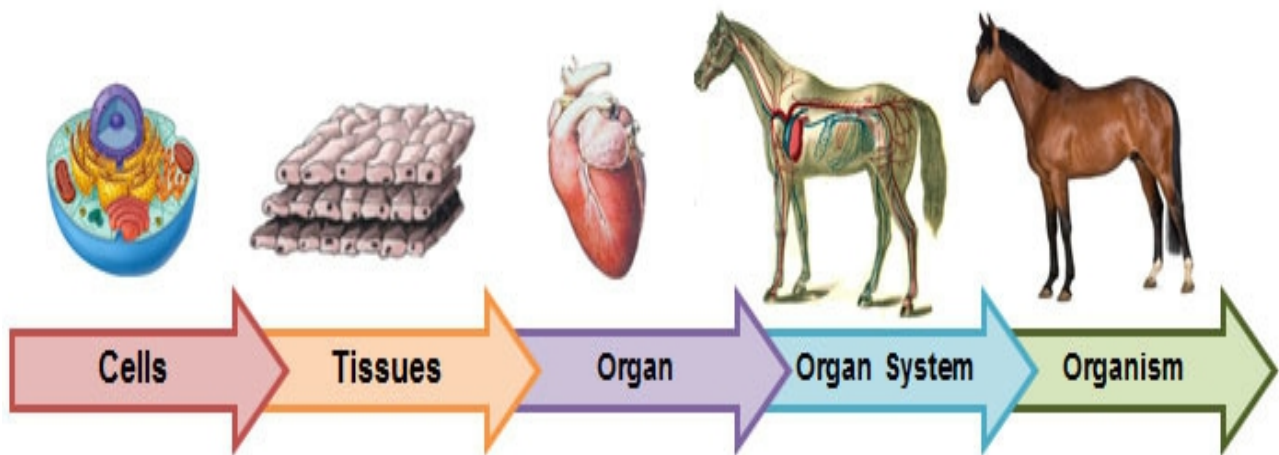
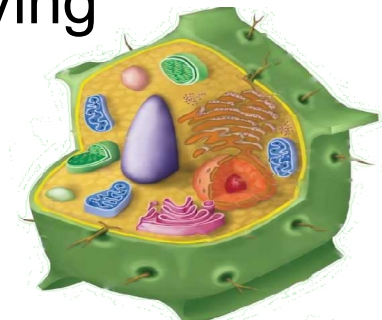
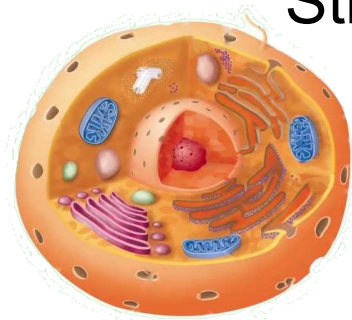


Grade 9 Natural Sciences

Strand 1: Life and Living



Day 1

Topic 1.1: Cells as the basic units of life

Week 1

- ✓ Let's learn Terminology!

Cell: The smallest basic structural unit of life.

Microscopic: Something so small that it can only be seen under a microscope.

- ✓ Let's Read!

Read through page 8 in your textbook.

- ✓ Let's sum it up!

Cells are the tiny building blocks that make up your body and the bodies of other living organisms, and they work together to make our bodies function. Most cells are microscopic, meaning that they are so small that they can only be seen under a microscope.

Cells are classified as the smallest structural unit of life because they are the smallest organism that carries out the seven life functions:



Teacher Tip!

You can easily remember the seven life functions by remembering MRS GREN:



Movement

Respiration

Sensitivity

Growth

Reproduction

Excretion

Nutrition



- ✓ Did you understand the work?

Complete the following exercise in your workbook.

1. In your own words, explain why cells are considered the smallest structural units of life. (2)
 2. Provide a brief description for each of the SEVEN life functions. (7)
- [9]

Day 2

Topic 1.2 Cell Structures



- ✓ Let's learn Terminology!

Organelle: The small structures inside a cell that perform various functions.

DNA: The genetic information used to build a new organism.



- ✓ Let's Read!

Read through pages 8 & 9 in your textbook.



- ✓ Let's sum it up!

Cells are classified in TWO groups: - Plant cells
- Animal cells

Each cell is made up of different structures called organelles. Plant and animal cells have the following components in common:

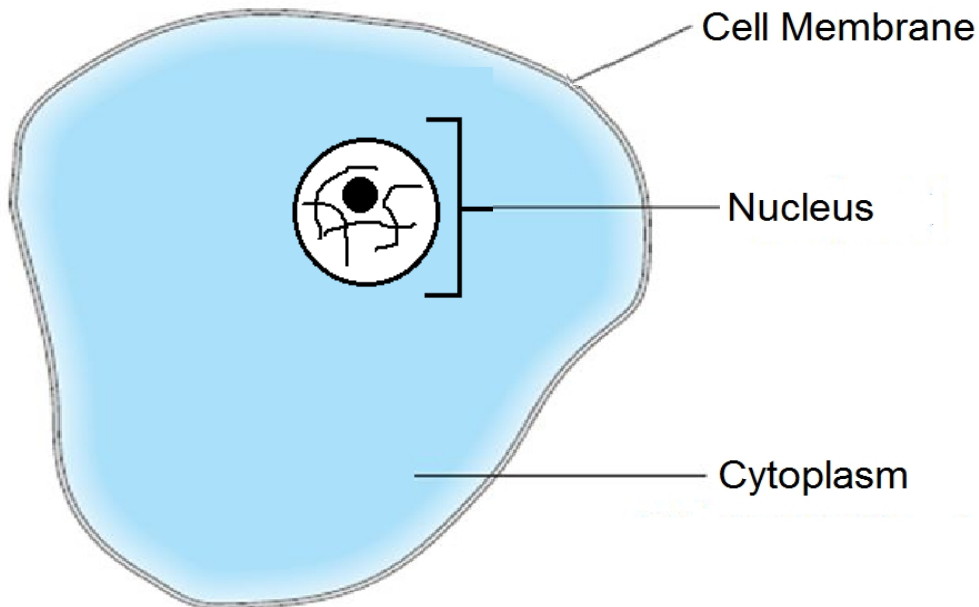
- **Cell membrane:** The thin layer around the cell that encloses the contents of the cell. It also controls what enters and exits the cell, allowing nutrients to enter and waste to exit.
- **Cytoplasm:** The jelly-like liquid that fills the inside of the cell and contains the organelles. The cytoplasm supports organelles in the cell, and is where chemical reactions take place.

- **Nucleus:** The nucleus controls all processes that happen in a cell. The nucleus contains DNA which contains an organism's genes. Genes carry the inherited characteristics which you get from your parents.



Teacher Tip!

Use this diagram when drawing your own cell:



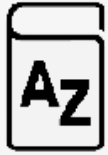
✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Copy the following sentences into your workbook and fill in the missing words:

- 1.1. Organisms are built of building blocks called _____. (1)
 - 1.2. The _____ in a cell contains cell sap. (1)
 - 1.3. The _____ controls what goes into and out of a cell. (1)
 - 1.4. The DNA in a plant or animal cell is found in the _____ of the cell and is responsible for _____. (2)
- [5]**

Day 3



Topic 1.2 Cell structures

- ✓ Let's learn Terminology!

Chlorophyll: The green pigment necessary for photosynthesis to take place.

Photosynthesis: The process where plants produce oxygen and glucose.

- ✓ Let's Read!



Read through page 9 in your textbook.



- ✓ Let's sum it up!

Organelles:

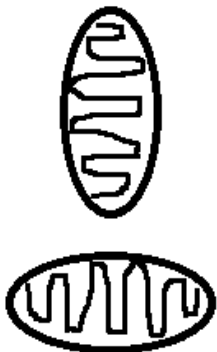
- **Mitochondria**: The organelle responsible for cellular respiration, where sugar is converted into energy for the cell to carry out life processes.
- **Vacuoles**: A space in the cell where cell sap is stored. Cell sap is a solution of sugars, salts and water.
- **Chloroplasts**: The organelles that contain chlorophyll, which use light energy to produce it's own food.



Teacher Tip!

Use these diagrams when drawing your own cell:

Mitochondrion:



Vacuole:

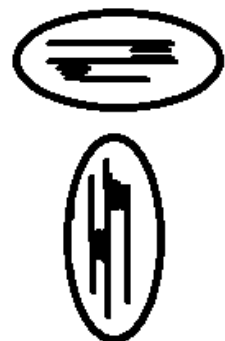
Small:



Large:



Chloroplast:





- ✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Provide the function of the following organelles:

- 1.1. Cell membrane. (2)
- 1.2. Chloroplast. (2)
- 1.3. Nucleus. (2)
- 1.4. Vacuole. (2)
- 1.5. Mitochondrion. (2)

[10]

Day 4

Topic 1.2 Differences between plant and animal cells



- ✓ Let's Read!

Read through pages 10 and 11 in your textbook.



- ✓ Let's sum it up!

We have covered the organelles that plants and animals have in common. Now we are going to cover the DIFFERENCES between plant and animal cells:

-Vacuoles: Plant cells need to store more water and sugars, so they have LARGE vacuoles.

Animal cells do not need to store as much water and sugars, so they either have SMALL or NO vacuoles.

-Cell wall: Plant cells have a cell wall; a thick layer that surrounds the outside of the cell membrane. The cell wall provides extra protection and helps the cells keep its RIGID shape.

Animal cells do not have a cell wall and have an IRREGULAR shape.

-Mitochondria: Animal cells need a lot of energy to carry out all of the necessary processes, so they have MORE mitochondria. Plant cells do not need as much energy, so they have FEWER mitochondria.

-Chloroplasts: Plant cells produce their own food and oxygen using chloroplasts, so they have MANY chloroplasts. Animal cells have NO chloroplasts.



✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Tabulate FOUR differences between plant and animal cells. (5)

2. Tabulate FOUR similarities between plant and animal cells. (5)

[10]

Day 5

Revision Exercise for Week 1



IT'S TIME TO DRAW!!

We are going to draw diagrams of both plant and animal cells, but before we start we need to revise the rules for drawing in Natural Sciences.



Diagram rules:

1. Your diagram **MUST** have a **HEADING**.
2. Your diagram **MUST** be at least **10 LINES** in size.
3. Your **DIAGRAM** must be **DRAWN** in **PENCIL**.
4. Your **LABEL LINES** must be **DRAWN** in **PEN**.
5. Your **LABEL LINES** **MAY NOT CROSS** each other.
6. Your **LABELS** must be written **UNDERNEATH** each other on the **RIGHT** side of the diagram.

• Drawing an Animal Cell:

Step 1: Give your diagram a heading.

Step 2: You are going to start your diagram by drawing your cell membrane.
Remember that your animal cells have an irregular shape.

Step 3: Draw your nucleus. Use the example provided to draw it.

Step 4: Draw multiple mitochondria. Remember that your animal cells must have more mitochondria than your plant cell.

Step 5: Draw your vacuoles. Remember that your animal cell has very few small vacuoles.

Step 6: Label your organelles in pen. Remember that your labels must be on the right side and must be underneath each other. You should have 5 labels.

- **Drawing a Plant Cell:**

Step 1: Give your diagram a heading.

Step 2: You are going to start your diagram by drawing your cell membrane and cell wall, which is a second wall around your cell membrane. Remember that your plant cell has a rigid shape.

Step 3: Draw your nucleus. Use the example provided to draw it.

