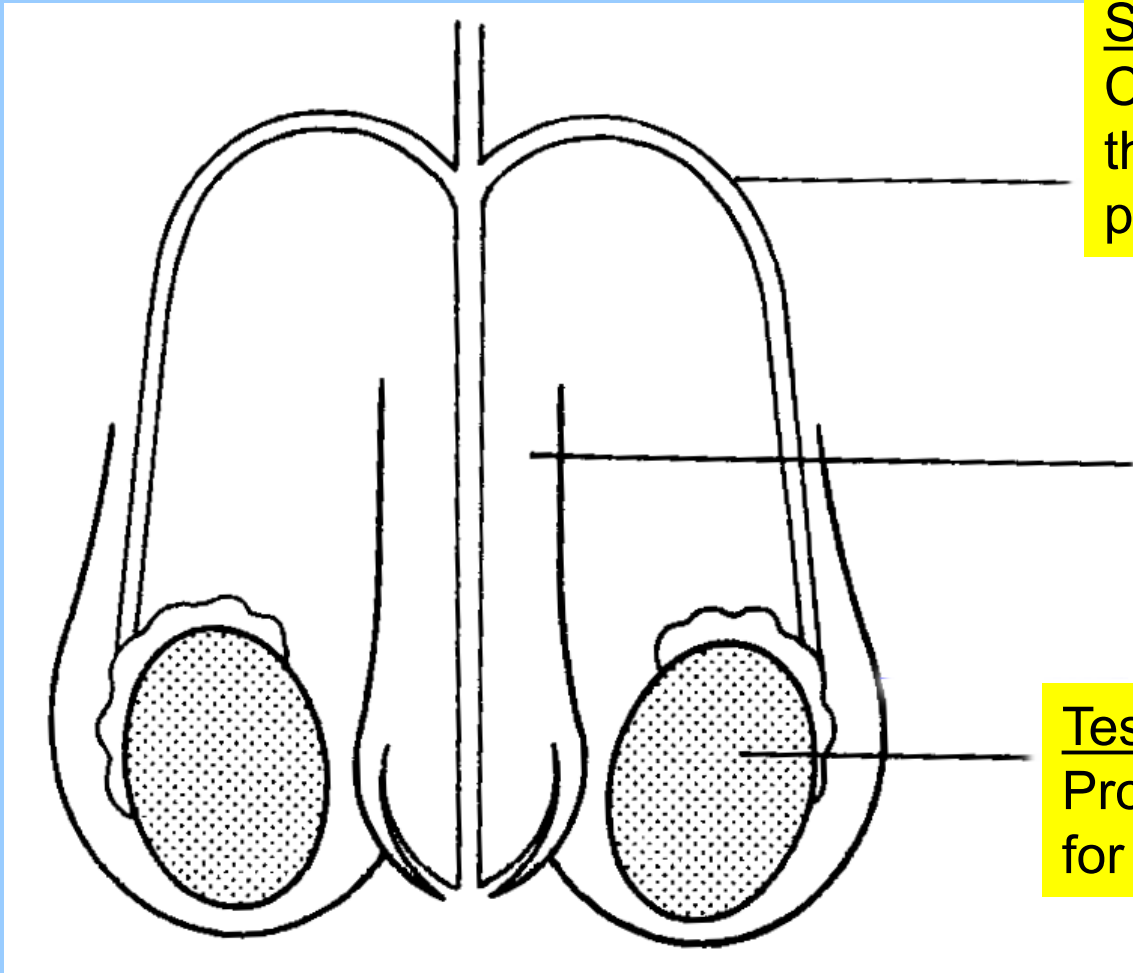
# Sperm and Egg



In your booklet, draw labelled diagrams of a sperm and egg cell then answer the following questions:

1. A sperm consists of a head containing a nucleus and a tail which helps it swim to the egg.
2. An egg is larger than a sperm because it also has a food store so it can survive until the sperm reaches it.

# The Male Reproductive System



## Sperm duct

Carries sperm from the testes to the penis.

## Penis

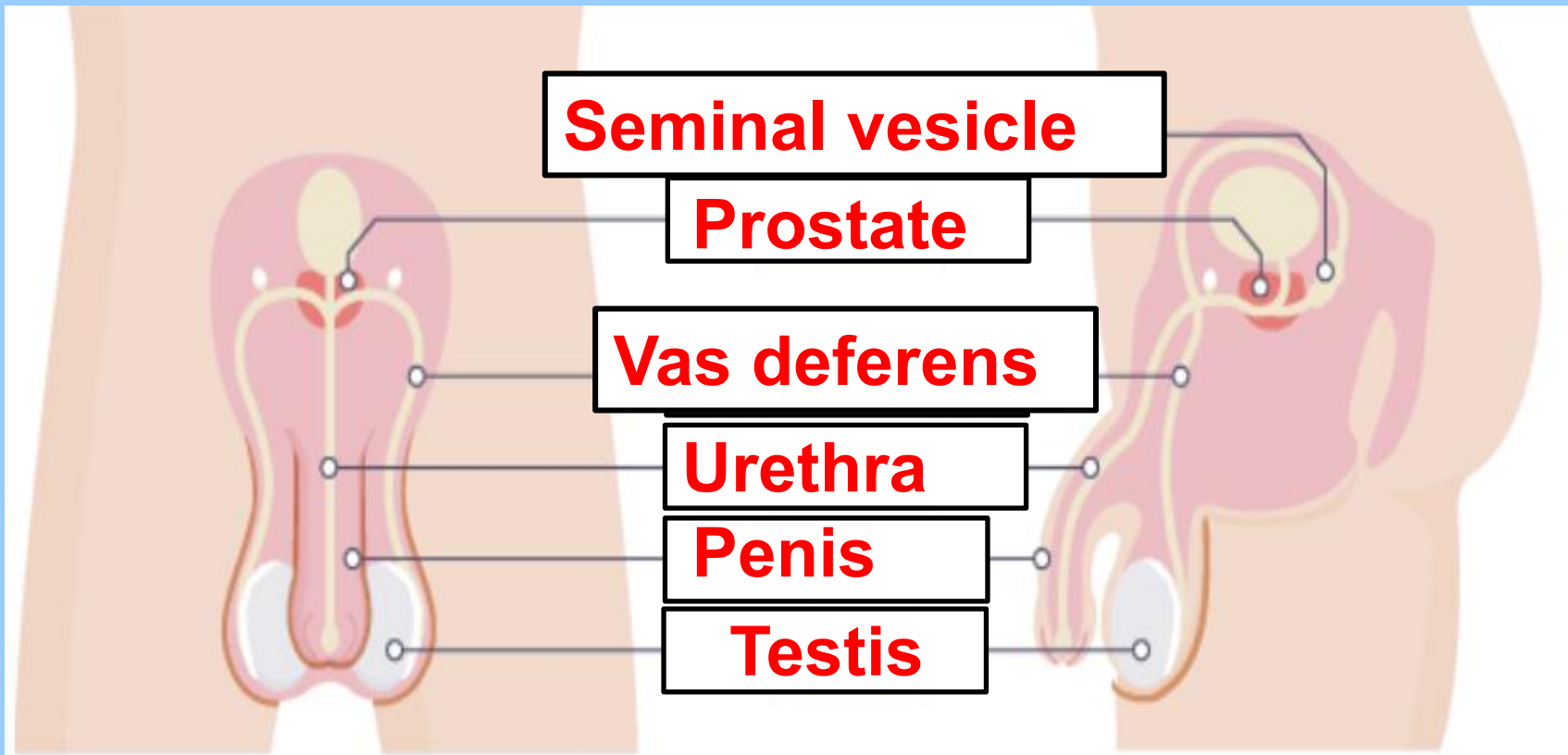
The organ from which semen and urine leaves the body.

## Testes

Produces sperms for reproduction.



# The Male Reproductive System



Use this slide to label the diagram in your booklet of the male reproductive system.

# The Male Reproductive System

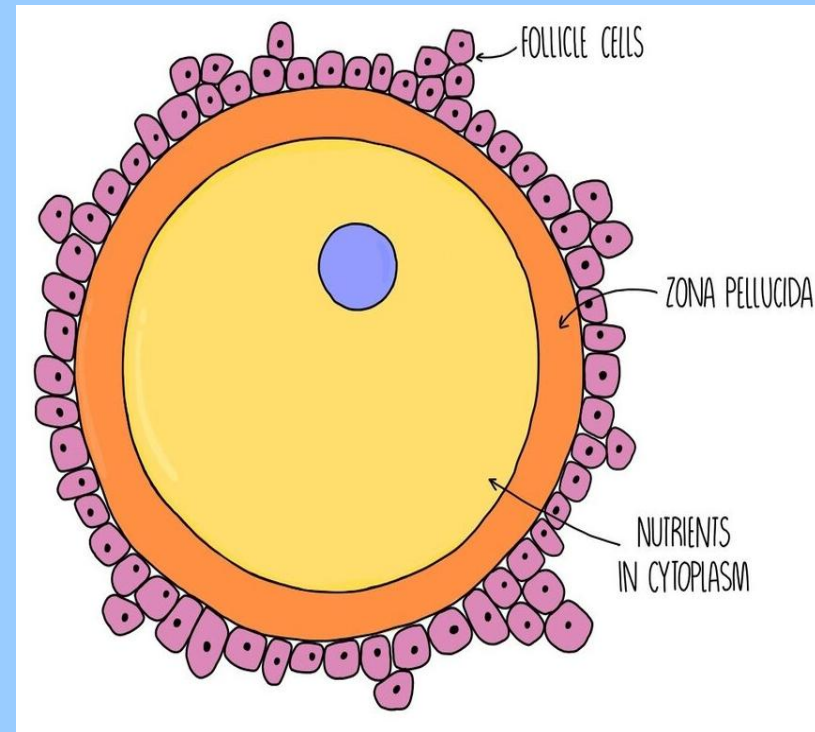
Complete the table in your booklet, using the word bank to help.

| Structure            | Function                                              |
|----------------------|-------------------------------------------------------|
| <input type="text"/> | Carries sperm from the testes to the penis            |
| <input type="text"/> | Produce sperm for reproduction                        |
| <input type="text"/> | The organ from which semen and urine leaves the body. |

