A1 CELLS KNOWLEDGE ORGANISER

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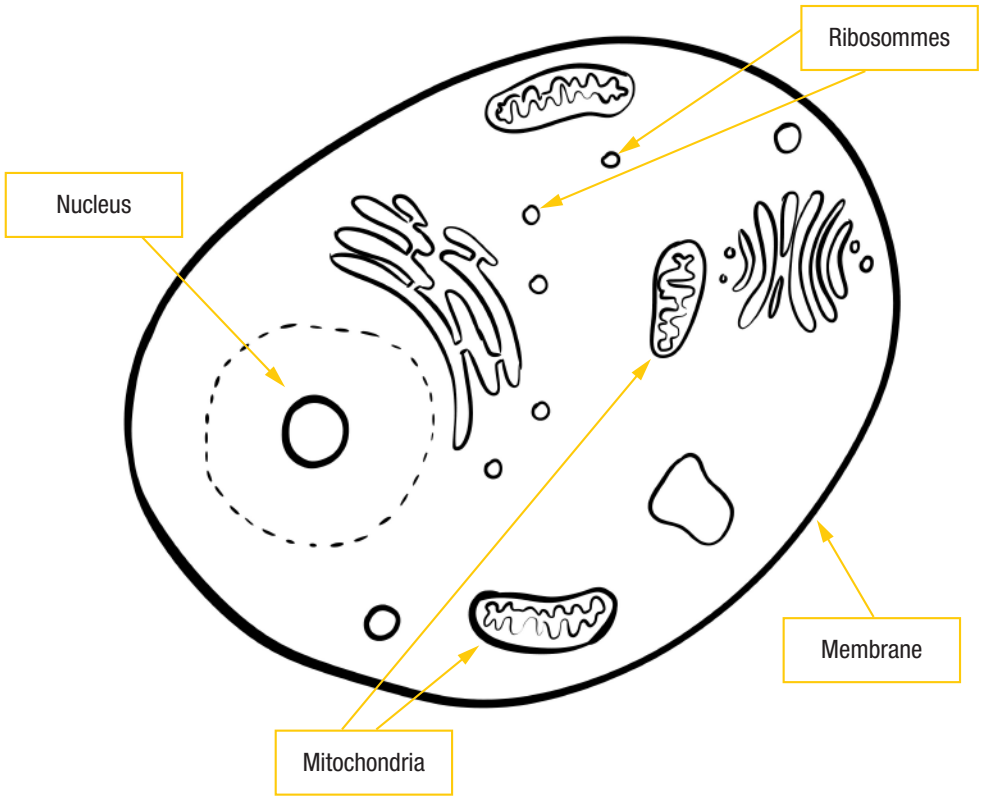

Membrane

Structure	Function
• Flexible phospholipid bilayer • Phospholipid molecules line up in a double layer, with hydrophilic heads facing outwards and hydrophobic tails facing inwards • Proteins embedded into bilayer to make transport channels • Proteins on surface of membrane for cell signalling	• Acts as physical barrier keeping contents inside and preventing unwanted substances from entering • Semi-permeable – permits transport into cell of essential nutrients, and transport out of waste products

Nucleus

Structure	Function
• Nuclear envelope – double membrane separating nucleus form rest of cell • Nuclear pores – gateways on surface of nuclear envelope • Nucleoplasm – gel-like substance that contains chromatin and the nucleolus • Chromatin – DNA (genetic material) • Nucleolus – dense structure inside the nucleus	• Contains genetic material which supports its function of coordinating cell activities like protein synthesis and cell division

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Ribsomes

Structure	Function
• Ribosomes are small, round organelles made of RNA (a helper for making proteins) and proteins • They can be free-floating in the cytoplasm or attached to the rough endoplasmic reticulum (RER)	• Protein Synthesis – Ribosomes are responsible for making proteins by assembling amino acids in the correct order according to the instructions from mRNA (a messenger that carries genetic instructions)

Mitochondria

Structure	Function
• Outer membrane – separating mitochondria from contents of cell • Inner membrane folded into cristae • Matrix – space inside the cristae which contains enzymes, DNA and ribosomes	• Site of cellular respiration – the breakdown of glucose and oxygen, which releases energy in the form of ATP and heat, and produces water and carbon dioxide waste products • ATP is the essential for cellular activities