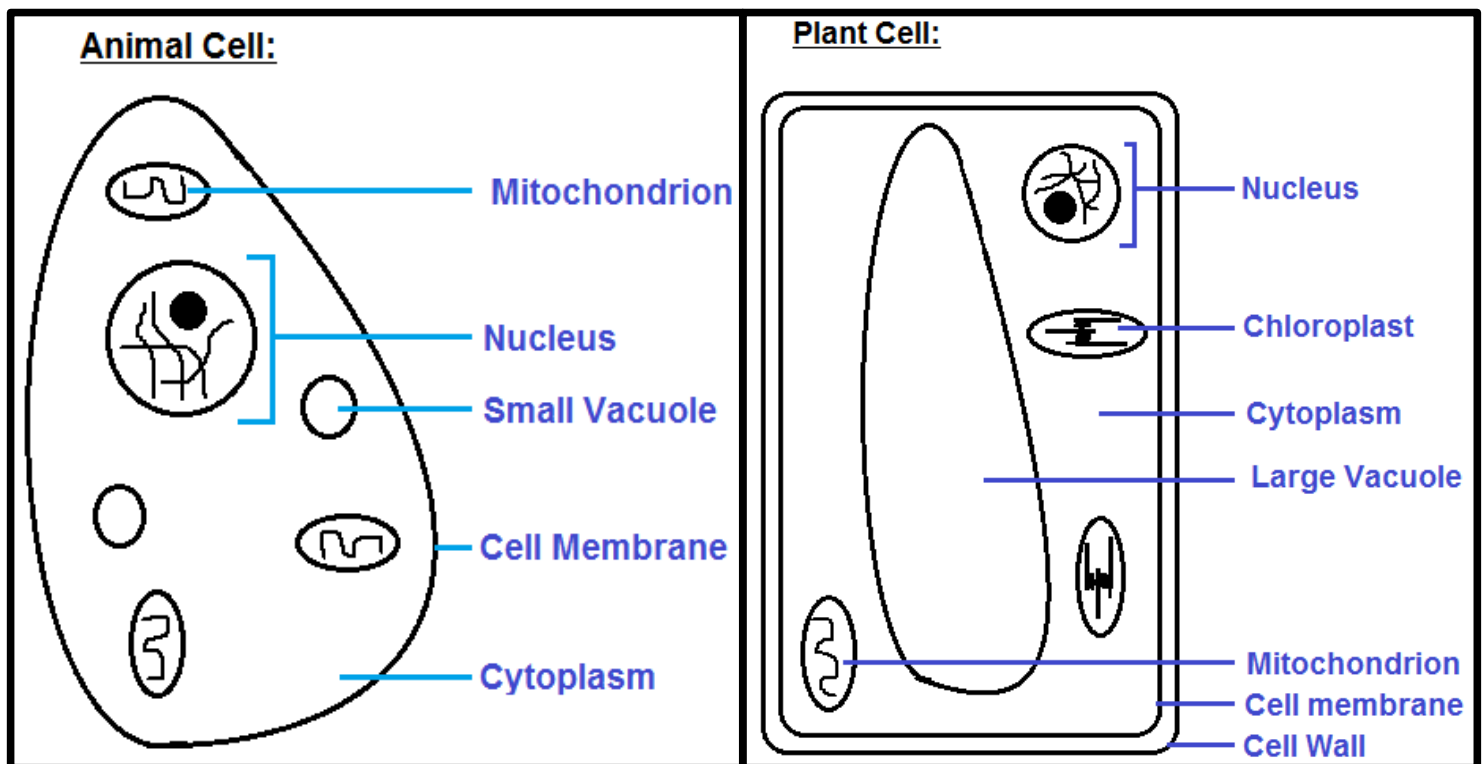
Step 4: Draw a small number of mitochondria. Remember that your plant cell must have fewer mitochondria than your animal cell.

Step 5: Draw your vacuole. Remember that your plant cell has one large vacuole.

Step 6: Draw in multiple chloroplasts. Use the example provided to draw it.

Step 7: Label your organelles in pen. Remember that your labels must be on the right side and must be underneath each other. You should have 7 labels.

Use the examples provided below to check your diagrams:



Make sure that:

- Your diagram is in pencil and your label lines are in pen.
- Your diagrams have a heading.

Congratulations on completing Week 1!!!

Day 1



Topic 1.3 Cells in tissues, organs and systems



✓ Let's learn Terminology!

Unicellular: Organisms that consists of only one cell.

Multicellular: Organisms that consist of more than one cell.

✓ Let's Read!

Read through pages 13 - 15 in your textbook.

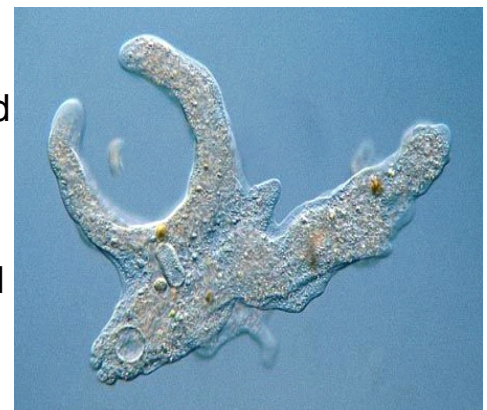
✓ Let's sum it up!



- Single-celled organisms:

Some organisms are only made up of one cell. These unicellular organisms live on their own and perform all seven life functions.

Example: In open bodies of water, like lakes and dams, you can find microscopic organisms called **amoeba**. The one on the right is capable of moving and is in the process of ingesting food.

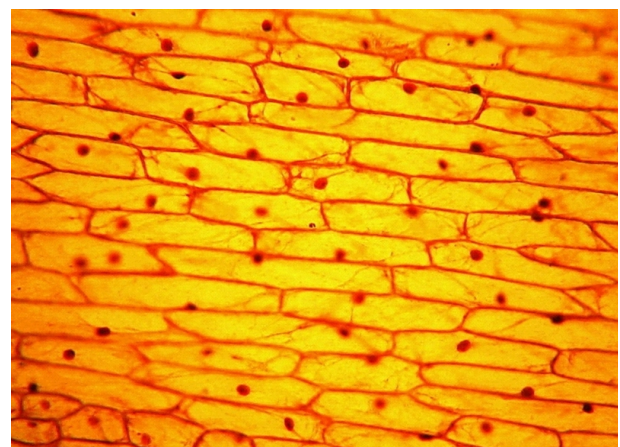


- Multicellular organisms:

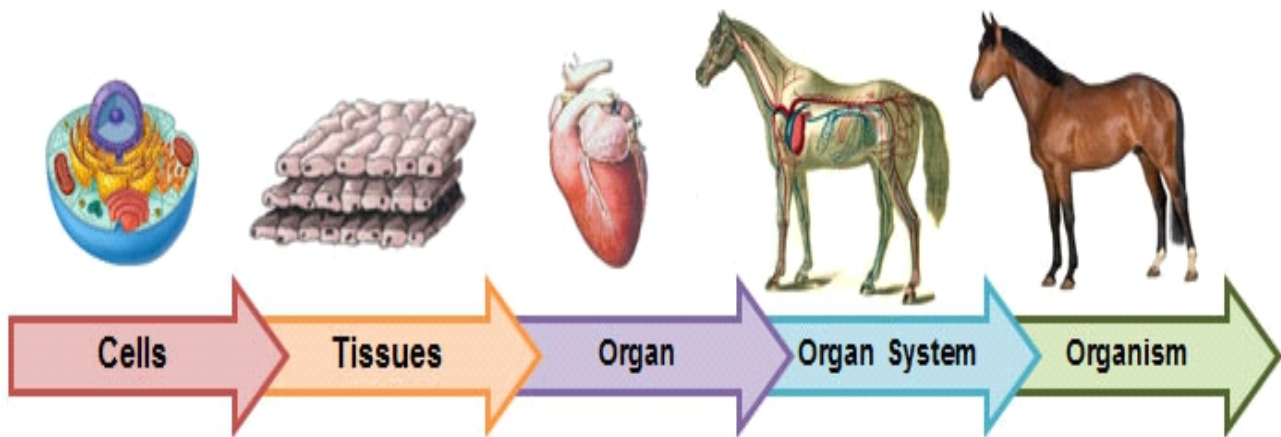
Some organisms are made up of millions of cells.

These cells are **specialised**, meaning that they have different shapes and functions. Cells that have the same specialisation work together to perform a specific function.

Example: The cells in an onion are specialised for storing water and nutrients.



A group of similar **cells** working together form **tissue**.
 Different tissues working together form an **organ**.
 A group of organs working together form an **organ system**.
 All of the organ systems work together to form an **organism**.



✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Copy the following sentences into your workbook and fill in the missing words:

- 1.1. _____ organisms such as an amoeba consist of only _____ cell. (2)
- 1.2. _____ organisms such as humans consist of millions of _____ cells. (2)
- 1.3. Cells that perform the same _____ are grouped into _____. (2)
- 1.4. Tissues that work together form _____. (1)
- 1.5. Organs working together that share a _____ form an _____. (2)

[9]

Day 2

Topic 1.3 The Microscope

✓ Let's Read!

Read through pages 15 – 16 in your textbook.

✓ Let's sum it up!

The History of the Light Microscope

In **1665** Robert Hooke looked at cork bark under his microscope and saw many rows of "small rooms" and called them *cells*.

Antony van Leeuwenhoek improved on the simple, single-lensed microscope around **1670** and was the first to describe unicellular organisms. He invented new methods to allow for further magnification.

What is a micrograph?

A **micrograph** is a photograph taken through a microscope.

The number on the micrograph shows how many times the image has been magnified.

The parts of a microscope:

The object being magnified is placed on the **stage** and is secured by the **stage clips**.

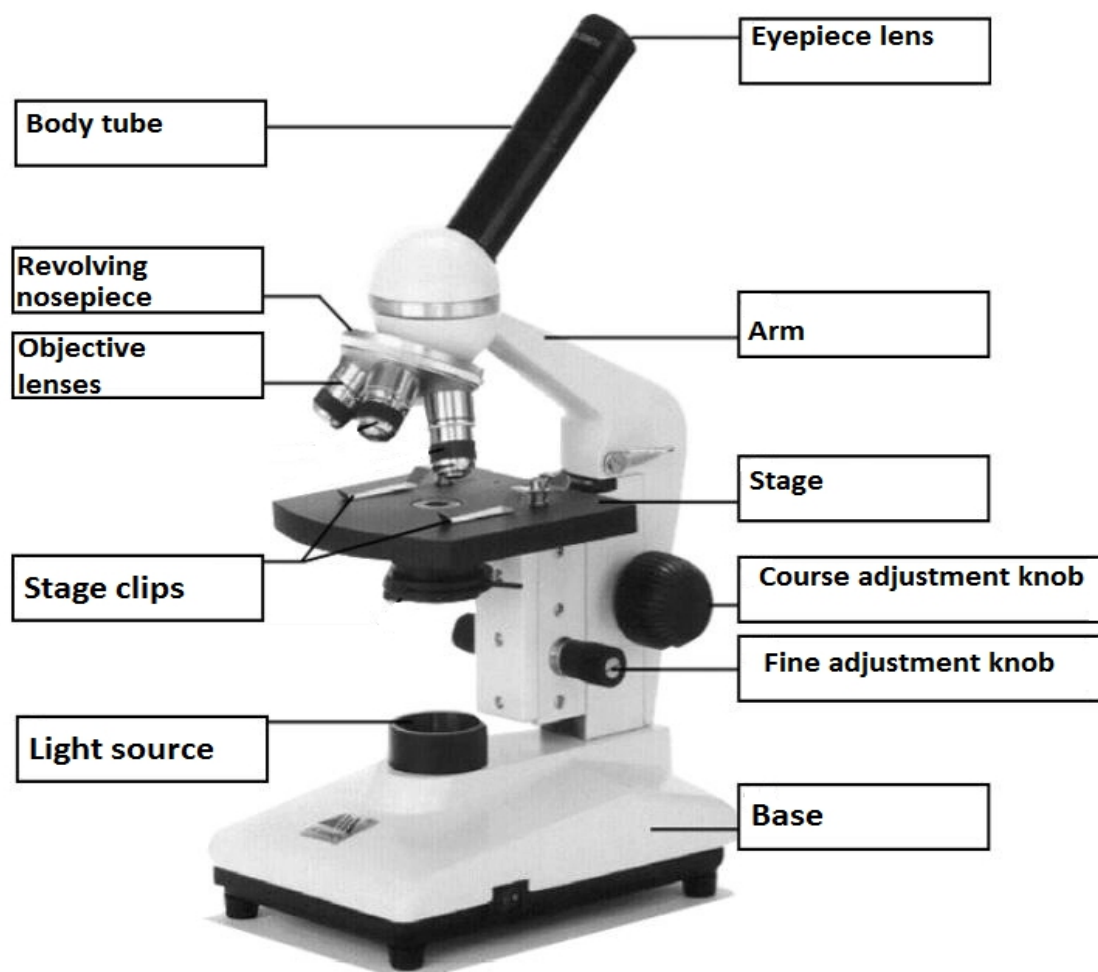
The **light source** reflects light through a hole and onto the stage.

The **objective lenses** refract light from the object to form a large, upside-down image.