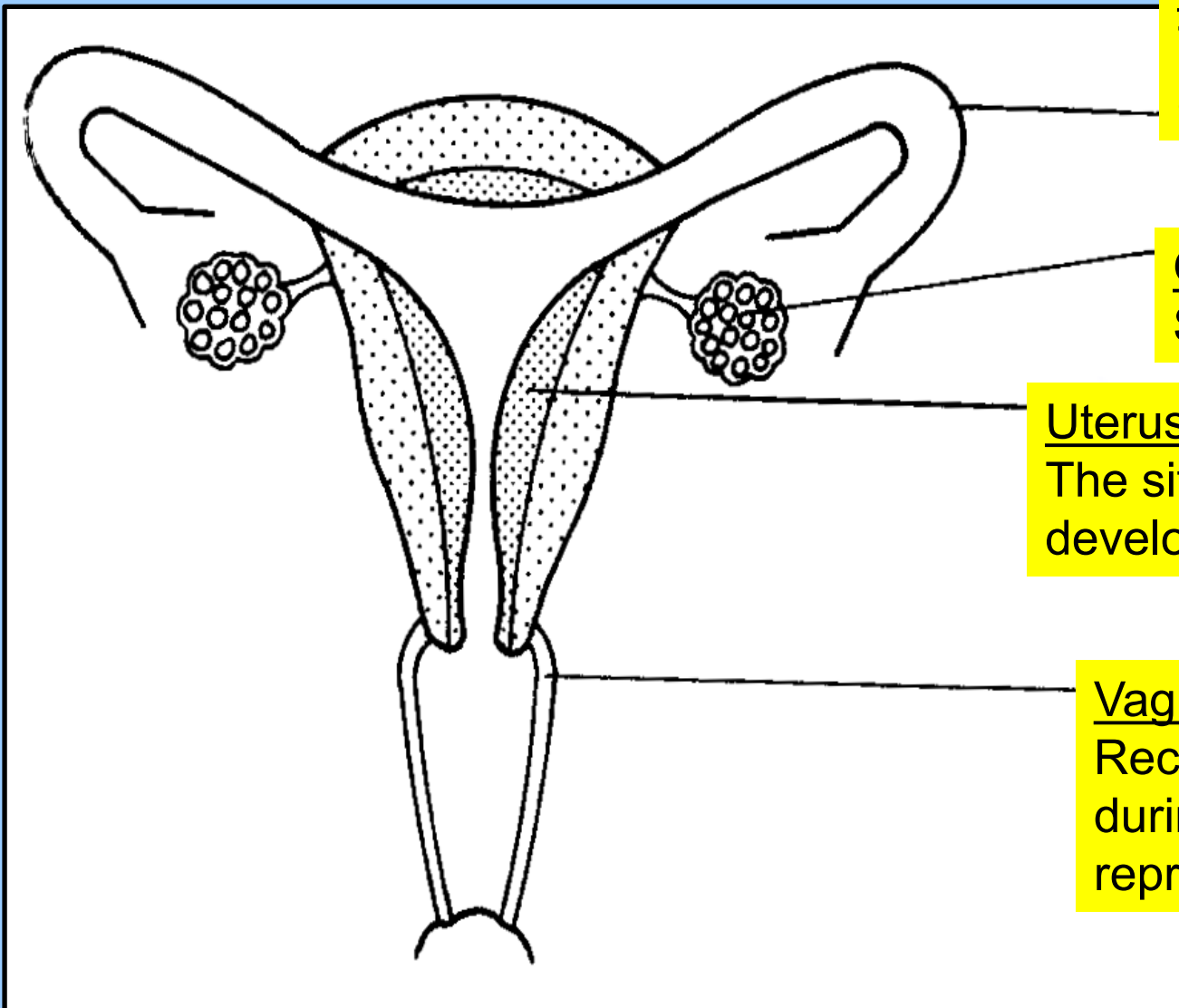
Word bank: Penis, sperm duct, testes

# The Female Reproductive System

- The female reproductive system produces egg cells that may be fertilised by male sperm.
- A sperm is the smallest cell in the body, about 5000 sperm cells would fit into one millimetre!
- The egg cell is the largest – about the size of a full stop.



# The Female Reproductive System



## Oviduct

Transports egg from ovary to uterus.

## Ovary

Stores eggs.

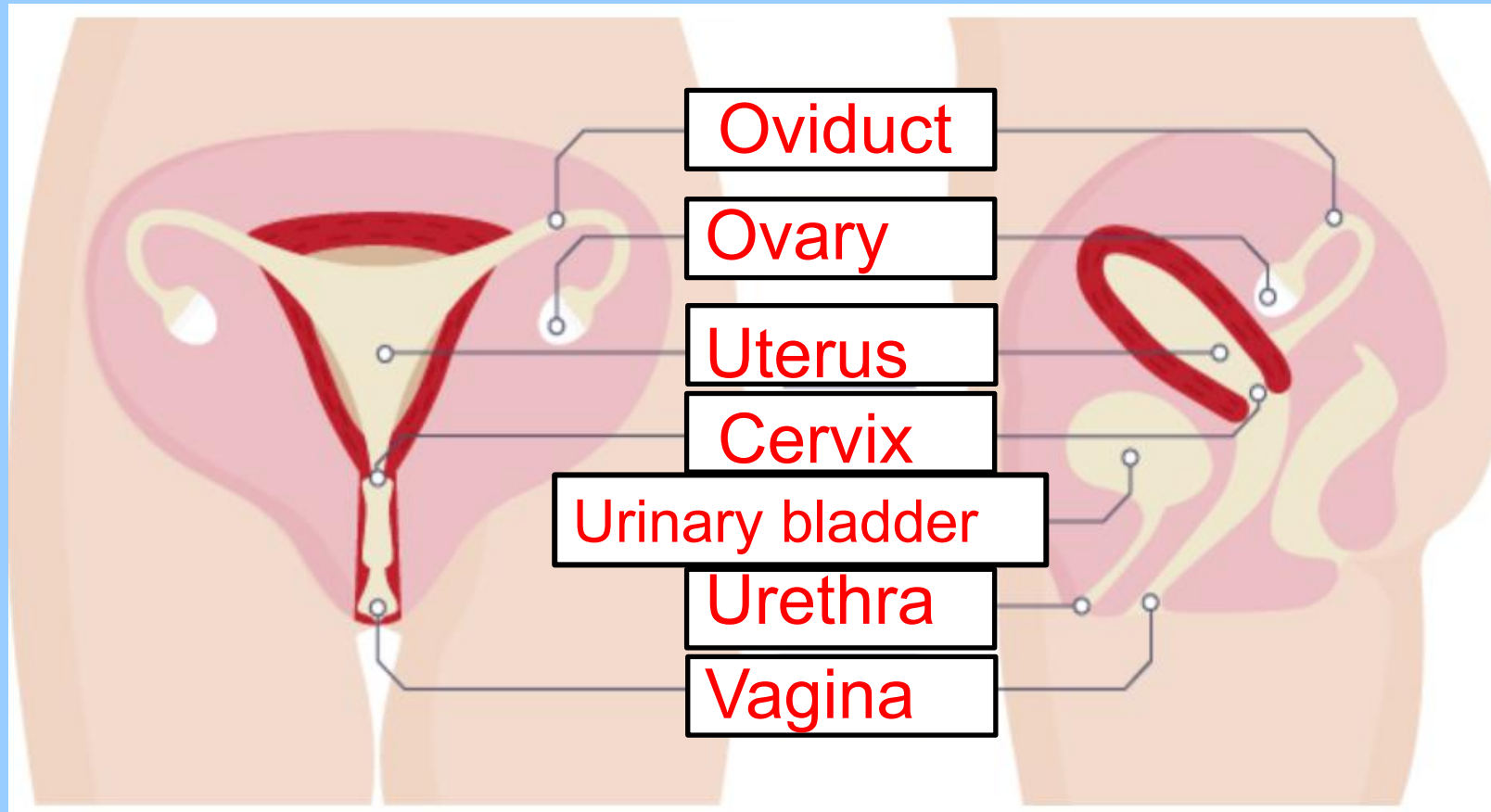
## Uterus

The site of foetus development.

## Vagina

Receives sperm during sexual reproduction.

# The Female Reproductive System



Use this slide to label the diagram in your booklet of the female reproductive system.



# The Female Reproductive System

Complete the table in your booklet, using the word bank to help.

| Structure            | Function                                                                    |
|----------------------|-----------------------------------------------------------------------------|
| <input type="text"/> | Produces eggs.                                                              |
| <input type="text"/> | Transports the egg from the ovary to the uterus.                            |
| <input type="text"/> | The site of foetus development.                                             |
| <input type="text"/> | Allows entry of sperm during sexual reproduction and exit of baby at birth. |

Word bank: vagina, oviduct, ovary, uterus

# The Reproductive System Activity



Work through the Human Reproductive Organ slides and worksheets, answering the questions throughout

<https://www.thenational.academy/teachers/programmes/science-secondary-ks3/units/reproduction-in-humans/lessons/human-reproductive-organs#slide-deck>

# Plenary – Exit Ticket

1. What did you learn in the lesson today?
2. Is there anything you need me to go over again?



# Puberty

- Starter

List three changes which happen during puberty.



# Puberty

Page 27

## **Learning Intentions:**

- I am learning about what happens to the human body during puberty.

# Puberty

Page

## Success Criteria

- ☐ I can list changes that happen to boys during puberty.
- ☐ I can list changes that happens to girls during puberty.
- ☐ I can list changes that happen to both boys and girls during puberty.

# Puberty

- Puberty is the stages in life when a child's body develops into an adults body, usually between the ages of 10 and 16.
- Changes occur at puberty because of hormones.
- Testosterone controls development in males.
- Oestrogen controls development in females.



# Puberty

You will be working in groups to sort the cards into 3 categories:

1. Changes that happen to **boys** during puberty
2. Changes that happen to **girls** during puberty
3. Changes that happen to **both** during puberty



# Puberty

| Changes in boys | Changes in girls | Changes in both boys and girls |
|-----------------|------------------|--------------------------------|
|                 |                  |                                |

The **testes** begin to produce sperm cells.

**Voice** becomes deeper

Growth of **pubic hair**.

**Growth hormones released** causing growth of body and reproductive organs.

**Hips** widen (often but not always) and **breasts** develop.

**Oestrogen and progesterone** hormones are released by the ovaries.

Production of **testosterone** by the testes

Increase in **erections**

Ovaries begin to release **egg cells**

**Foreskin** detaches from the glans.

Changes in moods and **emotions**.

Increased interested in **sex**

# Body Story – Teen Dreams - EXTENSION

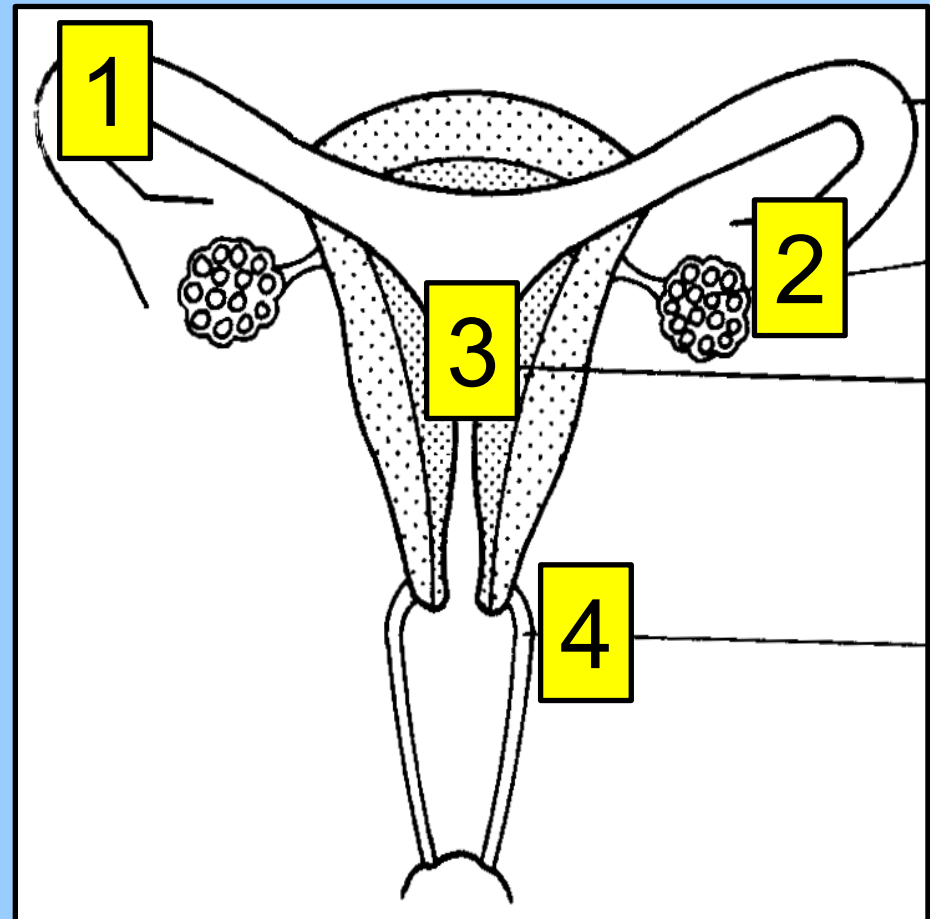


# Fertilisation

## Starter

1. Name the parts 1-4 of the female reproductive system.
2. What is the function of parts 1 and 3?

Page 30



# Fertilisation

Page 30

## **Learning Intentions:**

- I am learning about fertilisation.