A2 TISSUES KNOWLEDGE ORGANISER

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Epithelial

Structure	Location	Function
Simple Epithelial		

• Single layer of cells
• Can be:
  ◦ flat (squamous)
  ◦ cuboidal
  ◦ columnar
• May also be ciliated (have hairlike projections)
	Linings of cavities and organs, e.g.
	• Alveoli in lungs for gas exchange (diffusion)
	• Kidney tubules for filtration
	• Intestines for absorption
		• Absorption
		• Secretion
		• Diffusion
		• Filtration

Compound Epithelial		

• Multiple layers of cells
• Can be:
  ◦ flat (squamous)
  ◦ cuboidal
  ◦ columnar
• May also be ciliated (have hairlike projections)
	Linings of cavities and organs, e.g.
	• Skin and mouth lining for protection/ absorption/ secretion
	• Bladder for stretch
		Provides protection against:
		• Mechanical stress (e.g. friction)
		• Chemicals
		• Pathogens

Connective

Structure	Location	Function
Blood		
• Red blood cells • White blood cells • Platelets • All suspended in plasma	Throughout the cardiovascular system	• Plasma: transports cells, nutrients and waste products, maintains body temperature and pH balance • RBCs transport oxygen • WBCs fight infection • Platelets form clots to repair damaged tissues and prevent excessive bleeding from trauma
Bone		
• Dense outer layer of compact bone • Spongy bone – mesh like structure to absorb impact but maintain strength • Bone marrow – where blood cells are produced • Periosteum – thin, tough membrane on outside where muscles and tendons attach	Throughout the skeleton	• Support • Protection • Movement • Mineral storage • Blood cell production

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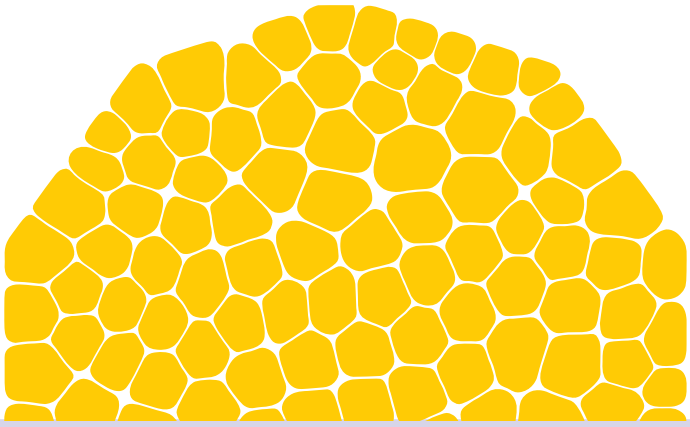
Connective

Structure	Location	Function
Cartilage		
• Chondrocytes (cartilage cells) • Strong flexible extracellular matrix of collagen, elastic fibres and proteoglycans	• On the ends of long bones in children/ adolescents (growth plates) • At the junction of bones, e.g. joints such as the knee • In the intervertebral discs • In the trachea	• Growth plates which become bone • Reduce friction during movement • Absorb shock • Provide a slippery surface for pain-free movement • Support and flexibility
Areolar		
• Cells (e.g. fibroblasts, macrophages) • Fibres (e.g. collagen, elastic, reticular) • Suspended in a soft gel-like extracellular matric	• Under skin • Around organs • Around blood vessels and nerves	• Supports organs, blood vessels, nerves to stay in place • Cushions organs, blood vessels, nerves • Pathway for immune cells to fight infection
Adipose		
• Adipocytes (large round cells) • Collagen • Reticular fibres • Blood vessels • All in a loose extra-cellular matrix	• Under skin • Around organs • In joints • Visceral fat (in abdominal cavity)	• Energy storage • Insulation • Cushioning and protection • Hormone production



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Muscle

Structure	Location	Function
Striated		
• Also known as skeletal muscle • Long, cylindrical cells with multiple nuclei • Visible striations (stripes) due to organised protein filaments.	• Throughout the musculoskeletal system • Attached to bones, e.g. biceps	• Voluntary movement • Posture • Locomotion
Non-striated		

• Also known as smooth muscle
• Spindle-shaped cells with a single nucleus
• No visible striations
	• Walls of organs, e.g.
	  ◦ Intestines
	  ◦ Uterus
	  ◦ Blood vessels
	  ◦ Bronchioles (smallest airways in the lungs)
		• Involuntary movement/functions e.g.
		  ◦ Blood vessel constriction
		  ◦ Pupil dilation
		  ◦ Intestinal peristalsis