The **revolving nosepiece** allows the viewer to change the magnification.

The **eyepiece lens** refracts light from the objective lens to make the image larger and turn the image the right way up.

The **adjustment knobs** control the sharpness and clarity of the image.



Day 3

Topic 1.3 Stem cells

- ✓ Let's learn Terminology!

Stem cell: An unspecialised cell that can develop into different types of cells.

- ✓ Let's Read!

Read through page 19 in your textbook.

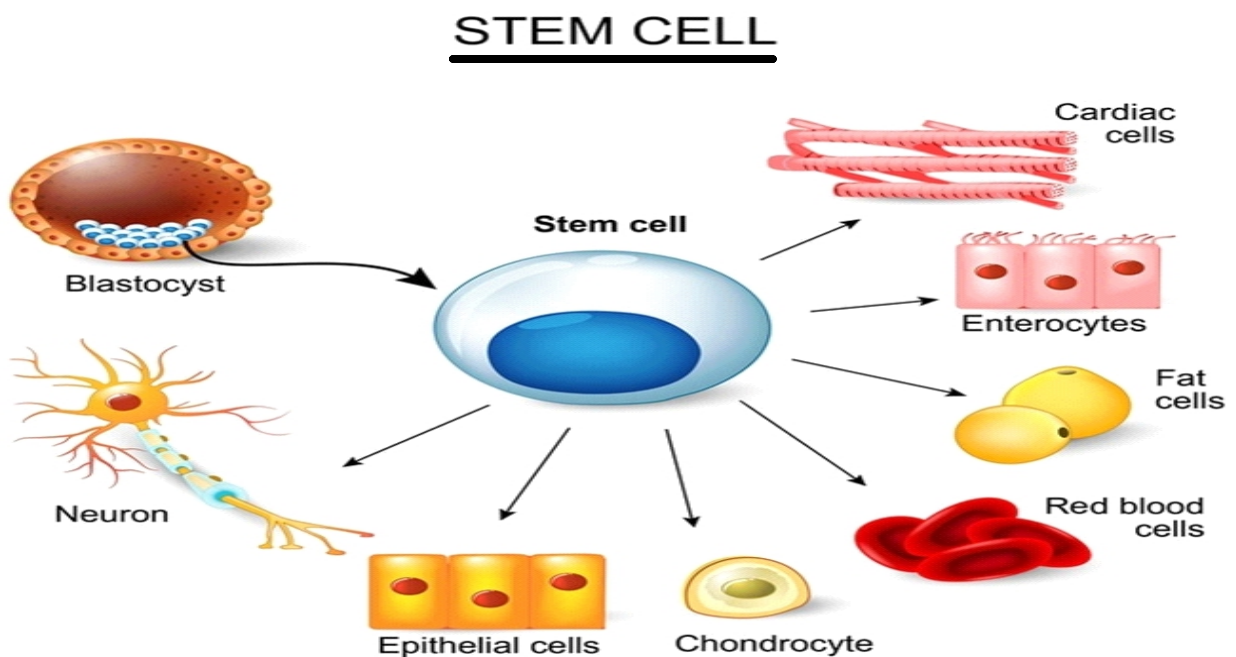
- ✓ Let's sum it up!

Stem cells are groups of cells that are **unspecialised**. This means that stem cells can change into other types of cells if they need to.

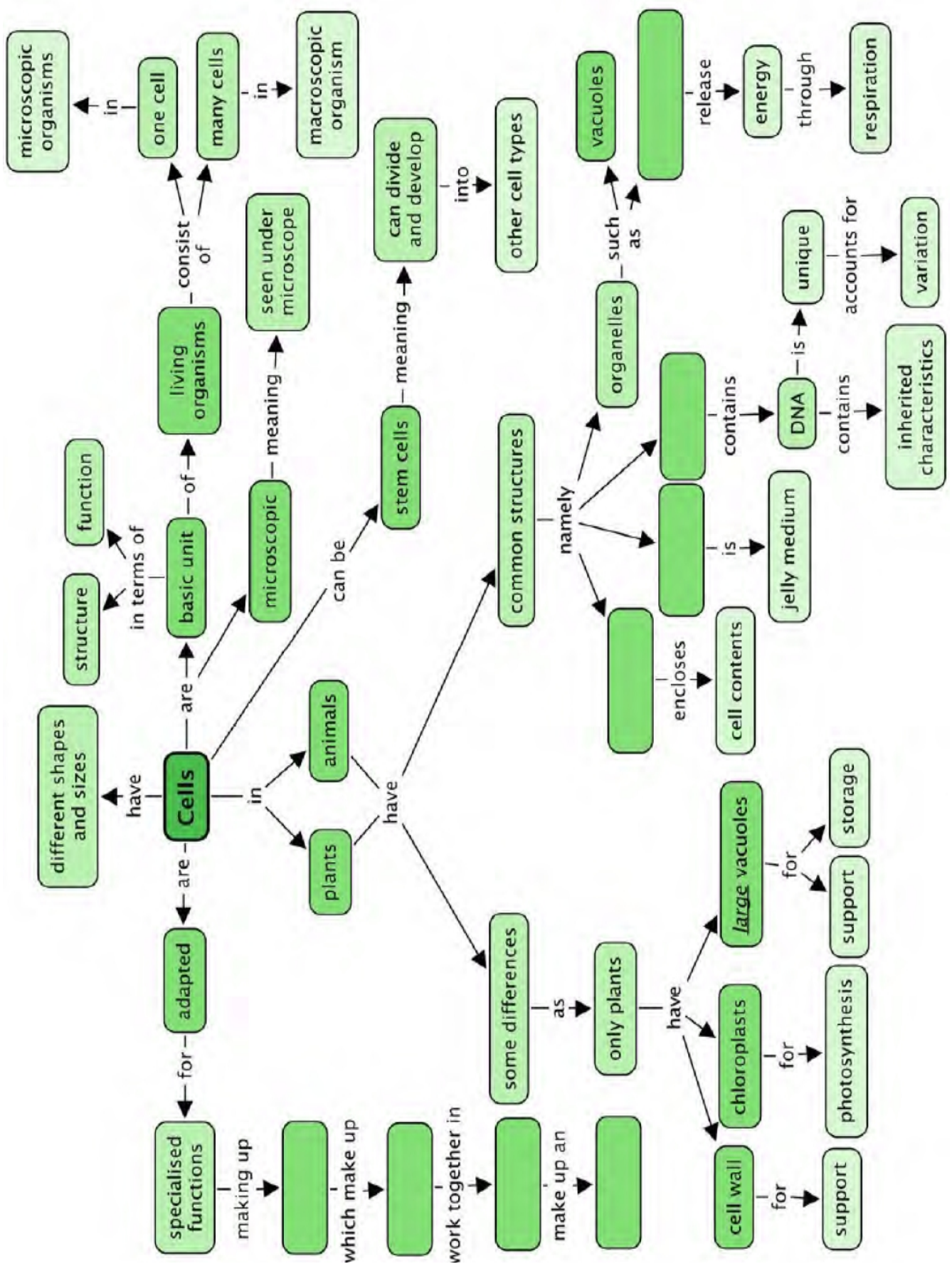
Scientists are learning to force stem cells to develop into specialised cells to treat diseases and conditions.

E.g. Diabetes is a condition where a person's body does not produce enough insulin so their body cannot break down sugars. Scientists hope to change stem cells into cells that produce insulin to treat diabetes.

Stem cells are found in a number of different places. Developing embryos contain **embryonic stem cells**, which are found in the developing embryo and the placenta. Adult stem cells are found in the bone marrow.



Day 4



Day 5

Revision Exercise for Week 2



Complete the following exercises in your workbook to revise the work covered in Week 2.

1. Draw and label a diagram of a plant cell. (5)
2. Answer the following questions:
 - 2.1. Differentiate between unicellular and multicellular organisms. (2)
 - 2.2. What do we call a group of cells that perform a specific function? (1)
 - 2.3. List and provide an explanation for each of the seven life functions. (14)
3. Provide the function for the following parts of the cell:
 - 3.1. Cell membrane. (2)
 - 3.2. Cytoplasm. (2)
 - 3.3. Chloroplast. (2)
 - 3.4. Vacuole. (2)
 - 3.5. Mitochondrion. (2)
 - 3.6. Nucleus. (2)
4. Tabulate FOUR differences between plant and animal cells. (5)
5. Tabulate FOUR similarities between plant and animal cells. (5)

[44]

Congratulations on completing Week 2!!!

Day 1

Topic 2.1 Systems in the human body



✓ Let's Read!

Read through page 22 in your textbook.



✓ Let's sum it up!

Humans are classified as living because they carry out the seven life functions. Each person can move, respire, sense their surroundings, grow, reproduce, excrete waste and take in nutrients.

All of these processes are carried out by different systems in the body. These systems are made up of different organs that work together to perform these processes.

The 7 body systems:

1. The Reproductive system
2. The Digestive system
3. The Circulatory system
4. The Respiratory system
5. The Musculoskeletal system
6. The Excretory system
7. The Nervous system

Day 2

Topic 2.1 The Reproductive system



- ✓ Let's learn Terminology!

Gamete: a male or female sex cell.



- ✓ Let's Read!

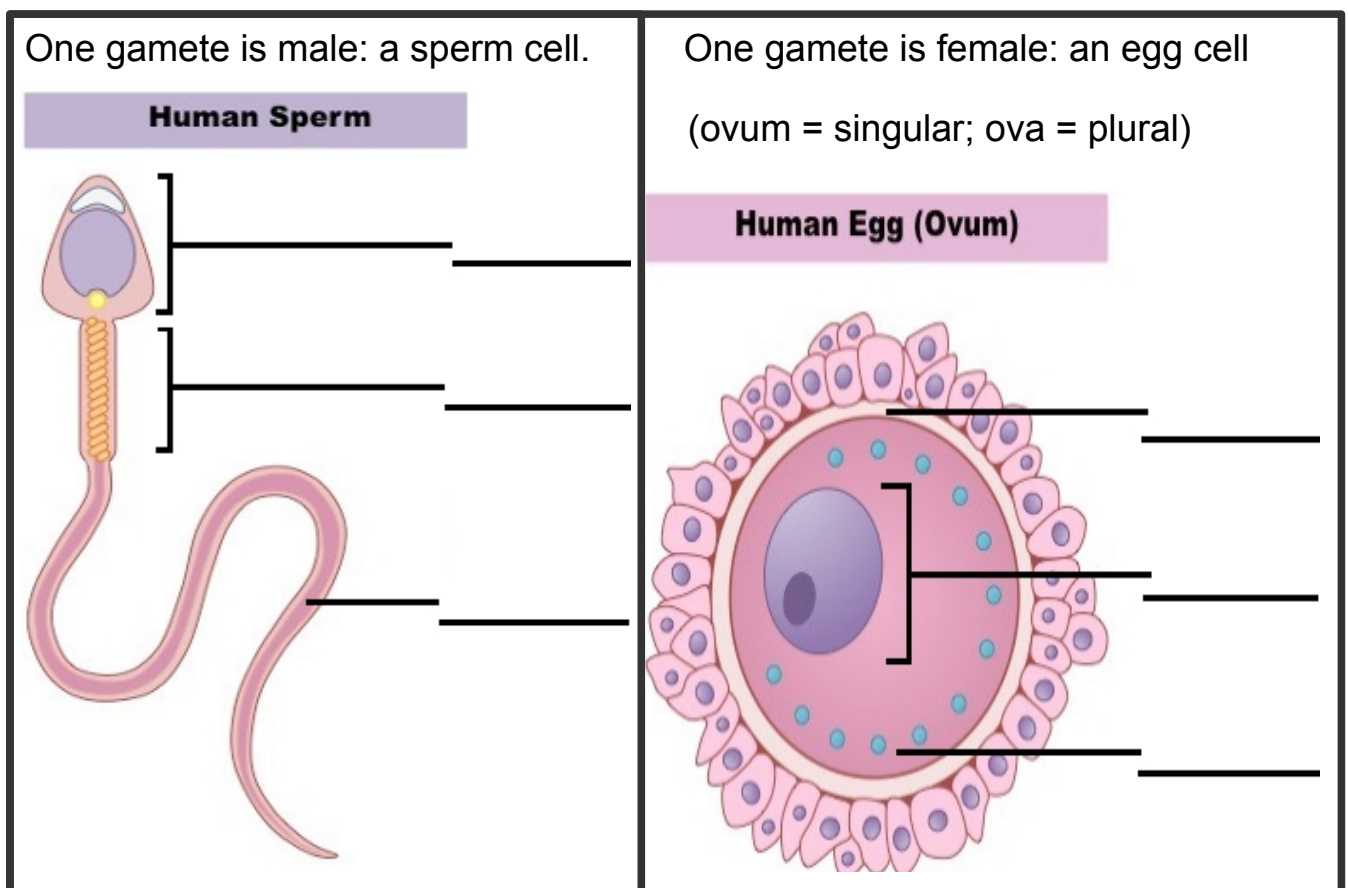
Read through pages 38 - 39 in your textbook.