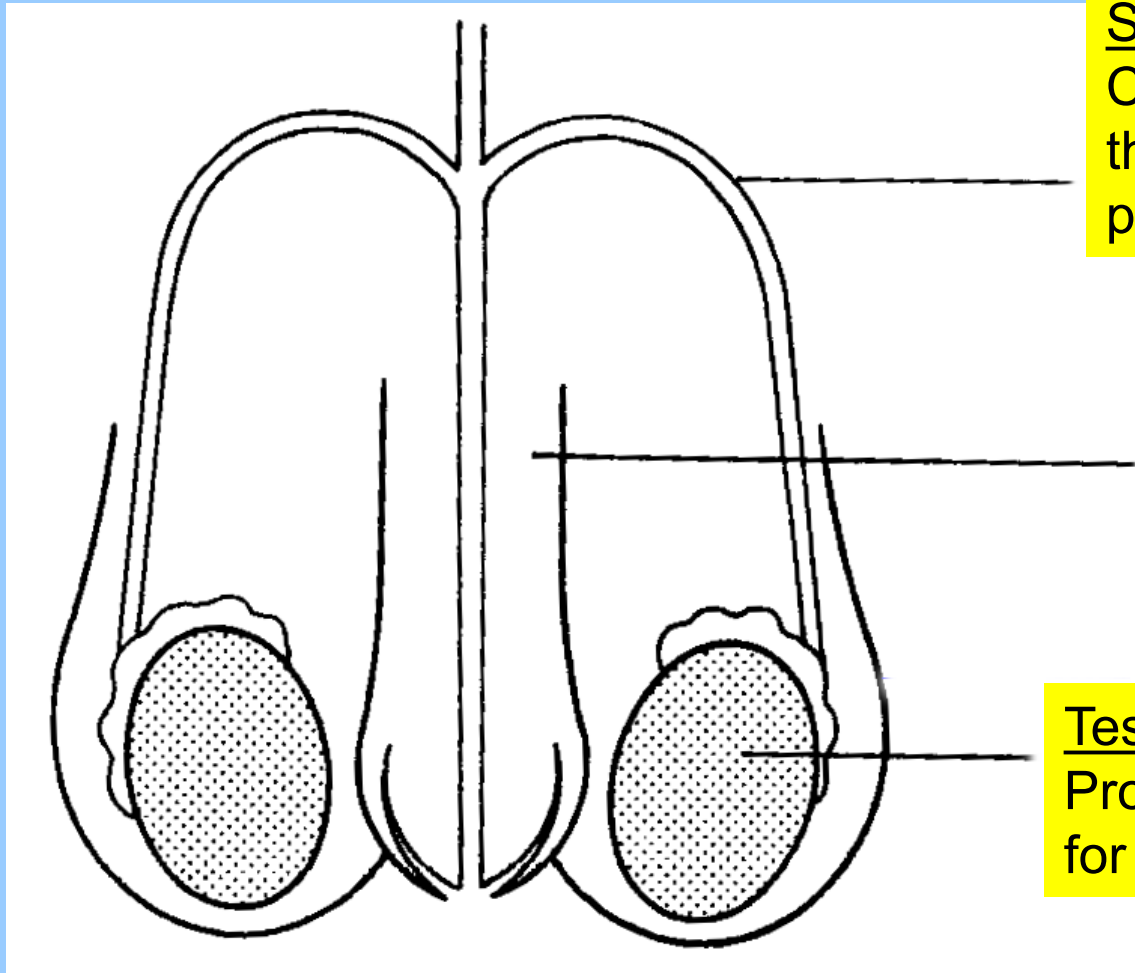
# Fertilisation

Page 30

## Success Criteria

- ☐ I can state the definition of fertilisation
- ☐ I can name the male and female parts involved in fertilisation

# Recap: The Male Reproductive System



## Sperm duct

Carries sperm from the testes to the penis.

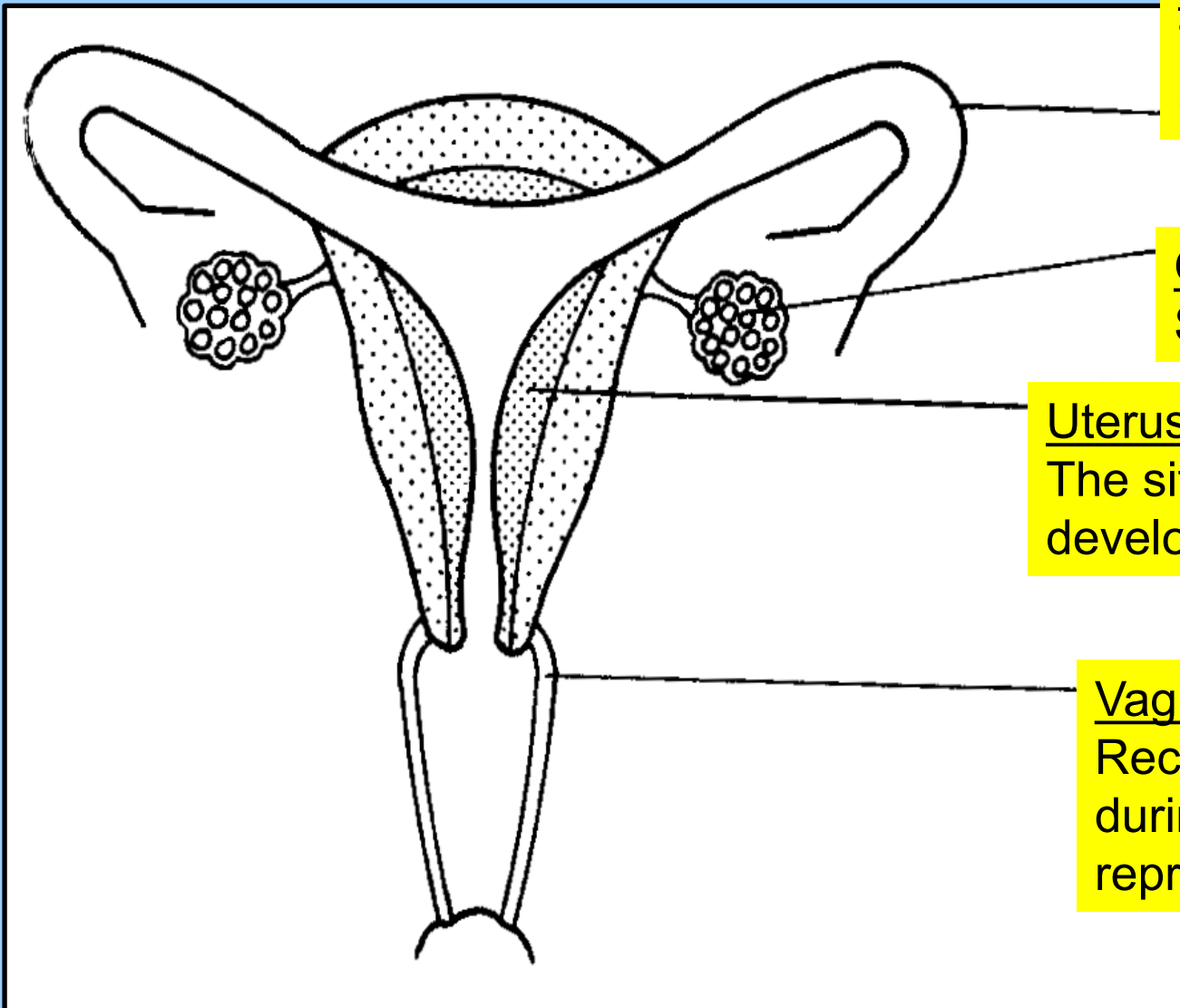
## Penis

The organ from which semen and urine leaves the body.

## Testes

Produces sperms for reproduction.

# Recap: The Female Reproductive System



## Oviduct

Transports egg from ovary to uterus.

## Ovary

Stores eggs.

## Uterus

The site of foetus development.

## Vagina

Receives sperm during sexual reproduction.

## Fertilisation

The process of fertilisation takes place within the oviduct of the female reproductive system. To do this, the male sperm cells must be placed within the female through sexual intercourse.



# Fertilisation

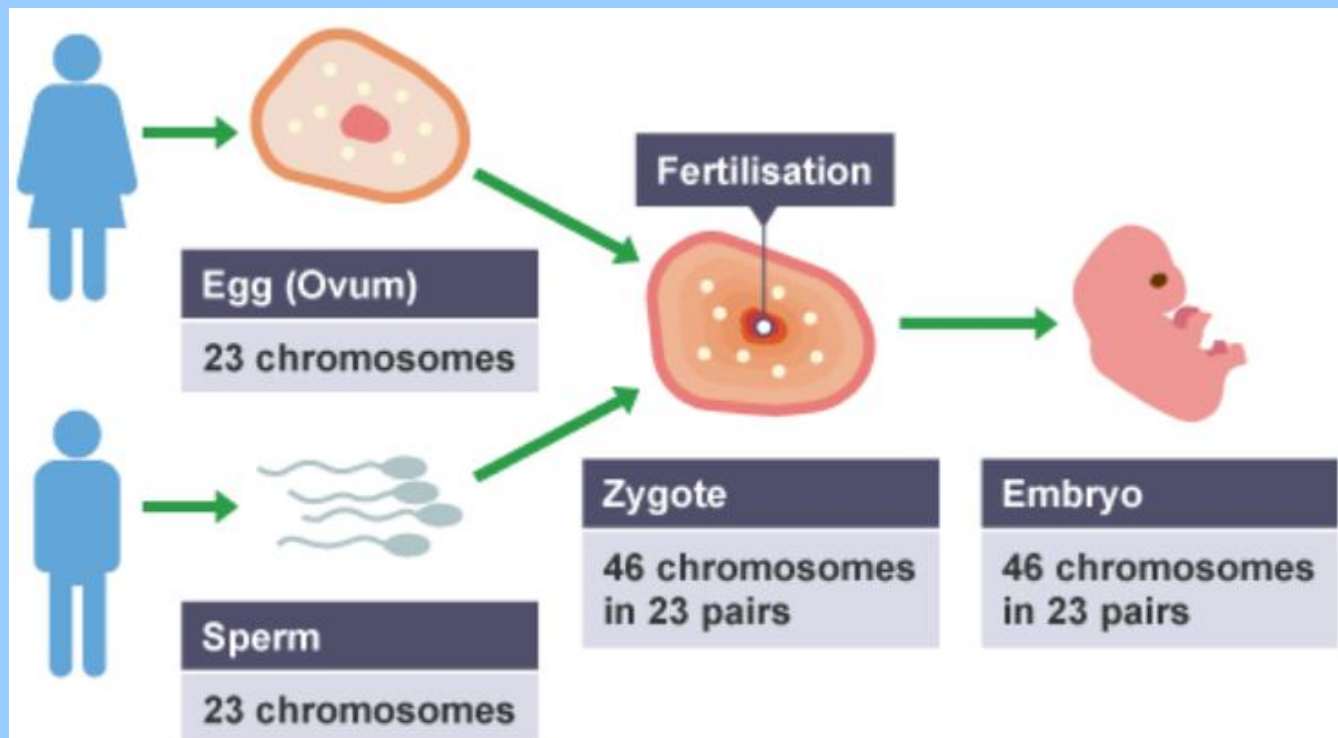
- The Sperm Cells 'Swim' from the Vagina, through the Cervix and Uterus to the Oviduct to reach the Ovum.
- The Video below shows the journey and difficulties a Sperm Cell must endure to fuse with the Ovum.