- ✓ Let's sum it up!

The purpose of reproduction:

- To ensure that a species does not die out but continues to survive by producing offspring.
- Sexual reproduction happens when two sex cells, called *gametes*, join together.



Puberty:

During each stage of the human life cycle certain changes take place in the body. Puberty is the stage when most changes happen and the body begins becoming ready to reproduce.

The sex organs mature and become ready for sexual reproduction.

Puberty starts when the *pituitary gland* in the brain releases hormones into the bloodstream. These hormones are chemical messengers that tell the testes or ovaries to start working.

Once the ovaries or testes become active, they secrete sex hormones. Testes produce the sex hormone called testosterone. Ovaries produce the sex hormones called oestrogen and progesterone. These sex hormones cause changes in the body called secondary sexual characteristics.

Secondary sexual characteristics:

Girls	Boys
Growth Spurt	Growth Spurt
Underarm and pubic hair grows	Underarm and pubic hair grows
Hips become wider	Shoulders become wider
Menstruation starts	Testes and penis increase in size
Breasts develop	Body and facial hair grows
	Voice deepens



✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Give the scientific name for a sex cell. (1)
2. Provide the name of the hormone that causes:
 - 2.1. Beards to grow. (1)
 - 2.2. Breasts to develop. (1)
3. Explain what a secondary sexual characteristic is in your own words. (2)

[5]

Day 3

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through page 40 in your textbook.



✓ Let's sum it up!

Function of the male reproductive organs:

- Produce sperm cells.
- Produce male hormones (testosterone).
- Place sperm in the vagina of the female.

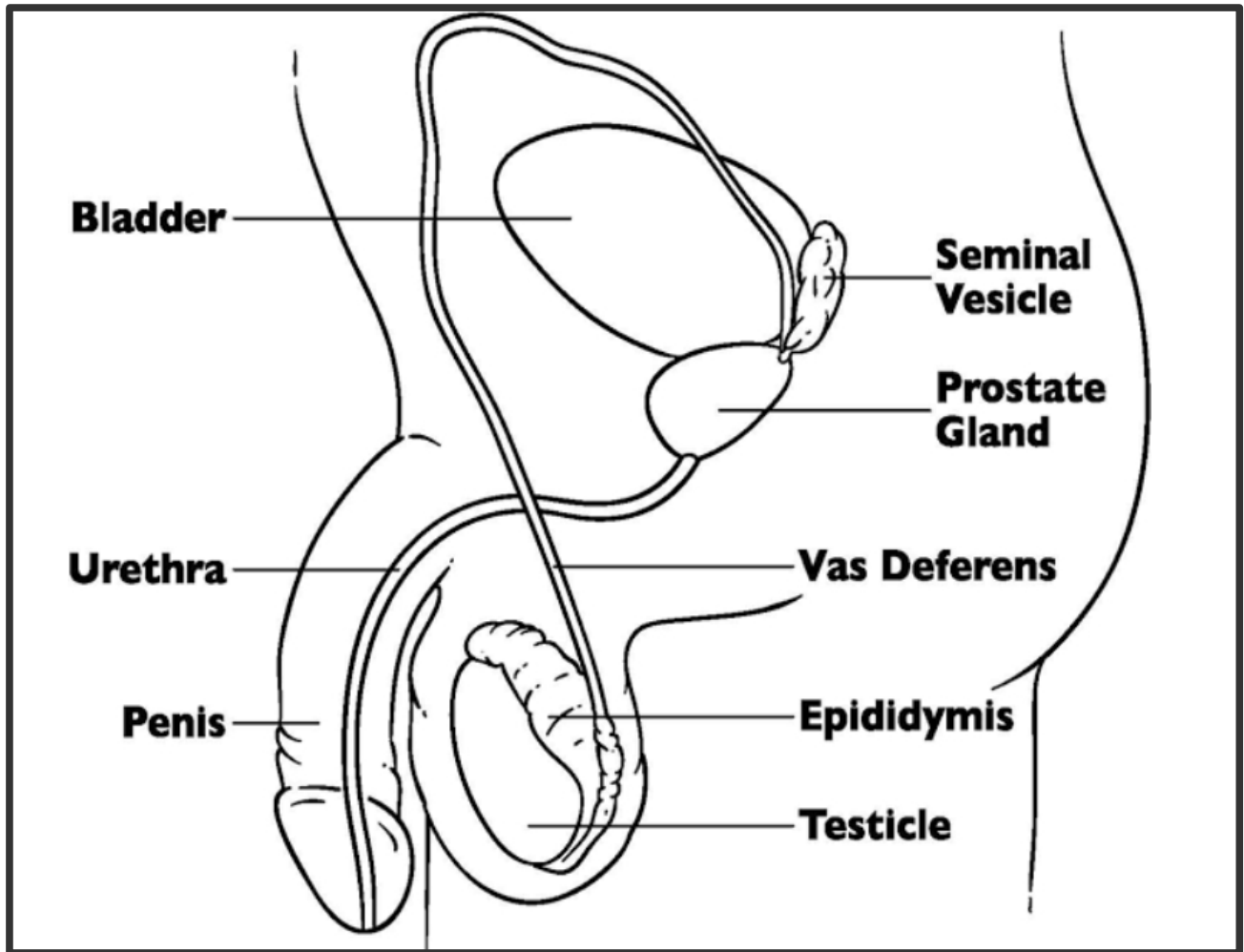
Male reproductive organs:

The penis fills with blood to stand erect so it can place sperm in the vagina during sexual intercourse. Sperm cells are made in the testes. The sperm cells are stored in the epididymis.

The sperm duct is also called the vas deferens. Sperm travels from the epididymis down the sperm duct to the urethra which runs down the centre of the penis. It transports both urine and semen to the outside, but never both at the same time.

The glands help make semen, which is the white liquid that contains sperm cells and keeps them alive.

The scrotum is a sac that holds the testes away from the body to regulate the temperature.



Day 4

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through page 41 in your textbook.



✓ Let's sum it up!

Function of the female reproductive organs:

- Produce female hormones (oestrogen and progesterone).
- Receive sperm from the male.
- Protect and nourish the unborn baby.

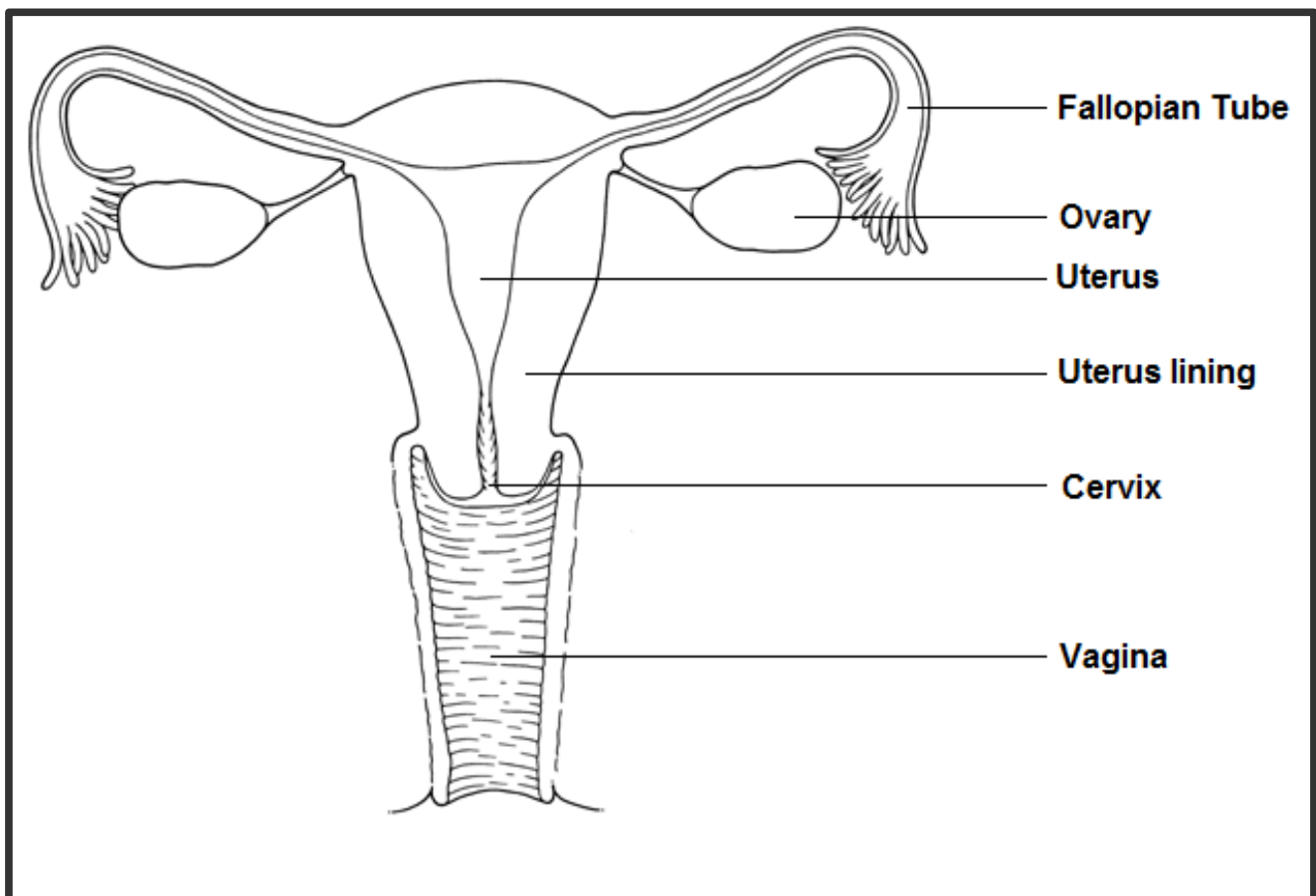
Female reproductive organs:

The uterus is where the baby develops before birth. The lining of the uterus gets thicker in case the female becomes pregnant. If not, it breaks down and passes out of the body during menstruation.

The fallopian tube (oviduct) carries an ovum (egg cell) from the ovary to the uterus. A sperm and egg cell join here after sexual intercourse.

The cervix is a narrow muscular opening leading from the vagina to the uterus. It stretches wide open during childbirth.

The vagina is a muscular passage that leads from the uterus to the outside of the body. Sperm is deposited here during sexual intercourse. The baby moves through this passage during birth.



Day 5

Revision Exercise for Week 3



Complete the following exercises in your workbook to revise the work covered in Week 3.

1. List TWO secondary sexual characteristics that occur in:
 - 1.1. Males only (2)
 - 1.2. Females only (2)
 - 1.3. Both males and females (2)

2. Provide the function for the following reproductive organs:
 - 2.1. Epididymis (2)
 - 2.2. Ovary (2)
 - 2.3. Testes (2)
 - 2.4. Fallopian tube (2)
 - 2.5. Uterus (2)

3. Draw and label a diagram of a sperm cell. Remember to apply your diagram rules. (5)

4. Draw and label a diagram of an egg cell. Remember to apply your diagram rules. (5)

5. List the parts of the male reproductive system that the sperm must travel through, starting with the testes and ending when the sperm is released out of the body. (4)

6. Provide the scientific name for the following:
 - 6.1. Egg cell (1)
 - 6.2. Oviduct (1)

[32]

Congratulations on completing Week 3!!!

Day 1

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through pages 42 - 43 in your textbook.