[https://youtu.be/\\_5OvgQW6FG4](https://youtu.be/_5OvgQW6FG4)

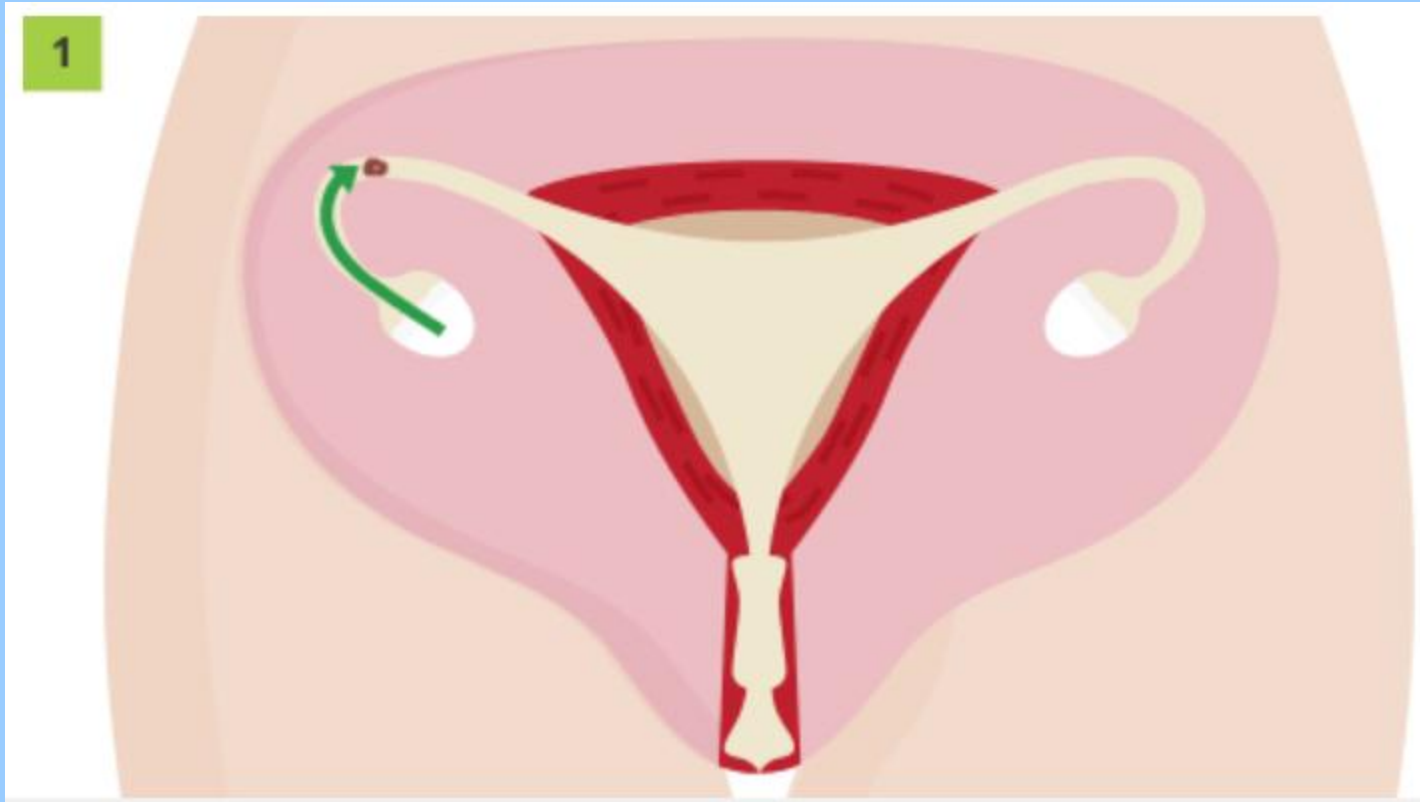


# Fertilisation

- Fertilisation occurs when the sperm nucleus and the egg nucleus joins, this produces a new cell called a zygote.
- The zygote then matures into an embryo.

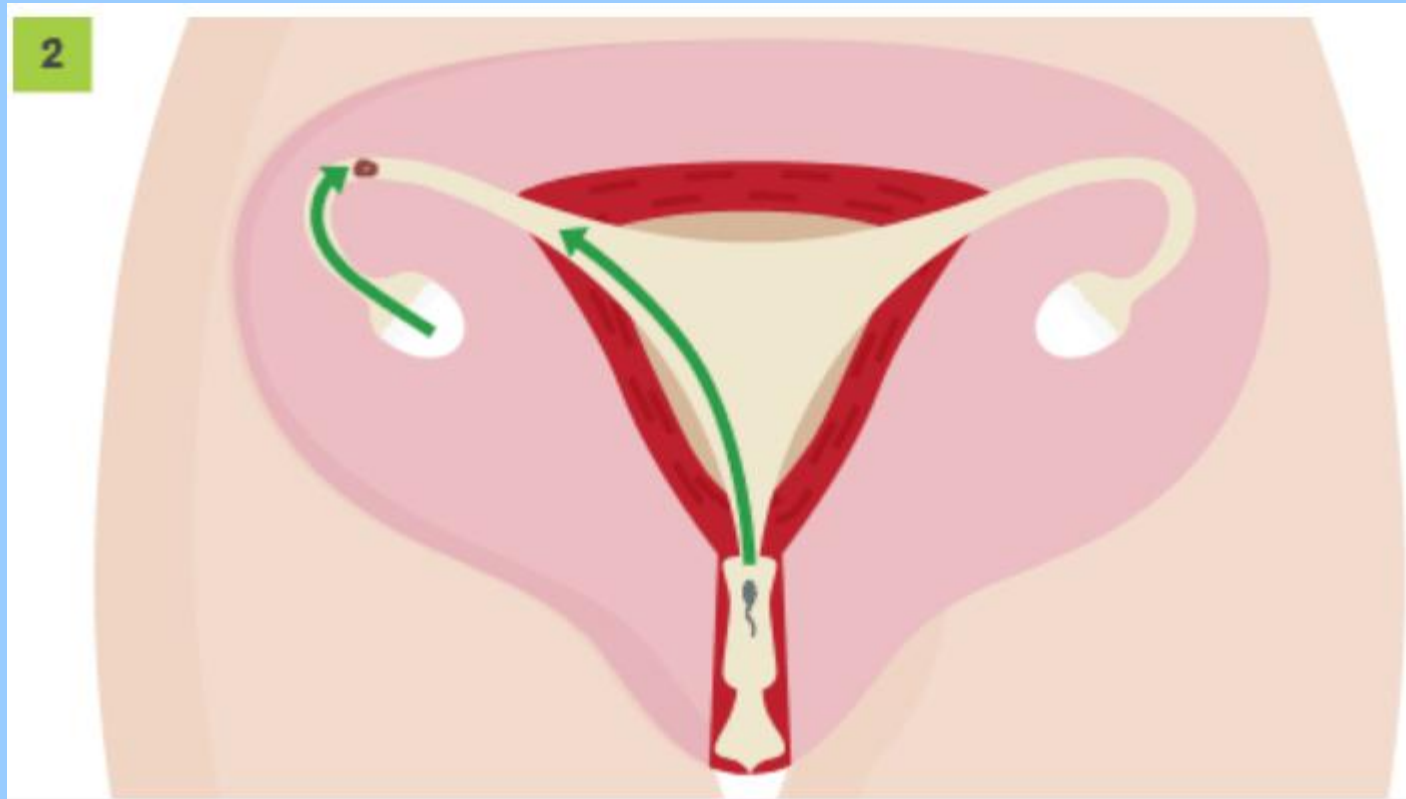


# Human fertilisation



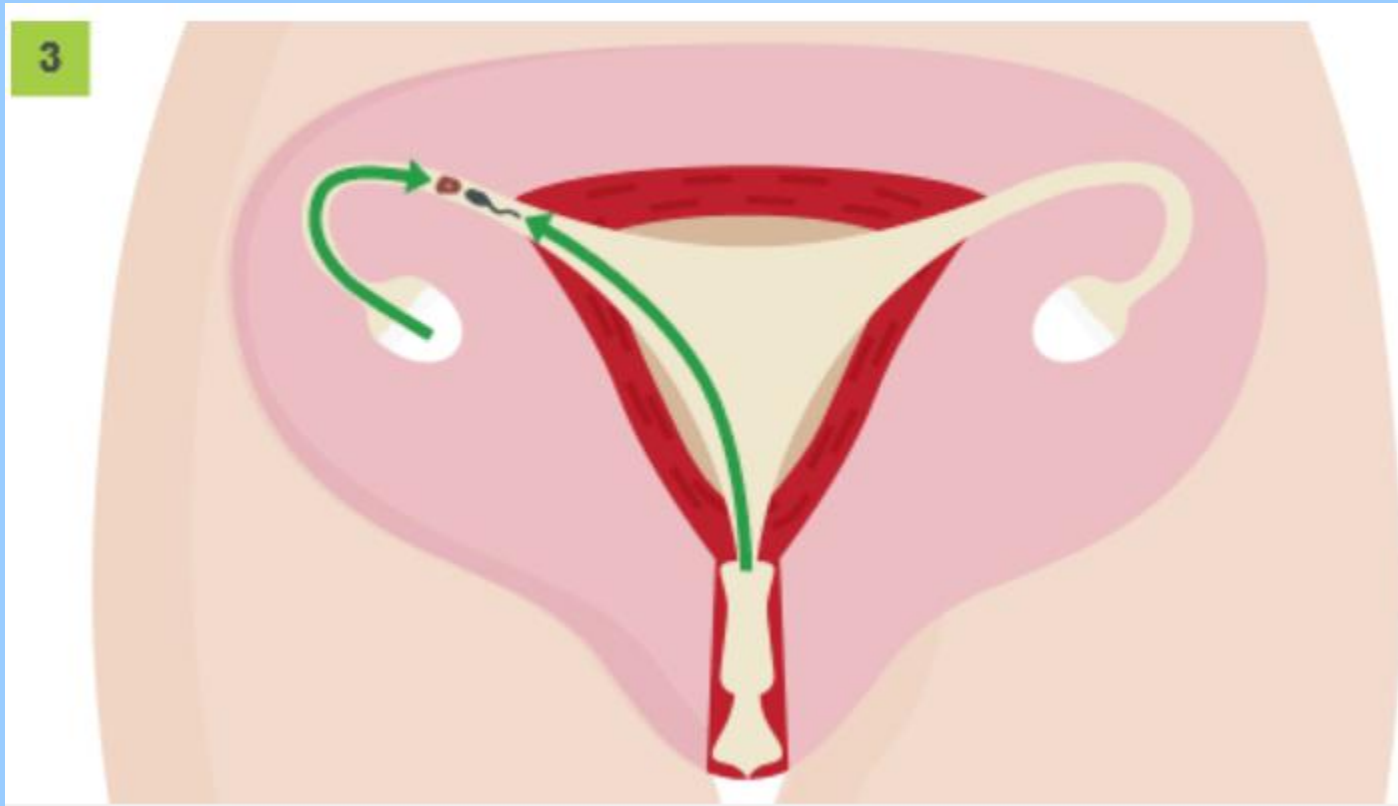
The egg is released from the ovary and moves toward the oviduct

# Human fertilisation



Sperm has been ejaculated into the vagina  
and is travelling up the cervix

# Human fertilisation



The egg and sperm meet at the oviduct and the process of fertilisation begins.

# **The Menstrual Cycle**

During human reproduction, the aim is for a sperm to meet an egg. This is only possible for a few days every month.

In order to ensure that the fertilised egg has the best possible environment to develop in, the entire lining of the uterus (called the endometrium) is replaced every 28 days in a process known as the menstrual cycle.