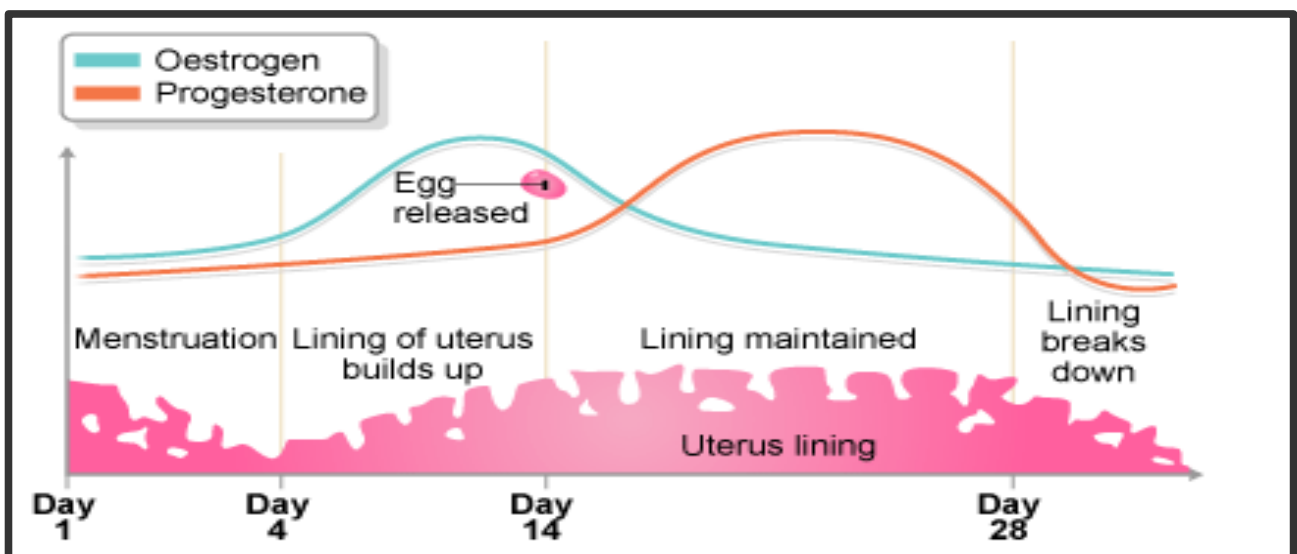
✓ Let's sum it up!

Stages of reproduction:

1. Menstrual cycle and ovulation:

28 day cycle:

- Days 1-5: Lining of the uterus breaks down and passes out the vagina. This is called menstruation, or having a period.
- Days 6-13: The lining of the uterus builds up again and becomes thicker in case of a pregnancy.
- Days 14-16: One of the two ovaries releases an ovum into the fallopian tube. This process is called ovulation. During this time the female is most likely to fall pregnant.
- Days 17-28: The lining remains thick while it waits for a fertilised egg (ovum joined with sperm) to arrive. If this does not happen, the female menstruates and the cycle begins again.



Day 2

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through pages 42 - 43 in your textbook.



✓ Let's sum it up!

2. Copulation:

Also called sexual intercourse.

The male's penis becomes erect and is placed inside the women's vagina.

The male ejaculates, which means semen is released from the penis into the vagina. The semen contains millions of sperm cells. The sperm passes through the uterus and into the fallopian tubes, where they may meet an ovum if ovulation has happened.

3. Fertilisation:

When a sperm meets an ovum, the head of the sperm enters the ovum.

Fertilisation happens when the nucleus of a sperm joins with the nucleus of an ovum. The fertilised egg is called a zygote.

Only one sperm cell can fertilise the ovum. After fertilisation occurs an extra skin forms around the ovum to prevent any other sperms from entering the ovum.

4. Implantation:

The zygote divides by cell division to form a ball of cells. This ball of cells moves down the fallopian tube towards the uterus.

It attaches and sinks into the soft, blood-rich lining of the uterus. This is called implantation.

The ball of cells grows to become an embryo.

Conception has taken place and the woman is now pregnant.

Day 3

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through pages 44 - 45 in your textbook.



✓ Let's sum it up!

5. Pregnancy:

The cells of the embryo multiply and develop into different types of tissue.

After nine weeks, the embryo begins to look like a human and is called a foetus.

Pregnancy, also called the gestation period, lasts for roughly 39 – 40 weeks.

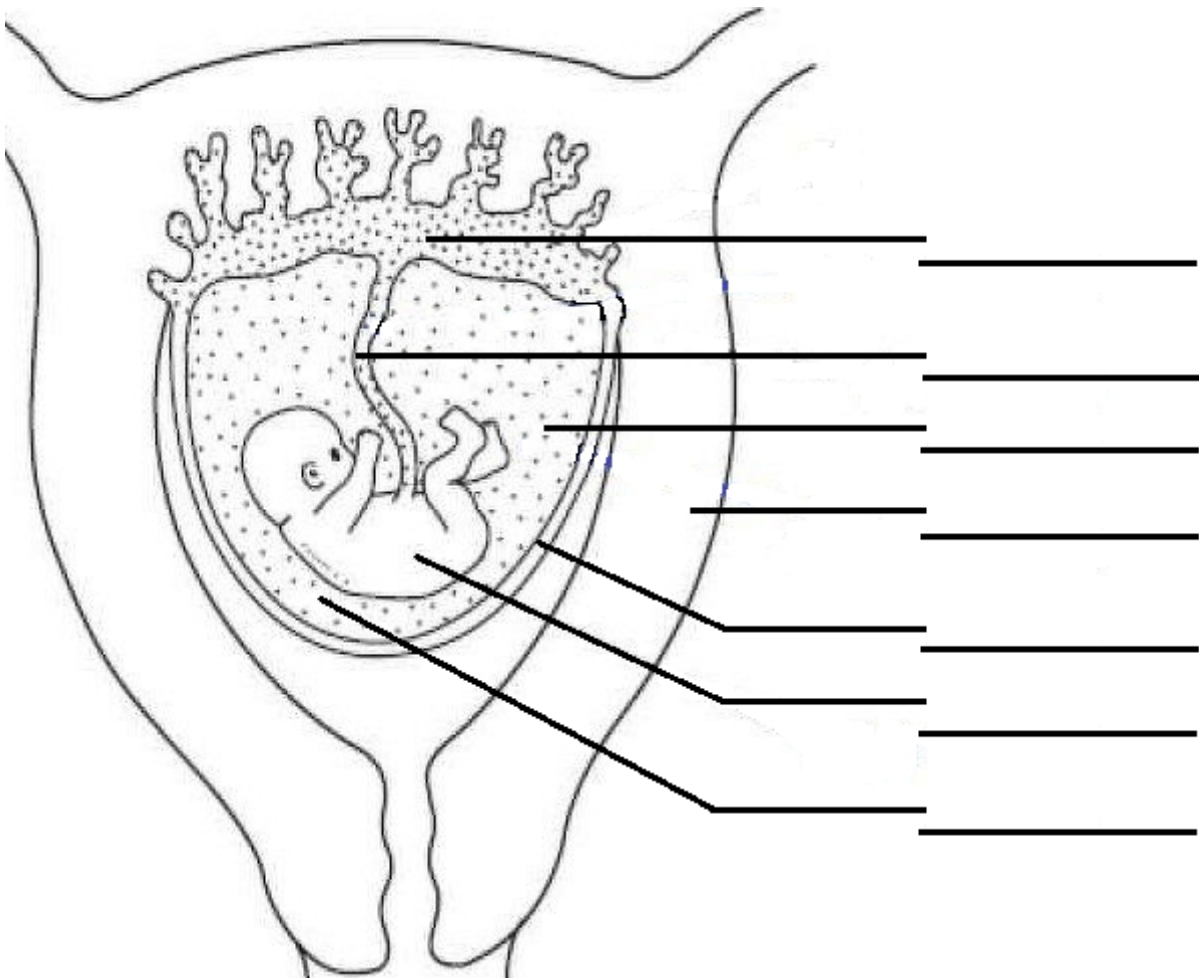
5.1. How is the foetus kept alive in the womb?:

The placenta forms in the wall of the uterus when a female is pregnant. It leaves the body after birth.

The umbilical cord connects the foetus to the placenta and therefore to the mother. The umbilical cord and placenta transport food and oxygen from the mother to the foetus, as well as removing waste products such as carbon dioxide.

In the placenta, a thin membrane separates the mother's blood from the blood of the foetus. The two systems do not mix, but dissolved substances can move between them through diffusion.

The amnion is a bag with watery liquid inside that surrounds the foetus. It keeps the temperature steady and protects the foetus from small shocks.



6. Birth of the baby:

After around 39 weeks, the muscles in the uterus start to contract. This is the start of labour. The contractions become stronger and more regular. The amnion bursts and the fluid escapes through the vagina. This is known as the water breaking. Shortly afterwards the uterus contracts powerfully, the cervix dilates (opens wide), and the baby is pushed through the vagina. The placenta leaves the mother's body through the vagina after birth.



✓ Did you understand the work?

1. Explain what happens to the lining of the uterus if the egg cell is fertilised. (3)
- 2.1 Explain the function of the umbilical cord. (3)
- 2.2. Explain why a pregnant woman should not smoke, drink or take drugs. (2)
3. Provide the functions of the amnion. (2)

[10]

Day 4

Topic 2.1 The Reproductive system



✓ Let's Read!

Read through pages 45 - 47 in your textbook.



✓ Let's sum it up!

Unhealthy lifestyle during pregnancy:

Just as nutrients and oxygen pass through the placenta from the mother to the child, harmful substances can pass to the foetus as well.

Cigarettes: Harmful substances enter the mother's blood and to the foetus. The foetus is starved of oxygen and its heart becomes stressed. The baby will have a low birth weight and will struggle for survival.

HIV/AIDS: The virus can pass from the mother to the foetus during birth and through breastmilk. Without medicine, the baby will only survive a few months.

German measles: If a woman contracts German measles during the first 12 weeks of pregnancy, it can cause the baby to be born blind and with a heart defect.

Medicine and drugs: Some medicine taken during pregnancy can cause birth defects. A pregnant woman should only take medicines prescribed by a doctor.

Alcohol: If a pregnant woman drinks alcohol, she puts her baby at risk of foetal alcohol syndrome (FAS), which can cause brain damage and growth problems.

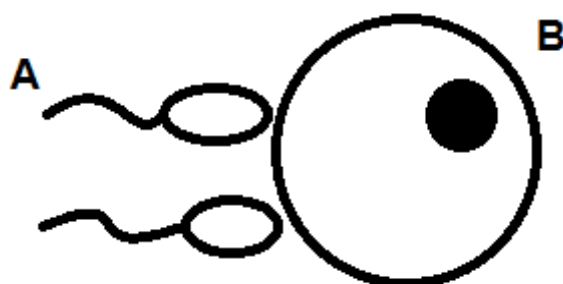
Poor diet and a lack of exercise: A poor diet can mean that the baby does not get enough of the right nutrients which will weaken the baby. A lack of exercise can weaken the mother's body and make giving birth more difficult.

Day 5

Revision Exercise for Weeks 3 & 4

 Complete the following exercises in your workbook to revise the work covered in Weeks 3 & 4.

1. Study the diagram below and answer the questions that follow.



- 1.1. Provide the name of the cell labelled A. (1)
- 1.2. Provide the name of the cell labelled B. (1)
- 1.3. Give the scientific name for the type of cell for cells A and B. (1)
- 1.4. Give the name of the reproductive organ that produces cell A. (1)
- 1.5. Give the name of the reproductive organ that produces cell B. (1)

2. Refer to the male reproductive system and provide the name of the structure that:
 - 2.1. Carries sperm from the testes to the urethra. (1)
 - 2.2. Passes semen to the vagina of the female. (1)
 - 2.3. Carries urine and semen at different times. (1)
 - 2.4. Stores sperm cells. (1)

3. Refer to the female reproductive system and provide the name of structure that:
 - 3.1. Receives sperm during copulation. (1)
 - 3.2. Produces egg cells. (1)
 - 3.3. Breaks down during menstruation. (1)
 - 3.4. Transports egg cells to uterus. (1)

4. Explain whether or not a woman will be able to fall pregnant if ONE of her oviducts is blocked. (3)

[16]

Day 1



Topic 2.1 The Digestive system



- ✓ Let's learn Terminology!

Soluble: A substance that can be dissolved in a liquid.

Insoluble: A substance that cannot be dissolved in a liquid.



- ✓ Let's Read!

Read through page 24 in your textbook.



- ✓ Let's sum it up!

- Functions of the digestive system:

- It breaks down food into smaller pieces until it can be absorbed into the blood.
- The blood transports the nutrients to all the cells in your body that then use the nutrients for energy.

- Processes of the digestive system:

Ingestion: Food is taken into the body via the mouth. When the food is swallowed, it moves down a tube called the oesophagus.

Digestion: Large insoluble food particles are broken down into smaller soluble particles. This process starts in the mouth when you chew the food and continues in the stomach and small intestine where food is dissolved in stomach juices.

Absorption: Soluble nutrients move through the walls of the intestines into the bloodstream.

Egestion: Insoluble and undigested food is removed from the body through an opening at the end of the digestive tract called the anus.

- Components of the digestive system:

The *alimentary canal* starts at the mouth and ends at the anus. Each part is adapted for its specific function.

1. **Mouth**: Teeth chew and grind food.
Tongue moves food and pushes food to the oesophagus.
Enzymes in saliva begin breaking down food.
2. **Oesophagus**: Long tube that connects the mouth and stomach.
Food pieces are pushed down with wave-like movements called *peristalsis*.
3. **Stomach**: Muscular sac-like organ.
Digestive juices break down food further.
Digestive juices consist of enzymes and weak hydrochloric acid.
4. **Small intestine**: Digestive juices complete digestion.
Nutrients are absorbed by the lining of the intestinal wall.
5. **Large intestine**: Undigested food moves into the large intestine.
Water is re-absorbed from waste.
6. **Rectum**: Final part of the large intestine.
Ends in the anus.
7. **Anus**: Faeces leaves the body through egestion.



✓ Did you understand the work?

Complete the following exercise in your workbook.

1. Explain the function of the digestive system. (2)
2. Provide the name of the component(s) where the following processes take place:
 - 2.1. Ingestion. (1)
 - 2.2. Digestion. (3)
 - 2.3. Absorbtion. (2)
 - 2.4. Egestion. (1)

[9]

Day 2

Topic 2.1 The Digestive system

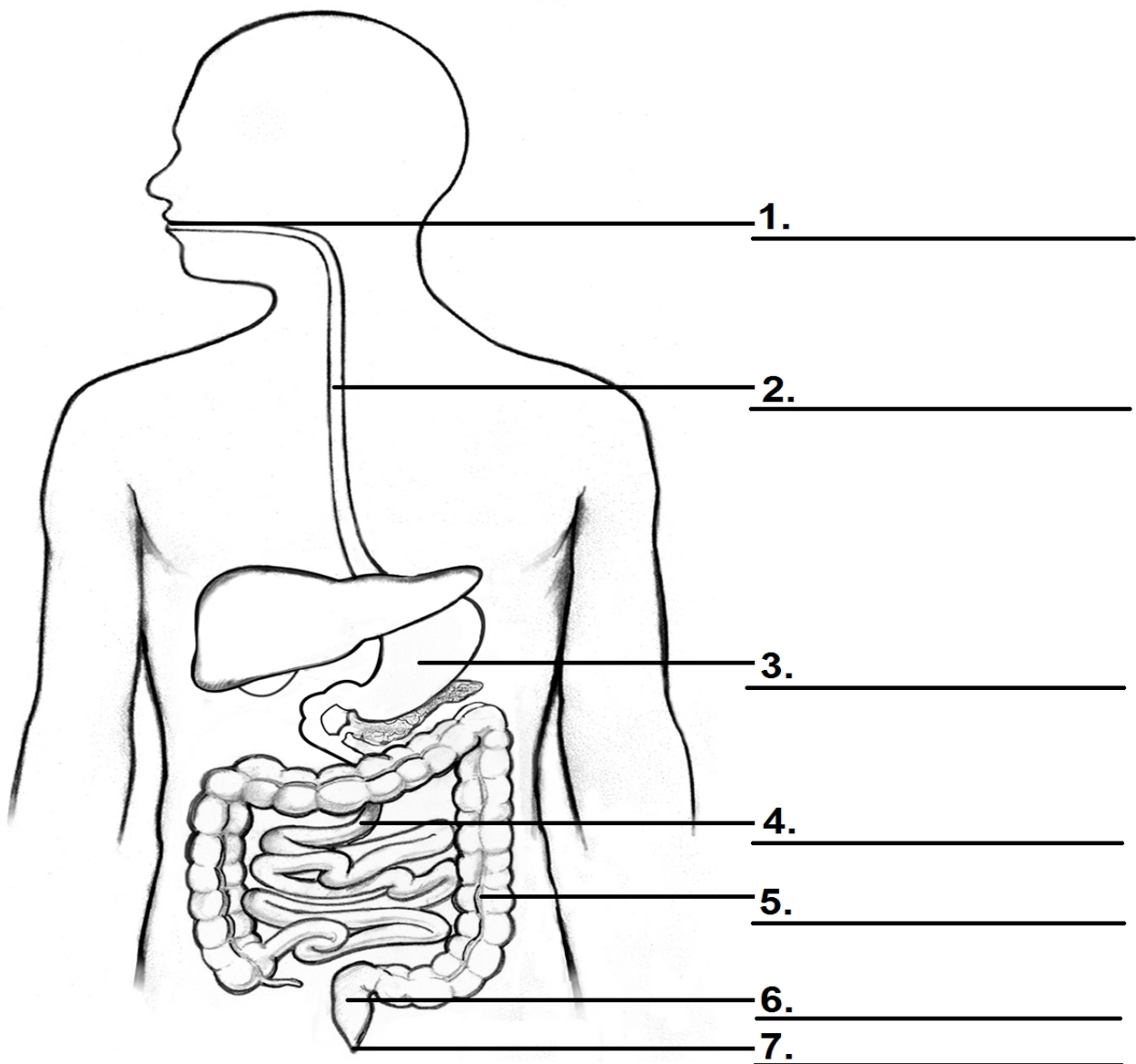
✓ Let's Read!

Read through pages 24 - 25 in your textbook.



✓ Let's sum it up!

Label the diagram of the Digestive system:



Digestion:

There are two types of digestion:

Mechanical digestion:

- Food is mechanically broken down:
- In the mouth where it is cut and crushed by teeth.
- In the stomach where muscles churn the food.

Chemical digestion:

- Food is chemically broken down by digestive juices:
- Saliva in the mouth.
- Digestive juices contain hydrochloric acid in the stomach and small intestines.

Health issues of the digestive system:

Ulcers: Sores that form in different parts of the digestive system. They can be caused by irritating foods, bacteria, alcohol abuse, drugs or smoking.

Anorexia nervosa: A mental disorder where the person suffering has an abnormal fear of gaining weight and therefore starves themselves.

Diarrhoea: When a person passes frequent watery stools. Undigested food passes through the intestines too quickly for water or nutrients to be absorbed. It can be caused by eating contaminated food or drinking polluted water.

Liver cirrhosis: Healthy liver tissue becomes hard and scarred and cannot function properly. It can be caused by alcohol abuse and eating unhealthily.



- ✓ Did you understand the work?

Complete the following exercise in your workbook:

1. State which processes take place in the following components:
 - 1.1. Mouth. (2)
 - 1.2. Stomach. (1)
 - 1.3. Small intestine. (2)
 - 1.4. Large intestine. (1)
 - 1.5. Anus. (1)
2. Provide the names of the health issues that can develop with excessive alcohol consumption. (2)
3. Explain the function of the enzymes and hydrochloric acid found in the stomach. (2)
4. Briefly explain in your own words the components and their processes that will affect an apple from the moment it is ingested to the moment it is egested. (10)

[21]

Day 3

Topic 2.1 The Digestive system



- ✓ Let's Read!

Read through page 56 in your textbook.



- ✓ Let's sum it up!

The digestive system and a healthy diet:

The food you eat serves multiple functions in your body:

- Fuel for energy and warmth.
- Provides substances for growth.
- Allows the body to repair and replace worn and damaged tissue.
- Helps fight disease and keep the body healthy.

The food you eat is called your *diet*.

Your diet must contain a variety of foods to get all of the nutrients that your body needs.

Components of a healthy diet:

The nutrients your body needs can be put into 3 categories based on what they do:

Energy producers: Carbohydrates (starches and sugars)

Fats and oils

Body builders: Proteins

Protectors: Vitamins and minerals

Your body also needs water and fibre for a healthy diet.

Day 4

Topic 2.1 The Digestive system



✓ Let's Read!

Read through page 60 - 61 in your textbook.

✓ Let's sum it up!



Malnutrition:

In order to keep your body healthy you need to take in enough nutrients. If you eat too much of the wrong types of food or not enough of another, this can lead to malnutrition.

Eating too little food over long periods of time can lead to starvation. The body wastes away and cannot fight off diseases.

Eating too little of a specific type of food can lead to deficiency diseases:

- Kwashiorkor (lack of protein)

- Rickets (lack of vitamin D)
- Beriberi (lack of vitamin B)

Eating more food than the body needs causes the body to store the extra food as fat and causes the body to become overweight.

A person that is very overweight is called obese.

Being obese causes fatty layers to build up in the arteries. This fatty layer contains cholesterol, which can block blood flow in the arteries and cause high blood pressure.

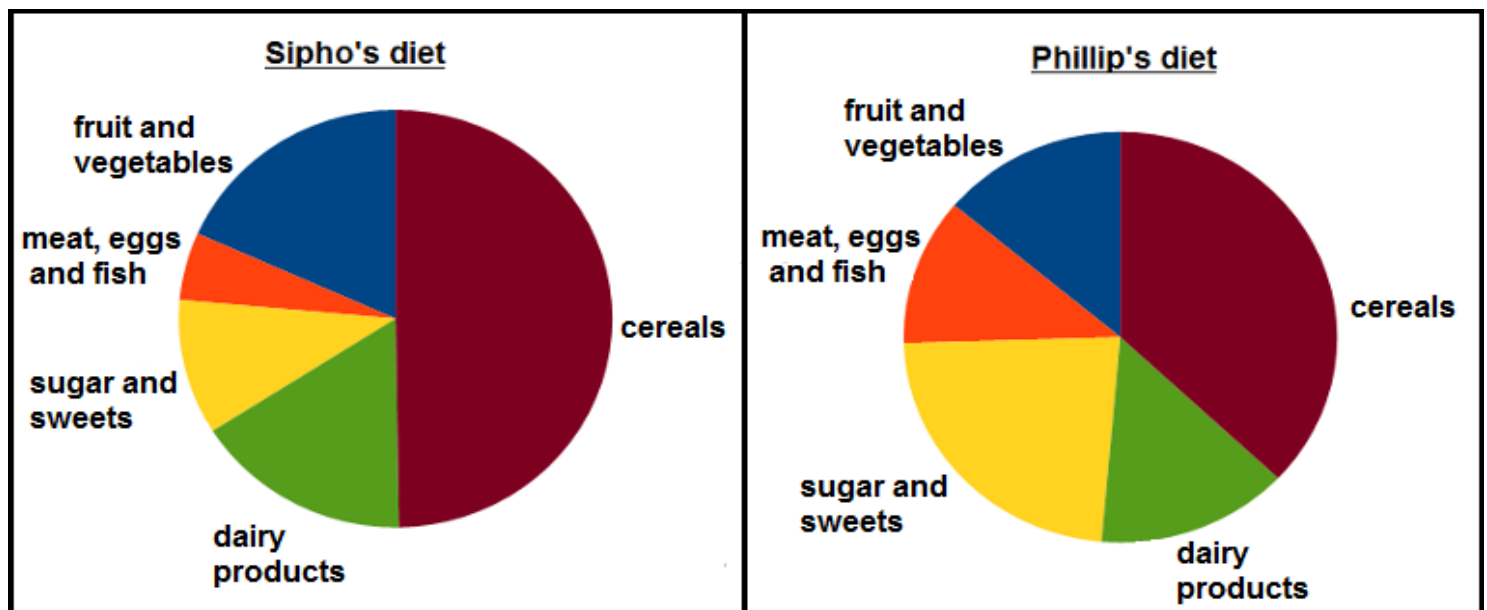
This increases the risk of a heart attack or stroke.

Being obese can also cause diabetes.



✓ Did you understand the work?

Complete the following exercise in your workbook:



- From the graphs, determine which person:
 - Eats more meat. (2)
 - Eats more fruit than sweets. (2)
- Explain how Phillip's diet may affect his health. (1)
- Predict the medical condition Sipho may be affected by due to his diet. (2)

[5]

Day 5

Revision Exercise for Week 5



Complete the following exercises in your workbook to revise the work covered in Week 5.