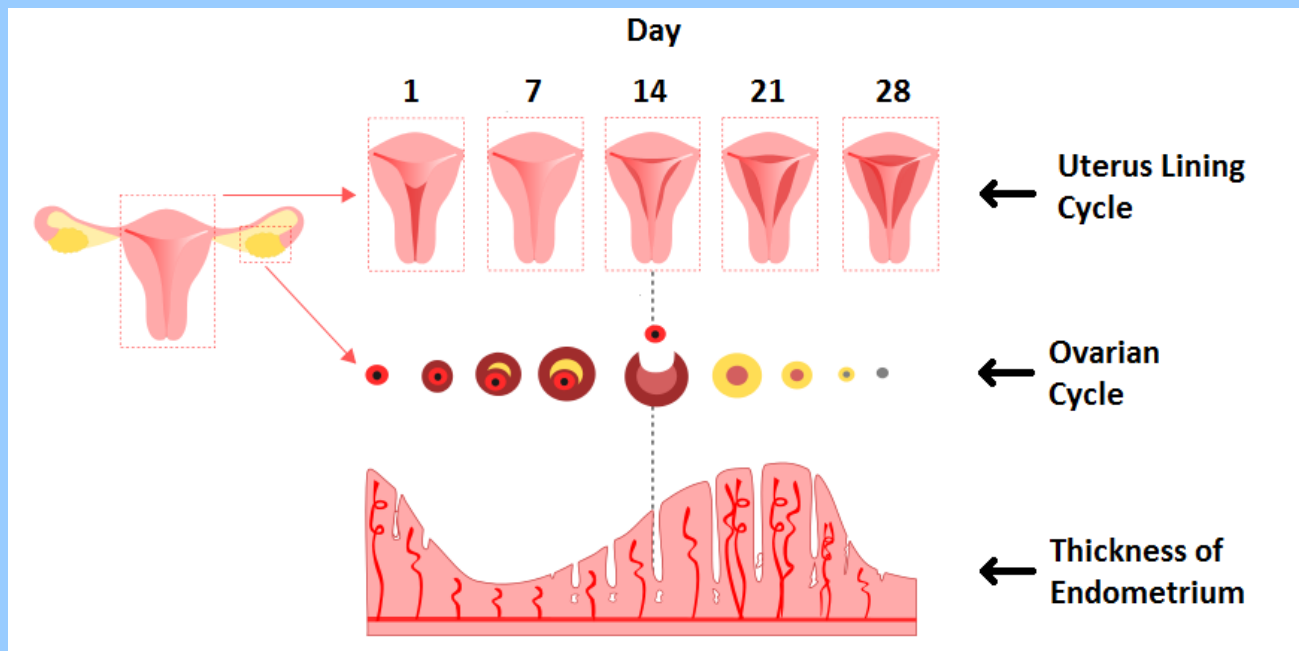
Day 1 - The endometrium breaks down and is lost from the body through the vagina. In the ovary, a new ovum starts to develop.

Day 7 – The endometrium starts to thicken again and the ovum is almost fully mature.

Day 14 - The ovum is released from the ovary in a process called ovulation. Cilia cells in the oviduct move the ovum towards the uterus.

Day 21 - The endometrium has reached full thickness and is ready for implantation if the female becomes pregnant.

Day 28 / 1 - If the female is not pregnant, the endometrium breaks down and is lost from the body through the vagina.



# An Everyday Miracle

Answer the questions to part 1 in your booklet as you watch the video.



## AN EVERYDAY MIRACLE – QUESTIONS

### PART 1

1. How many times a minute does the baby's heart beat?
2. How many babies are born each day?
3. How many times smaller is the sperm compared to the egg?
4. What will we condense a year into?
5. What are the names of the couple in the video?
6. How many days a year does a woman have a chance of becoming pregnant?
7. What is the name of the organ that releases eggs?
8. How many times in a woman's life will ovulation happen?
9. What distance does the sperm have to travel in the man?
10. What is the first "mortal danger" that the sperm face?
11. Where does the sperm meet the egg?
12. What does the dividing egg look like?
13. What happens to the lining of the uterus?

### PART 2

1. What blood-sucking animal is the developing embryo compared to?
2. What time did Phillipa take the pregnancy test?
3. What is the round ball?
4. Where does work start?
5. What are millions of cells becoming?
6. What is the work fuelled by?
7. What does the 12 week fetus weigh?
8. What is the most common complaint?
9. When do most women feel better by?
10. What was ultrasound developed for?
11. When will the foetus have started to develop senses?
12. Where do we translate the signals from our sense?
13. What allows mother and foetus to live together?
14. What is the message Phillipa hears from her body?

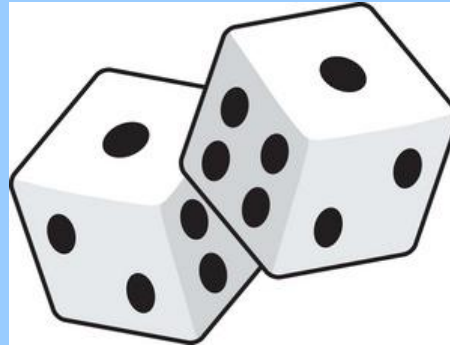
### PART 3

1. What has happened to Phillipa's spine?
2. What is the most dramatic change?
3. When is Phillipa and Jeff's baby due at this point?
4. What is the most difficult task the body has to tackle?
5. Why is the baby not ready for the world?
6. How early was Phillipa's baby?
7. How far apart are Phillipa's contractions?
8. What does the head act as?
9. Where does the baby's head face during birth?
10. How should birth be viewed?
11. Where is the last baby shown from?

# Plenary

1. Write down everything that you can remember from this lesson.

2. Write down two things you want to know more about



4. Write a question regarding today's lesson, then you may get to choose someone to answer your question.

5. Describe this lesson in 5 words

3. You will be given a key word, you must write everything you know about this word.

6. Summarise this lesson in under 15 words

# Pregnancy

Page 32

## Starter

1. Describe what happens during fertilisation.
2. What does a zygote develop into?



# Pregnancy

Page 32

## **Learning Intentions:**

- I am learning about pregnancy.

# Pregnancy

Page 32

## Success Criteria

- ☐ I can explain how a foetus develops.
- ☐ I can describe the stages of pregnancy.

# Stages of Pregnancy

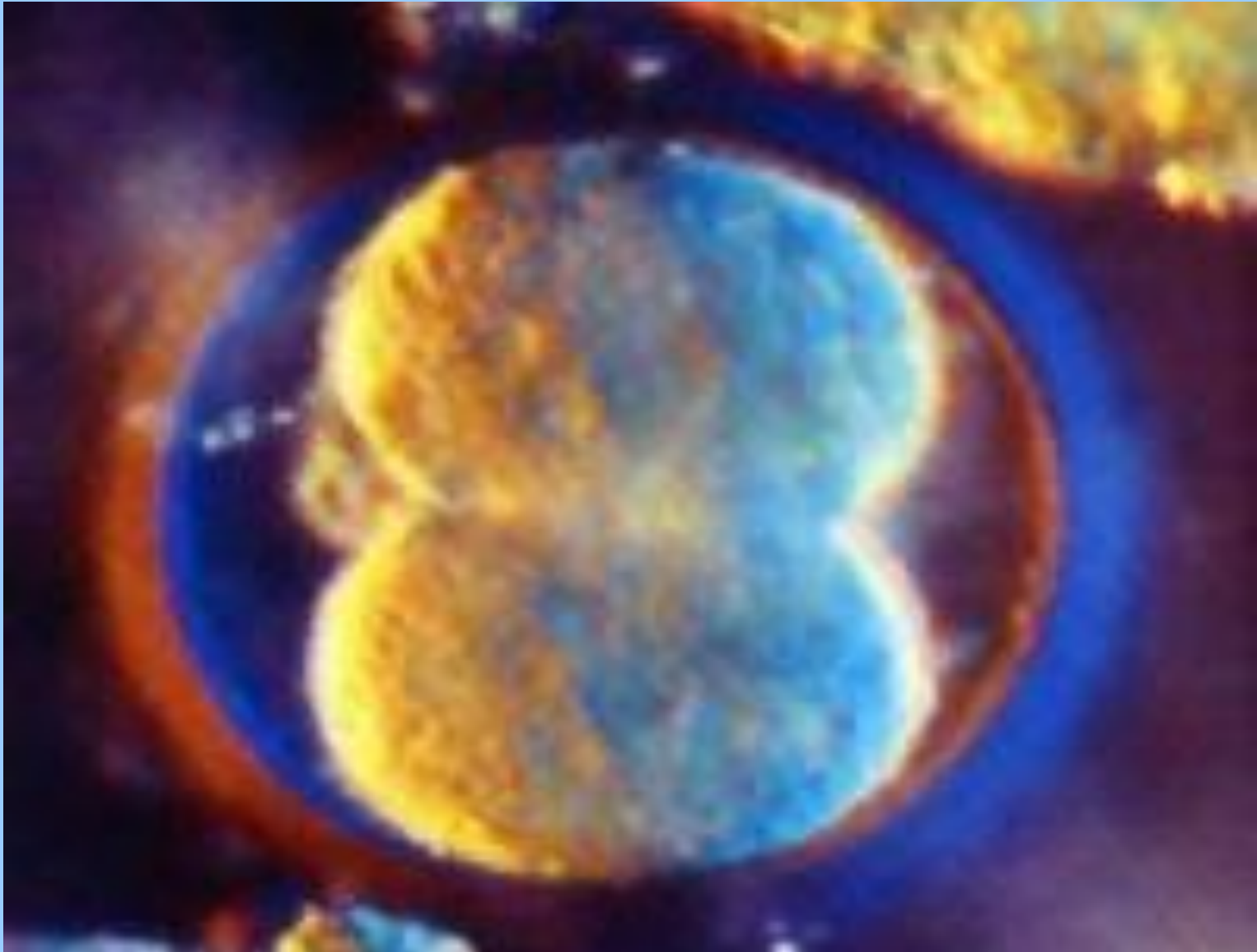
Once fertilisation has occurred, the process of pregnancy can begin. The single fertilised cell goes through a huge amount of change before the baby is ready to be born.



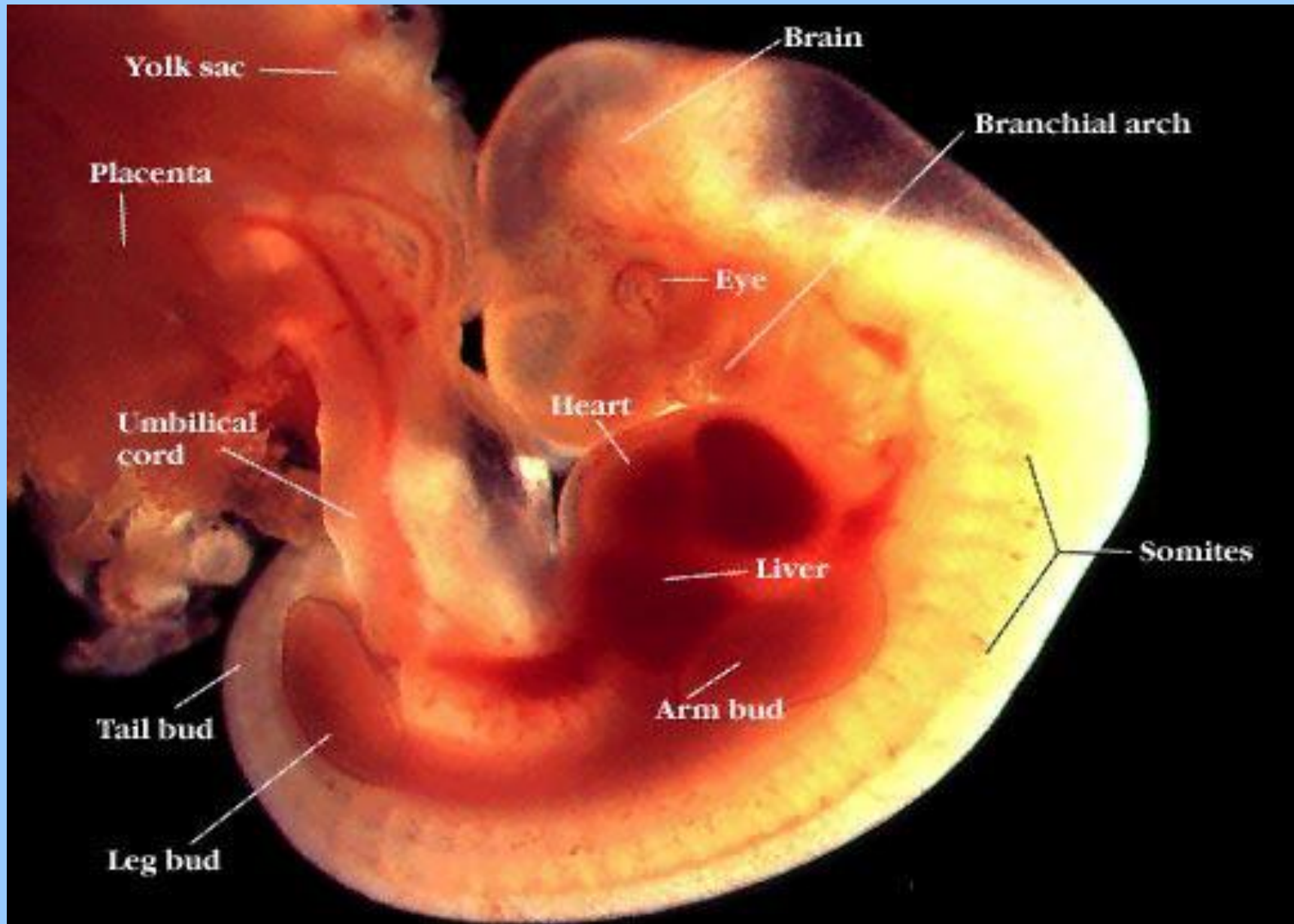
# Fertilisation (zygote)