1. Provide the function for the following components of the digestive system:
 - 1.1. Large intestine (2)
 - 1.2. Stomach (2)
 - 1.3. Small intestine (2)
2. Name and explain the TWO types of digestion that takes place in the mouth. (4)
3. Provide the name(s) of the components that are responsible for performing:
 - 3.1. Egestion (1)
 - 3.2. Absorbtion (2)
 - 3.3. Ingestion (1)
 - 3.4. Digestion (3)
4. Name the negative effects of a diet that:
 - 4.1. does not have enough protein. (1)
 - 4.2. has too much fat. (1)
 - 4.3. does not have enough vitamin B. (1)

[20]

Congratulations on completing Week 5!!!

Day 1



Topic 2.1 The Circulatory system



✓ Let's Read!

Read through page 26 in your textbook.

✓ Let's sum it up!



Functions of the circulatory system:

- Brings oxygen, water and nutrients to the cells.
- Transports waste such as carbon dioxide away from the cells.

The main process of the circulatory system is to circulate blood between the heart, lungs and the rest of the body.

Components of the circulatory system:

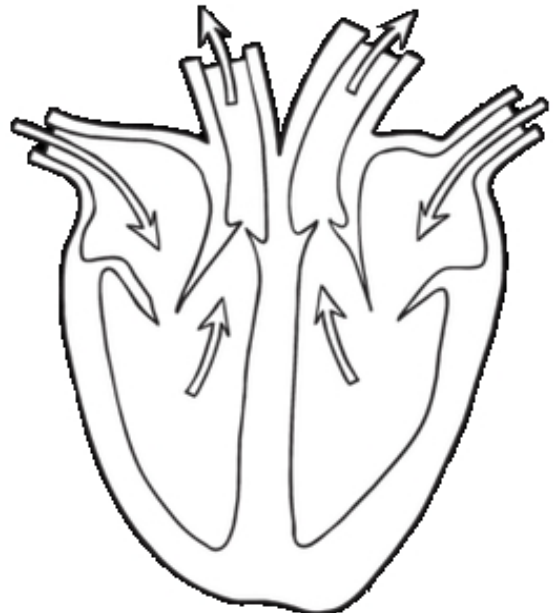
1. The heart:

Divided into four chambers.

Two upper chambers are called atria (single = atrium).

Two lower chambers are called ventricles (single = ventricle)

One-way valves between the chambers in the heart keep the blood flowing in the right direction.



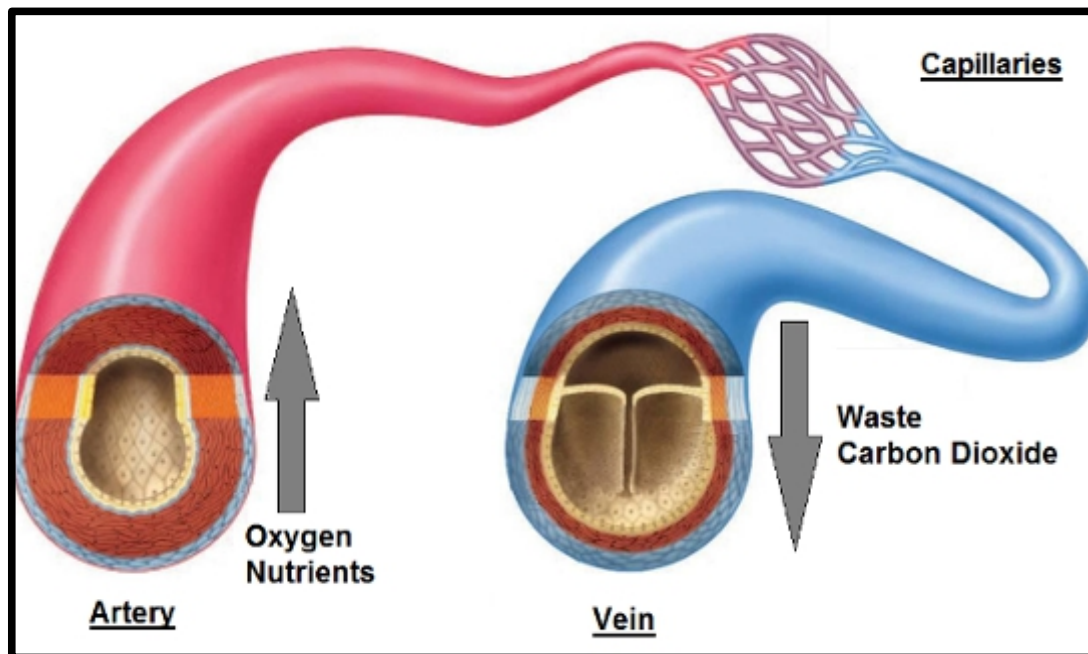
2. The blood vessels:

The heart pumps blood around the body through a network of tubes called *blood vessels*. There are three types of blood vessels:

Arteries: Blood leaves the heart at high pressure through the arteries with thick muscular walls which takes blood to different parts of the body.

Capillaries: The arteries divide into smaller, narrower tubes called capillaries. Every living cell in the body is close to a capillary so it is easy to receive oxygen, water and nutrients and to get rid of waste.

Veins: Blood from the capillaries move into wider tubes with thin muscular walls called veins that take blood back to the heart.



3. Blood:

Blood is the fluid that moves in the blood vessels and transports substances around the body. It consists of:

- The clear liquid, plasma.
- Red blood cells, which transport oxygen.
- White blood cells, which protect your body from infections.
- Platelets, which help blood to clot.

Day 2

Topic 2.1 The Circulatory system



✓ Let's Read!

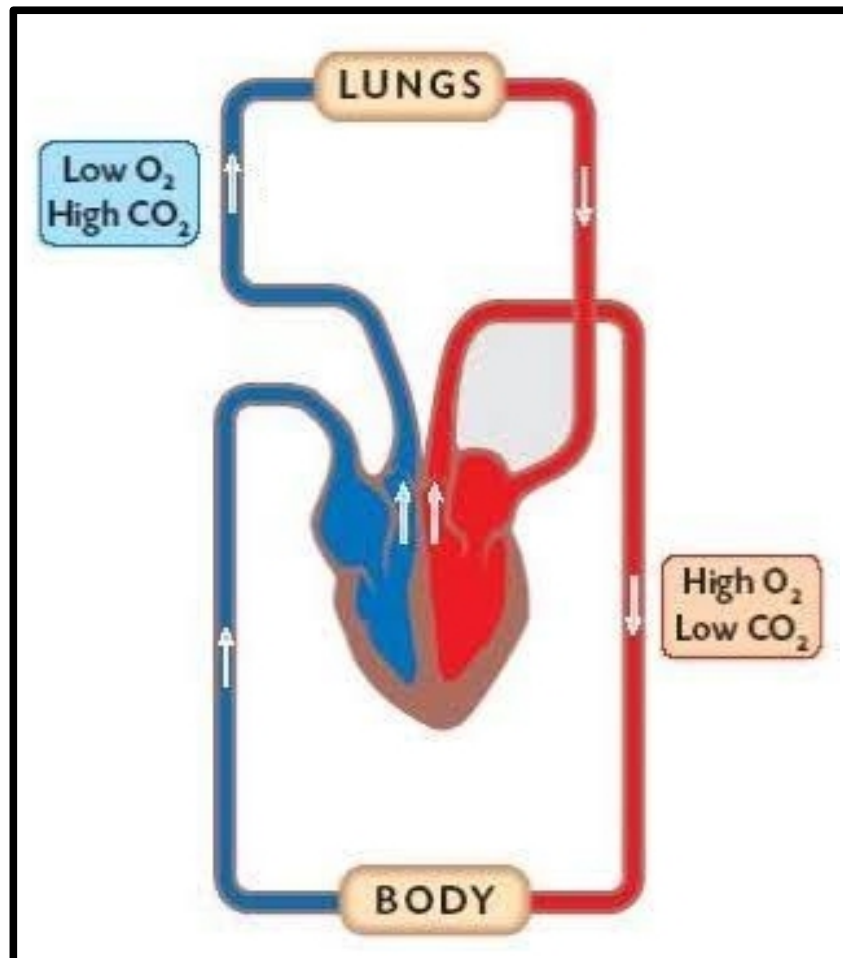
Read through pages 26-27 in your textbook.



✓ Let's sum it up!

Double circulation:

- Blood passes through the heart twice during one complete circulation.
- First, oxygen-poor blood (deoxygenated blood) is pumped from the left side of the heart to the lungs where the blood absorbs oxygen.
- The now oxygen-rich blood (oxygenated blood) returns to the right side of the heart where it is pumped to the rest of the body to deliver oxygen to the cells.



Health issues of the circulatory system:

High blood pressure: Also called hypertension, this is dangerous because it has no obvious symptoms. Over time it may damage the blood vessels and if a blood vessel ruptures (bursts) inside a vital organ, the affected person can die.

Heart Attack: When the blood supply to the heart muscle is blocked, it can cause a heart attack. This causes heart muscle tissue to die and the heart to stop functioning properly. A common symptom is a sharp pain in the centre of the chest which spreads to the left arm.

Stroke: When the blood supply to the brain is interrupted, a person can suffer from a stroke. The brain can be damaged and the person may become paralysed in parts of their body, experience numbness and have trouble speaking.



✓ Did you understand the work?

1. Provide the names of the three components of the circulatory system. (3)
2. Tabulate TWO differences between arteries and veins. (4)
3. Write a paragraph detailing the flow of blood through the circulatory system. Begin your paragraph with deoxygenated blood being pumped from the left side of the heart. (5)
4. Explain how eating lots of fatty foods increases your chance of having a heart attack or stroke. (3)

[15]

Day 3

Topic 2.1 The Respiratory system



- ✓ Let's learn Terminology!

Diffusion: The process where a gas or liquid moves from a high concentration to a low concentration.



- ✓ Let's Read!

Read through pages 28 - 29 in your textbook.



- ✓ Let's sum it up!

- Functions of the respiratory system:

- Supplies the body with oxygen.
- Removes the waste gas carbon dioxide.

- Processes of the respiratory system:

Breathing: The movement of air into and out of the lungs. Breathing in is called *inhalation*. Breathing out is called *exhalation*.

Gaseous exchange: The gases oxygen (O₂) and carbon dioxide (CO₂) are exchanged in your lungs and in your cells. This happens by means of diffusion, where the gases move from a high concentration to a low concentration.

Respiration: The reaction inside your cells between oxygen and glucose, where energy is released and CO₂ and water are formed as by-products.



- ✓ Did you understand the work?

1. Explain the following terms in your own words:

1.1. Breathing.

(2)

1.2. Gaseous exchange.

(2)

1.3. Diffusion.

(2)

1.4. Respiration.

(2)

[8]

Day 4

Topic 2.1 The Respiratory system



✓ Let's Read!

Read through pages 28 - 30 in your textbook.



✓ Let's sum it up!

- Components of the respiratory system:

1. **Nose:** Air enters the body here.

Hair in the nostrils filter air and remove dust.

Blood vessels warm air and mucous moistens air.

2. **Trachea:** Passage of air in and out of the lungs.

Has C-shaped cartilaginous rings for support.

Divides into two tubes called bronchi.

3. **Lung:** Spongy cone-shaped organ.

Contains the bronchioles and alveoli.

4. **Bronchus:** Plural = bronchi.

Allows air in and out of the lungs.

Circular cartilaginous rings for support.

Divides into narrower tubes called bronchioles.

5. **Bronchiole:** Plural = bronchioles.

Small tubes leading to alveoli.