30 hours later (zygote)



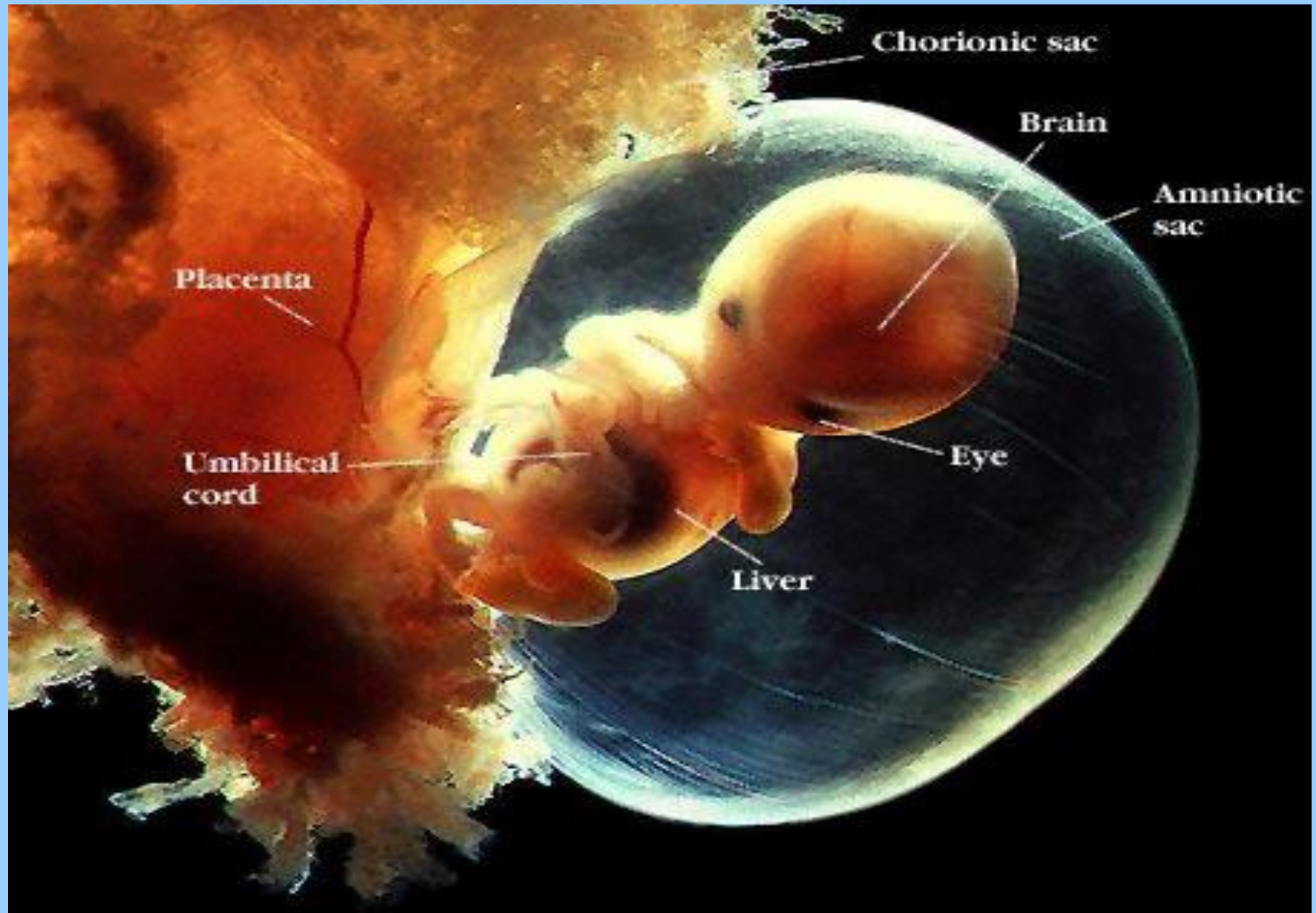
# Weeks 3-5 (embryo)



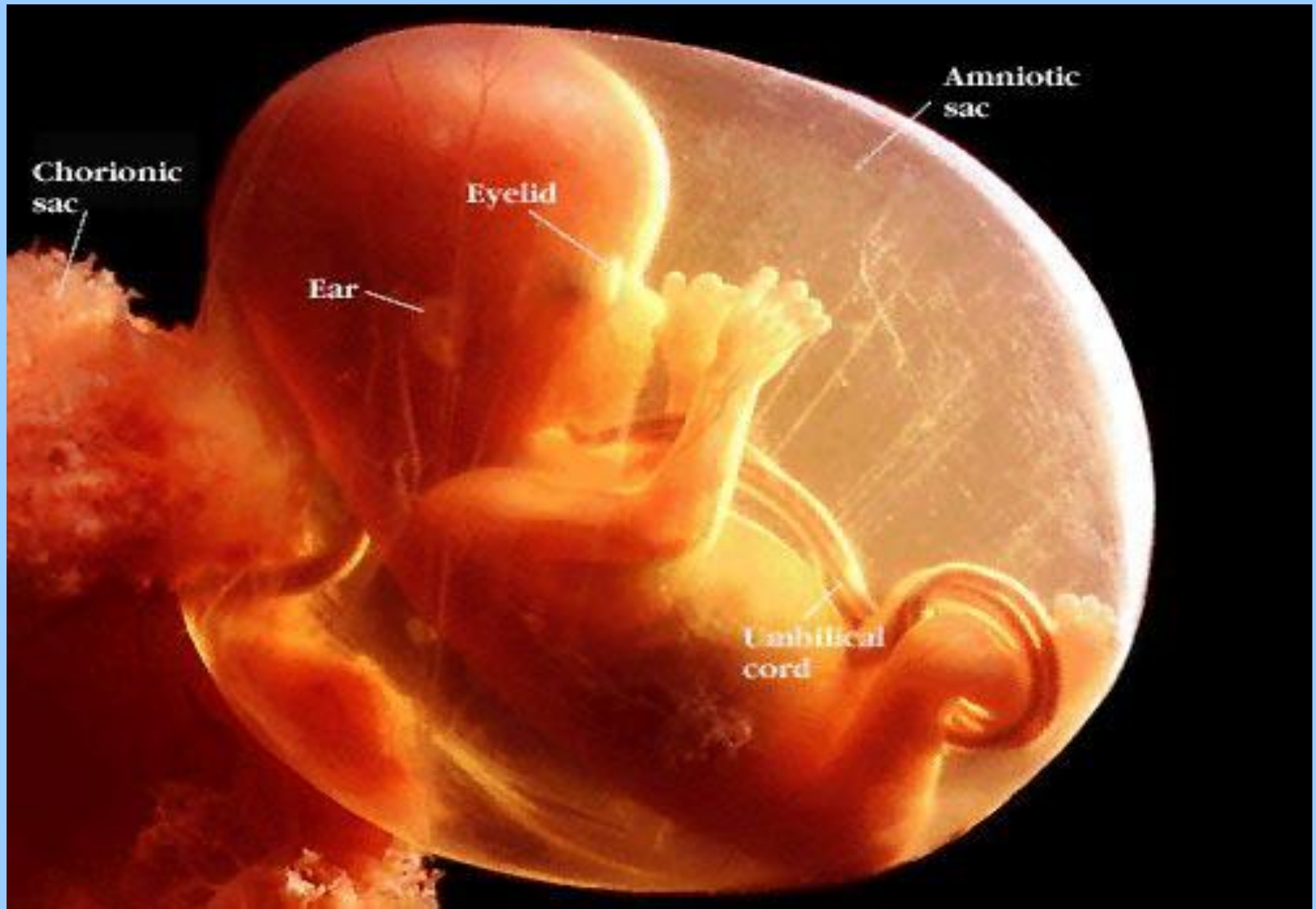
# Week 7 (foetus)



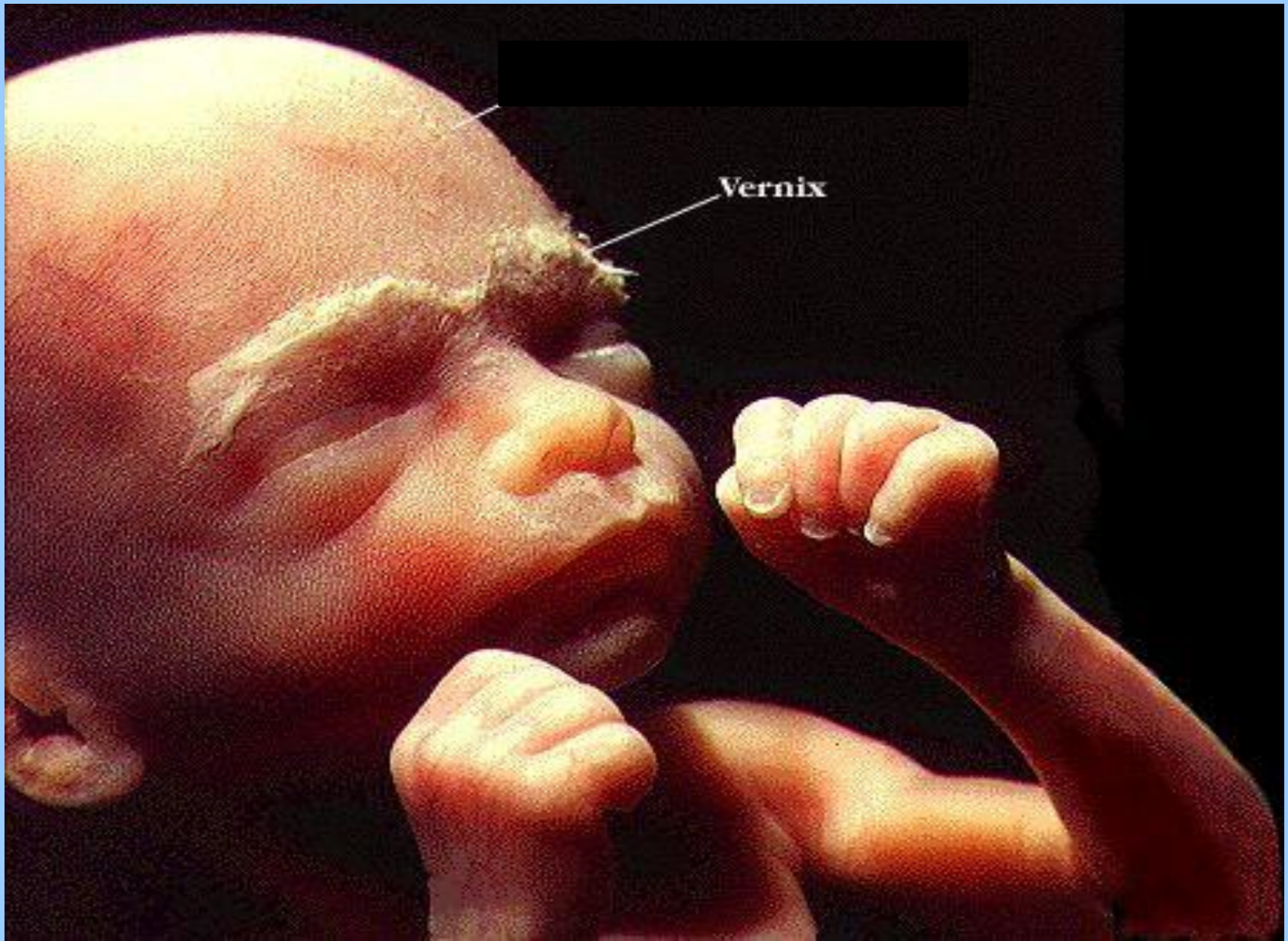
# Weeks 8-12 (foetus)