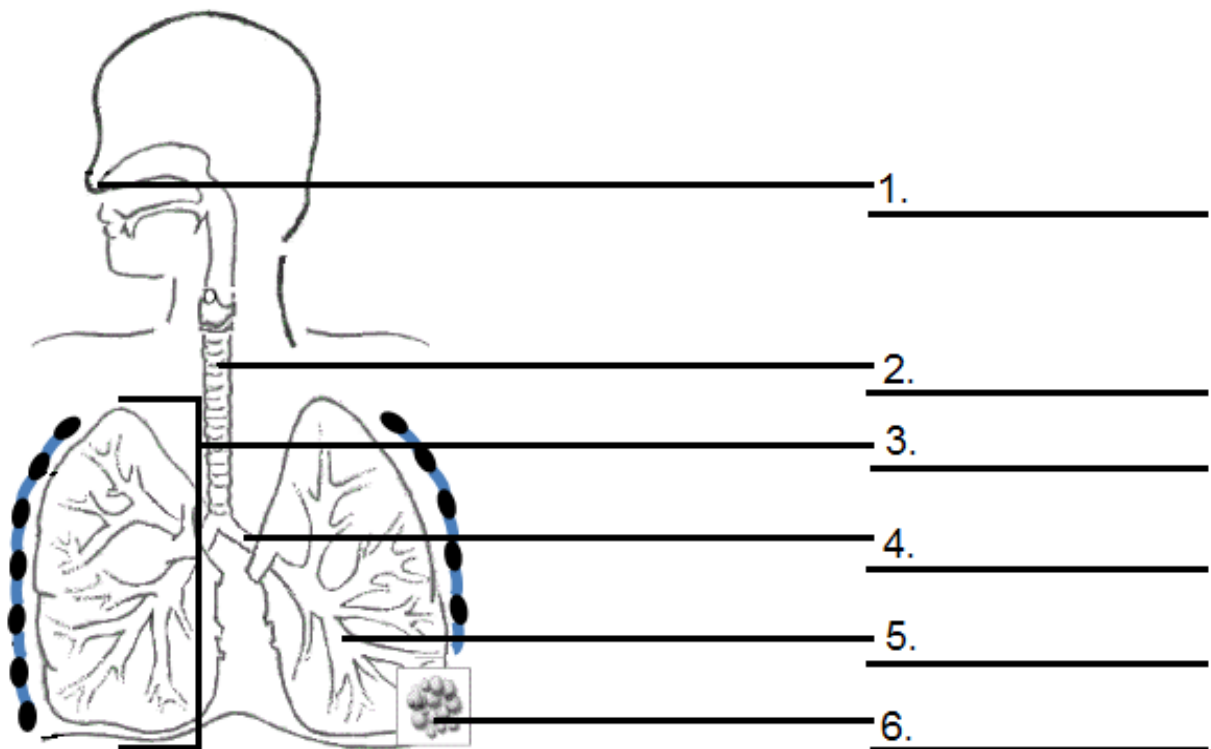
6. **Alveolus:** Plural = alveoli.

Cup shaped pouch.

Surrounded by network of capillaries.

One layer of cells thick.

Label the diagram of the Respiratory system:



- Health issues of the respiratory system:

Asthma: A condition where the airways are sensitive and easily irritated. If irritated, the lining of the airways swell, producing more mucus. This narrows the airways making it difficult to breathe.

Lung cancer: Cells in the lungs grow out of control and form a tumour. This causes chest pains, shortness of breath, a constant cough or wheezing and weight loss.

Bronchitis: An infection in the bronchial tubes caused by micro-organisms or smoking. The lining of the tubes becomes swollen and blocked by mucus.

Asbestosis: A lung disease caused by the inhalation of asbestos fibres. The particles become stuck in the lungs and cause the tissue to thicken and scar.

Day 5

Topic 2.1 The Circulatory and Respiratory system



✓ Let's Read!

Read through pages 51- 53 in your textbook.



✓ Let's sum it up!

Breathing, gaseous exchange, circulation and respiration:

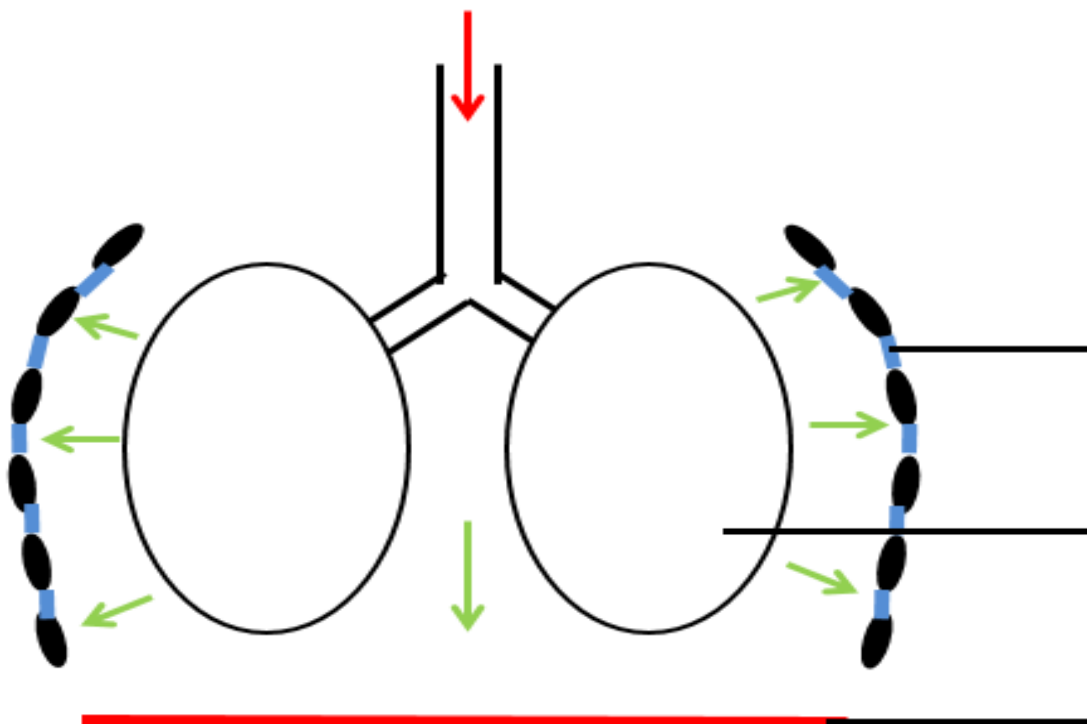
1. Inhalation:

Intercostal muscles contract making the ribs move up and out.

The diaphragm contracts and flattens.

Air pressure inside the lung is lower than outside the lung, causing air to rush in.

Label the diagram detailing the process of Inhalation:



2. Gaseous exchange in the lungs:

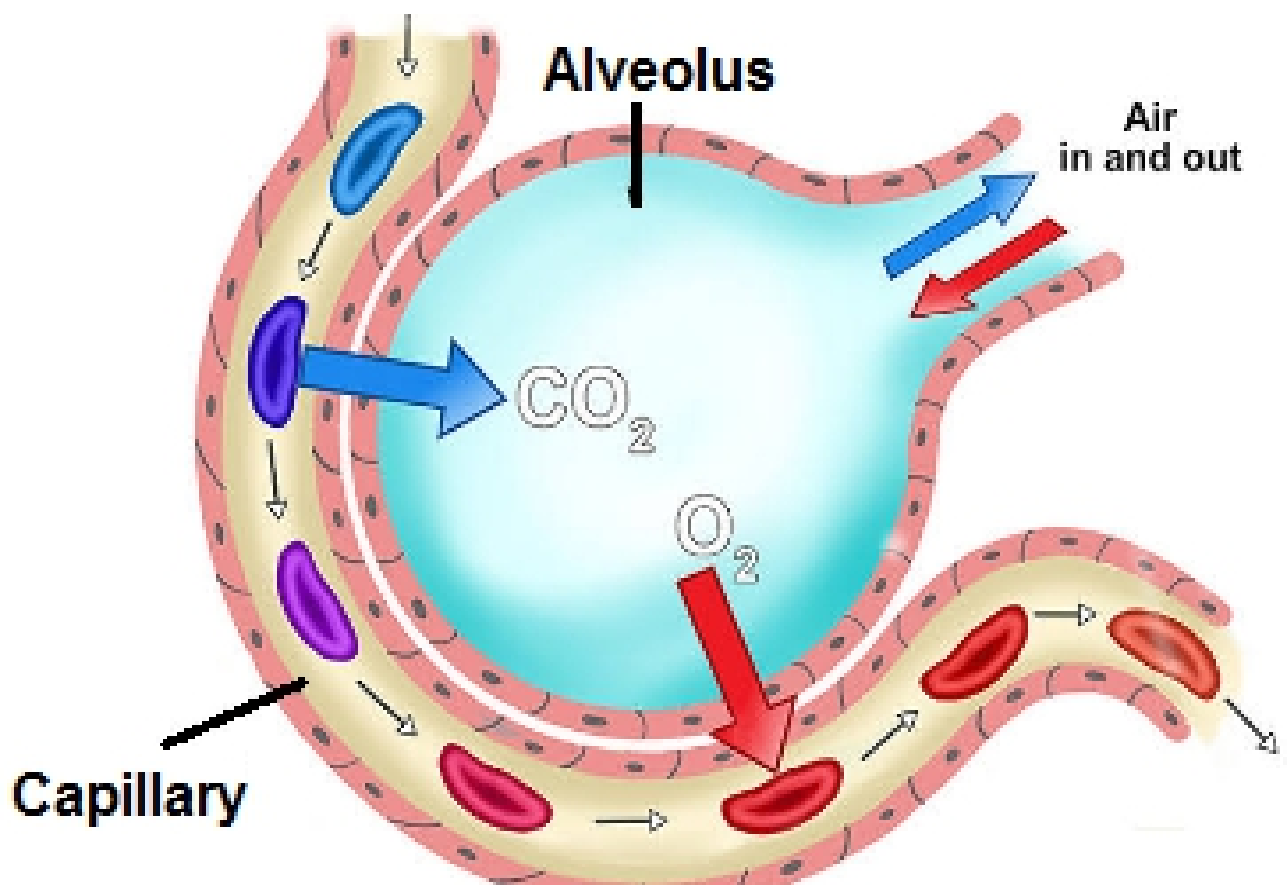
Deoxygenated blood enters the lungs through the pulmonary artery.

Oxygen diffuses from alveoli into red blood cells.

Oxygenated blood exits lungs through the pulmonary vein.

NB: Pulmonary artery is the only artery to carry deoxygenated blood.

Pulmonary vein is the only vein to carry oxygenated blood.



Day 1

Topic 2.1 The Circulatory and Respiratory system



✓ Let's Read!

Read through pages 51 - 53 in your textbook.

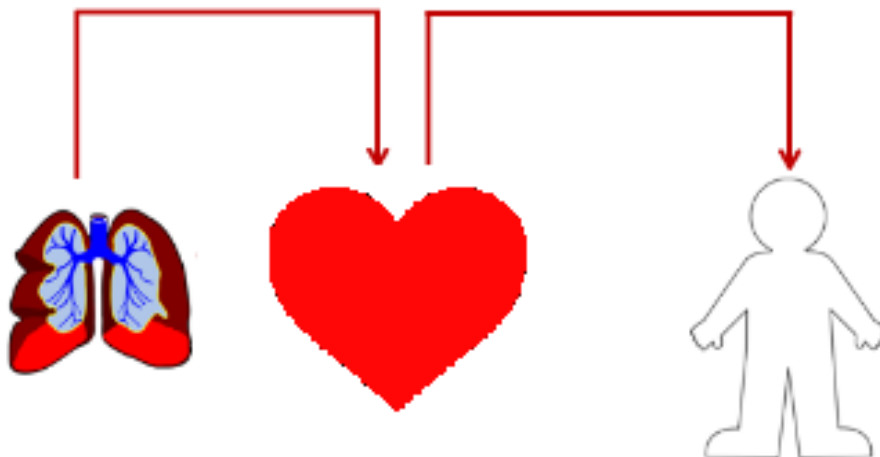


✓ Let's sum it up!

3. Circulation:

Oxygenated blood is transported to the **left side** of the heart from the lungs.

Blood is pumped under high pressure to the rest of the body.



4. Gaseous exchange in cells:

Oxygenated blood from the heart enters the capillary network near the cells.

Oxygen diffuses from red blood cells into body cells.

Carbon dioxide diffuses from body cells into blood.

Deoxygenated blood exits the capillary network at cells and flows back to the heart.

Day 2

Topic 2.1 The Circulatory and Respiratory system



✓ Let's Read!

Read through pages 51 - 53 in your textbook.



✓ Let's sum it up!

5. Circulation:

Deoxygenated blood from the body is transported to the **right side** of the heart.

Blood is pumped to the lungs to be oxygenated.

6. Exhalation:

Intercostal muscles relax making the ribs move down and in.

The diaphragm relaxes and bulges upwards.

Air is pushed out of the lungs.