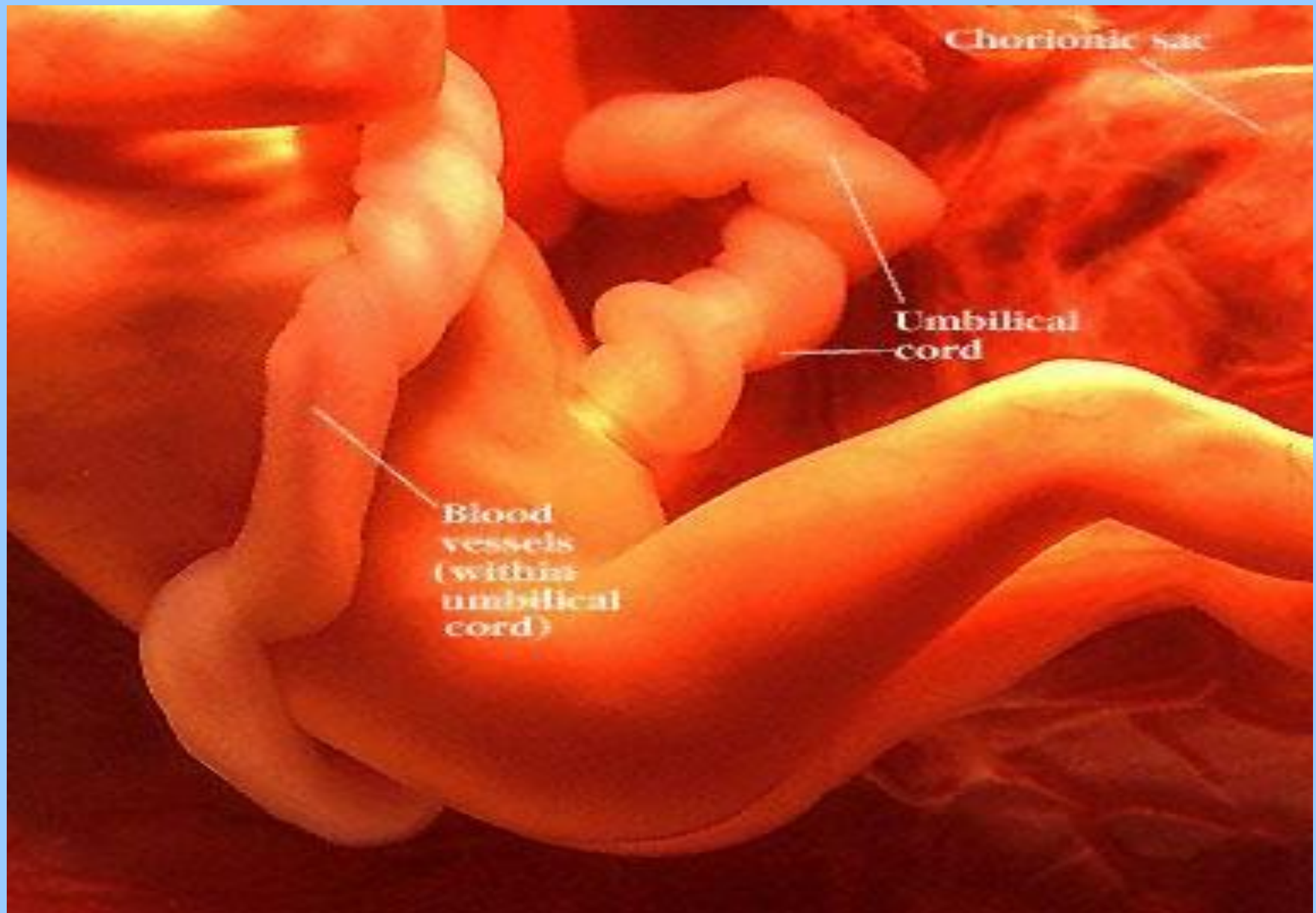
# Weeks 13-16 (foetus)



# Weeks 20-24 (foetus)



# Weeks 25-32 (foetus)



# Stages of Pregnancy



- When the sperm and the egg join, the cell formed is called a **zygote**.
- Between 1 and 8 weeks, the baby is called an **embryo**.
- After 8 weeks, it is called a **foetus**.

[https://www.youtube.com/watch?v=jvanNDQhI\\_YI](https://www.youtube.com/watch?v=jvanNDQhI_YI)



Age: **Day 1**



Age: **Day 2**



Age: **Day 8**  
(blastocyst)



Age: **4 weeks**



Age: **10 weeks**



Age: **30 weeks**



Age: **40 weeks**

# An Everyday Miracle

Answer the questions to part 2 in your booklet as you watch the video.



## AN EVERYDAY MIRACLE – QUESTIONS

### PART 1

1. How many times a minute does the baby's heart beat?
2. How many babies are born each day?
3. How many times smaller is the sperm compared to the egg?
4. What will we condense a year into?
5. What are the names of the couple in the video?
6. How many days a year does a woman have a chance of becoming pregnant?
7. What is the name of the organ that releases eggs?
8. How many times in a woman's life will ovulation happen?
9. What distance does the sperm have to travel in the man?
10. What is the first "mortal danger" that the sperm face?
11. Where does the sperm meet the egg?
12. What does the dividing egg look like?
13. What happens to the lining of the uterus?

### PART 2

1. What blood-sucking animal is the developing embryo compared to?
2. What time did Phillipa take the pregnancy test?
3. What is the round ball?
4. Where does work start?
5. What are millions of cells becoming?
6. What is the work fuelled by?
7. What does the 12 week fetus weigh?
8. What is the most common complaint?
9. When do most women feel better by?
10. What was ultrasound developed for?
11. When will the foetus have started to develop senses?
12. Where do we translate the signals from our sense?
13. What allows mother and foetus to live together?
14. What is the message Phillipa hears from her body?

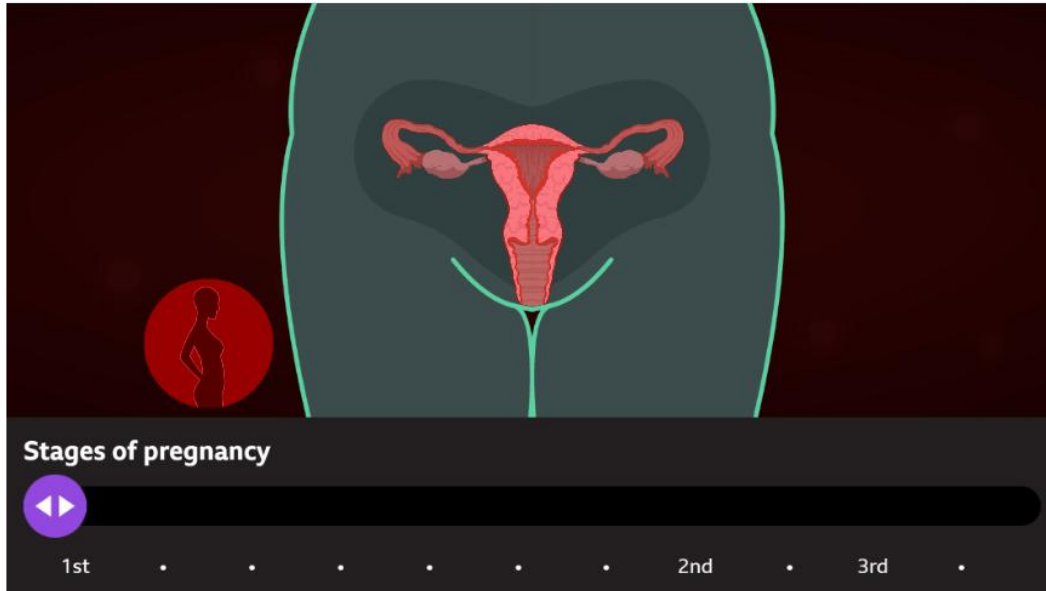
### PART 3

1. What has happened to Phillipa's spine?
2. What is the most dramatic change?
3. When is Phillipa and Jeff's baby due at this point?
4. What is the most difficult task the body has to tackle?
5. Why is the baby not ready for the world?
6. How early was Phillipa's baby?
7. How far apart are Phillipa's contractions?
8. What does the head act as?
9. Where does the baby's head face during birth?
10. How should birth be viewed?
11. Where is the last baby shown from?

# The Reproductive System Activity

## Human reproduction interactive

Play this game to explore human reproduction and the stages of pregnancy.



Read through the key points and take the quiz  
at the end

# Plenary

1. Give the term used to describe the ball of cells that is formed when a fertilised egg starts to divide (hint, day 8!)
2. Give the term used to describe the later stages of development before the baby is born.
3. Name the part of the female reproductive system where the embryo develops.

Extension : Can you think of the name of the technique used to monitor the health of the baby during pregnancy?

# Stages of Pregnancy

Page 34

## Starter

Describe **three** of these key words:

Fertilisation

Egg

Uterus

Embryo

Foetus

Puberty

Sperm

Oviduct

Ovary

Zygote

Pregnancy

Testes

# Stages of Pregnancy

Page 34

## Learning Intentions:

- I am learning about the stages of pregnancy.

# Pregnancy

Page 34

## Success Criteria

- ☐ I can describe how a foetus develops.
- ☐ I can describe the growth rate of the embryo in the womb.

# Pregnancy



## Uterus (womb)

Stores the baby for 9 months

## Placenta

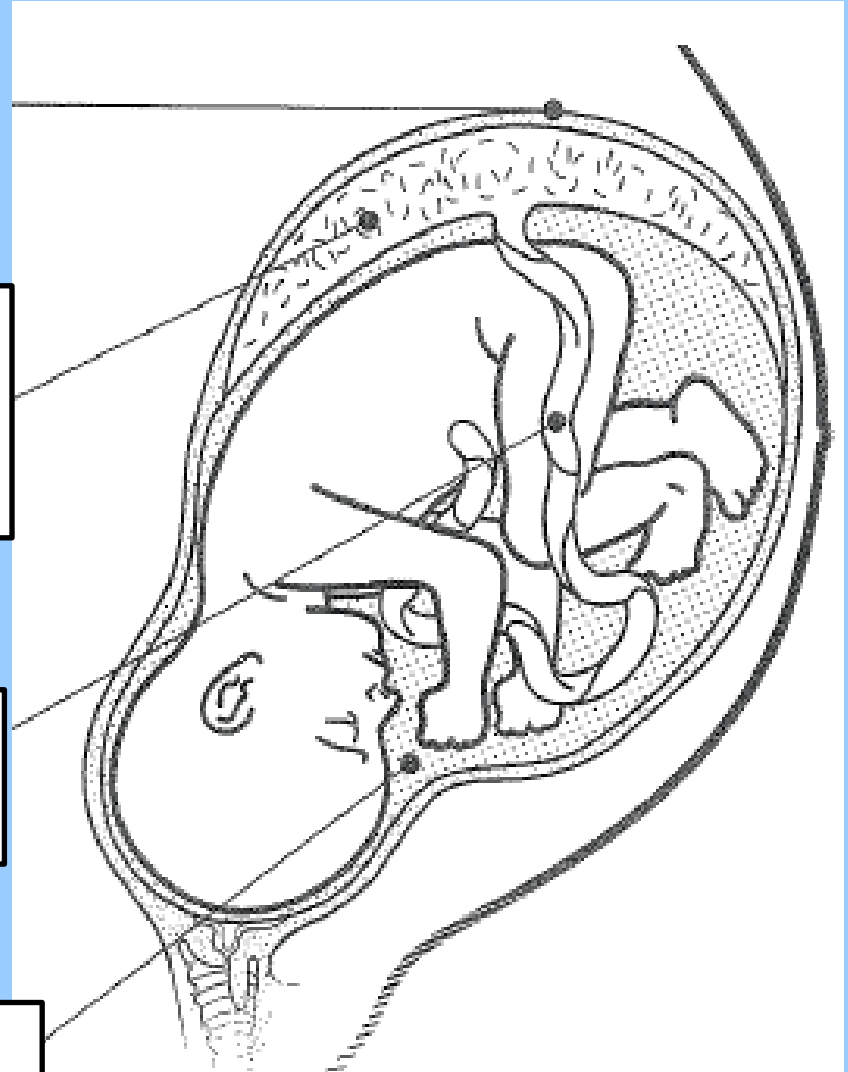
Transfer food/waste between the mother and the baby

## Umbilical Cord

Supplies blood to the baby.

## Amniotic Fluid

Protects the baby from bumps.





# Stages of Pregnancy

Pregnancy in humans lasts 9 months (40 weeks). It is split into three parts of 3 month each. Each part is called a **trimester**.

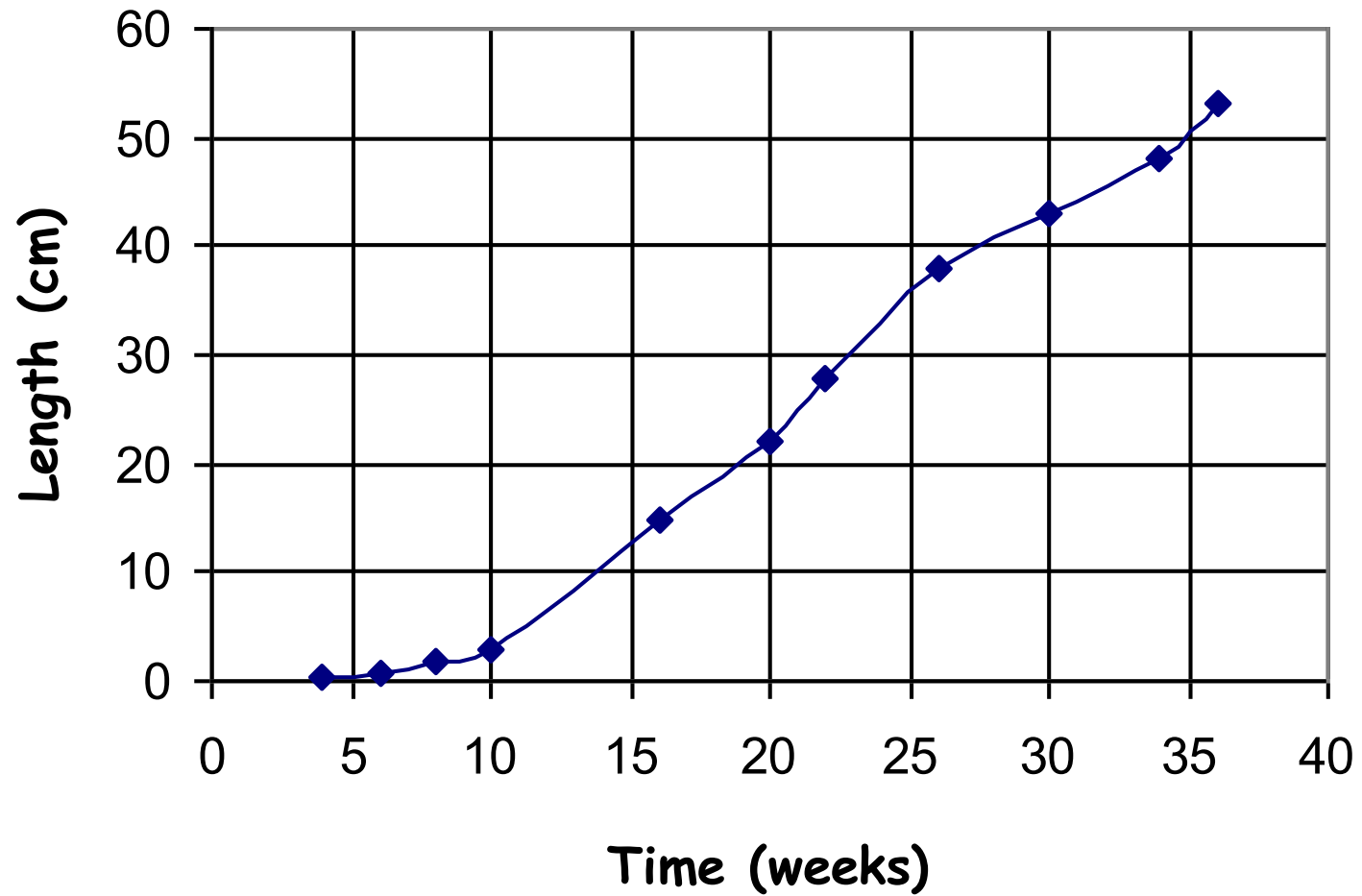
| First Trimester                                                          | Second Trimester                                                                                                                      | Third Trimester                                                                                                                                  |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| At this Stage the Baby is known as an Embryo.                            | At this Stage the Baby is known as a Foetus.                                                                                          | At this Stage ( 24 Weeks ) if born prematurely, the Baby could survive.                                                                          |
| Week 3 - Implantation Occurs                                             | Week 12 - All Vital Organs are now Formed. The Foetus can now hear Sounds and control its limbs, it can kick and even suck its thumb. | Week 24 to 36 - The Third Trimester is about growth, the Foetus will double in size.                                                             |
| Week 4 - Brain, Heart, Spine, Nervous and Circulatory Systems form.      | Week 17 - The Gender of the Foetus can now be seen.                                                                                   | Week 33 - The Foetus can hear the Outside World, learning to recognise its mother's voice. The Foetus can now see, its pupils reacting to light. |
| Week 7 - Facial Features, Limbs, Digestive and Respiratory Systems Form. | Week 24 - Foetus is now about 32 cm in size.                                                                                          | Week 37 to 40 - Foetus is now about 50 cm in size.                                                                                               |
| Week 12 - Embryo is now about 8 cm in size.                              |                                                                                                                                       |                                                                                                                                                  |

## Growth rate of the embryo in the womb



| Time (weeks) | Length (cm) |
|--------------|-------------|
| 4            | 0.5         |
| 6            | 1           |
| 8            | 2           |
| 10           | 3           |
| 16           | 15          |
| 20           | 22          |
| 22           | 28          |
| 26           | 38          |
| 30           | 43          |
| 34           | 48          |
| 36           | 50          |

Plot line graph of these results in your booklet



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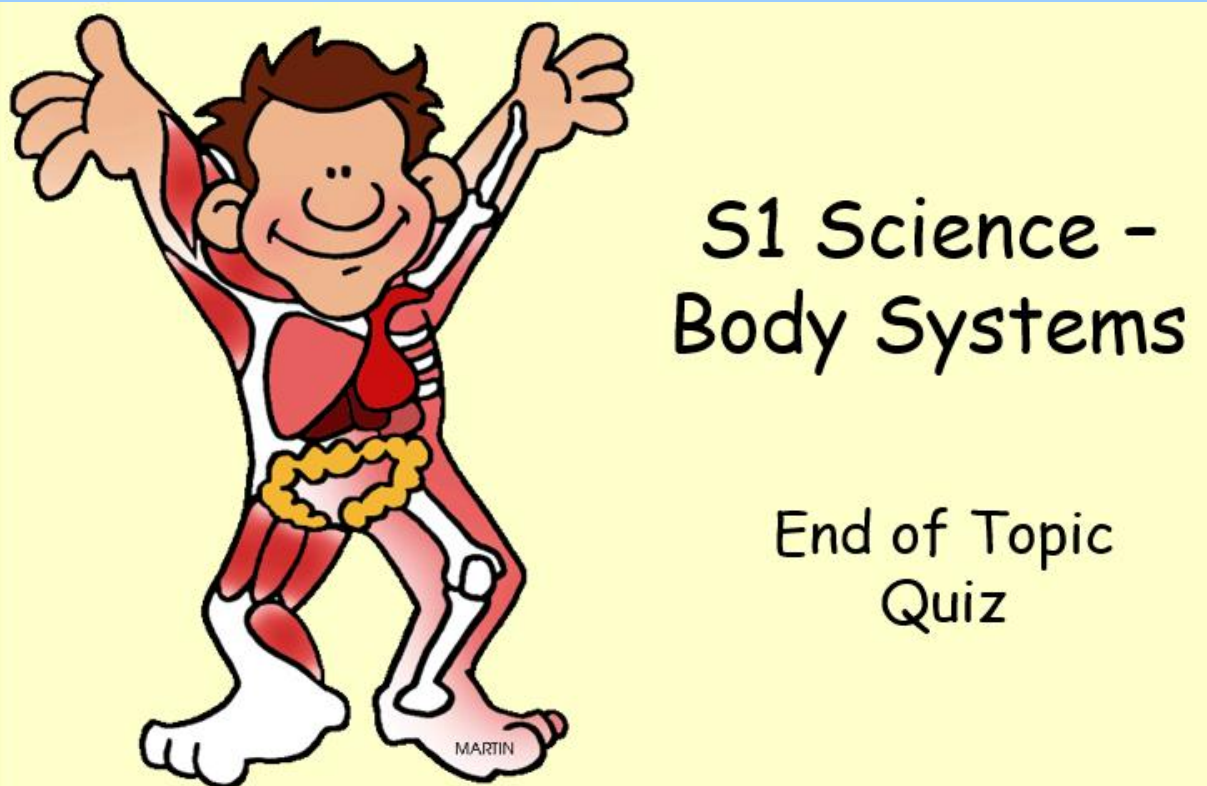
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# Revision



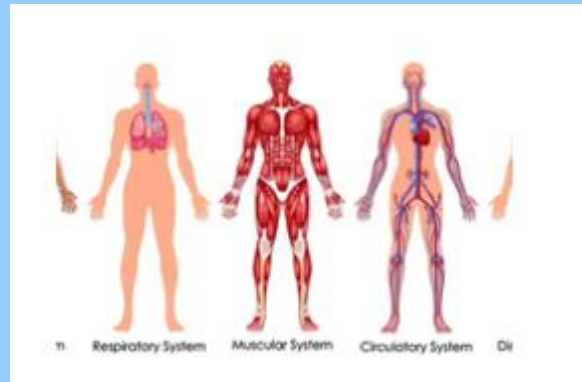
\\acad-kik-file\shared files\Curriculum Areas\Science\S1 S2 SCIENCE\S1  
COURSE\NEW S1 COURSE\NEW Unit 2 Feb-June\Biology - Body  
Systems\Revision

# Revision

Kahoot! GO

Kahoot! GO

Kahoot! GO



Kahoot! GO

Kahoot! GO

<https://create.kahoot.it/details/body-systems/988a6b77-c8d5-4aa8-a5f3-5e1ba61f9c1b?drawer=>