Cardiac		
• Branched cells with striations and a single nucleus. • Contains intercalated discs that allow coordinated contraction.	Heart muscle (myocardium)	• Involuntary contraction to pump blood • Does not fatigue

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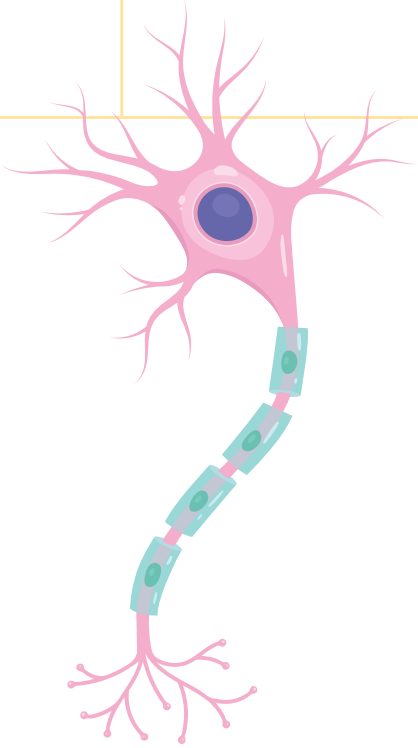
Nervous

Structure	Location	Function
Sensory Neurones		
• Long, unipolar structure • A cell body (soma) off to one side. • Dendrites at one end to receive stimuli • A long axon which has a myelin sheath for faster signal transmission	• Sensory neurones are part of the peripheral nervous system (outside of the brain and spinal column) • The soma (cell bodies) are grouped in the dorsal root ganglia, which are located along the spinal cord • Reside in the sensory organs, like the retina, cochlea, and taste buds	Carry sensory information (e.g. touch, pain, temperature) from receptors in sense organs (e.g. skin) to the central nervous system (CNS) (brain or spinal cord).
Motor Neurones		
• Multipolar structure • A cell body at one end • Multiple dendrites • A long axon which has a myelin sheath for faster signal transmission	• Soma (cell bodies) are located in the central nervous system (CNS), specifically within the brainstem, spinal cord, and motor cortex • Their axons extend to muscles and other structures in the peripheral nervous system	Send nerve impulses from the central nervous system (CNS) to effectors (muscles or glands), allowing movement or response to stimuli.
Neuroglia		

• Small, non-excitable support cells (this means they do not play a role in generating or transmitting electrical impulses).
• Different types include:
  ◦ Astrocytes
  ◦ Oligodendrocytes
  ◦ Schwann cells
  ◦ Microglia
	Through the peripheral and central nervous systems.	• Support, protection, and nourishment for neurones
		• Maintain the nervous system environment
		• Help in repair after injury



A3 ENERGY IN THE BODY KNOWLEDGE ORGANISER

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Energy Metabolism

Definition

The process of generating energy from nutrients which is used to build and maintain cells.

Catabolism

Definition	Examples
The breakdown of complex molecules into numerous simple ones to release energy.	• Digestion: The breakdown of food molecules (carbohydrates, proteins, and fats) into smaller units (simple sugars, amino acids, and fatty acids, respectively). • Glycolysis: The breakdown of glucose (a simple sugar) into pyruvate, releasing energy in the form of ATP.

Anabolism

Definition	Examples
The process of using the energy released by catabolism to synthesise complex molecules from numerous simple ones.	• Protein Synthesis: The body uses amino acids, the building blocks of proteins, to create new proteins for various functions, including building and repairing tissues, forming enzymes, and creating hormones. • Muscle Mass Gain: Anabolic processes, like protein synthesis, are crucial for building and maintaining muscle mass through exercise and proper nutrition

Cellular Repsiration

Definition

The process by which cells derive energy from glucose through catabolism which takes place in all living cells.

Aerobic Respiration

Explanation	Equation
Aerobic respiration requires oxygen and occurs in the mitochondria, producing a high amount of ATP (energy) along with carbon dioxide and water as byproducts. This process is efficient and happens during normal activities like walking or resting.	Word equation: Glucose + Oxygen → Carbon dioxide + Water + Energy (ATP) Chemical equation: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + ATP$

A3 ENERGY IN THE BODY KNOWLEDGE ORGANISER

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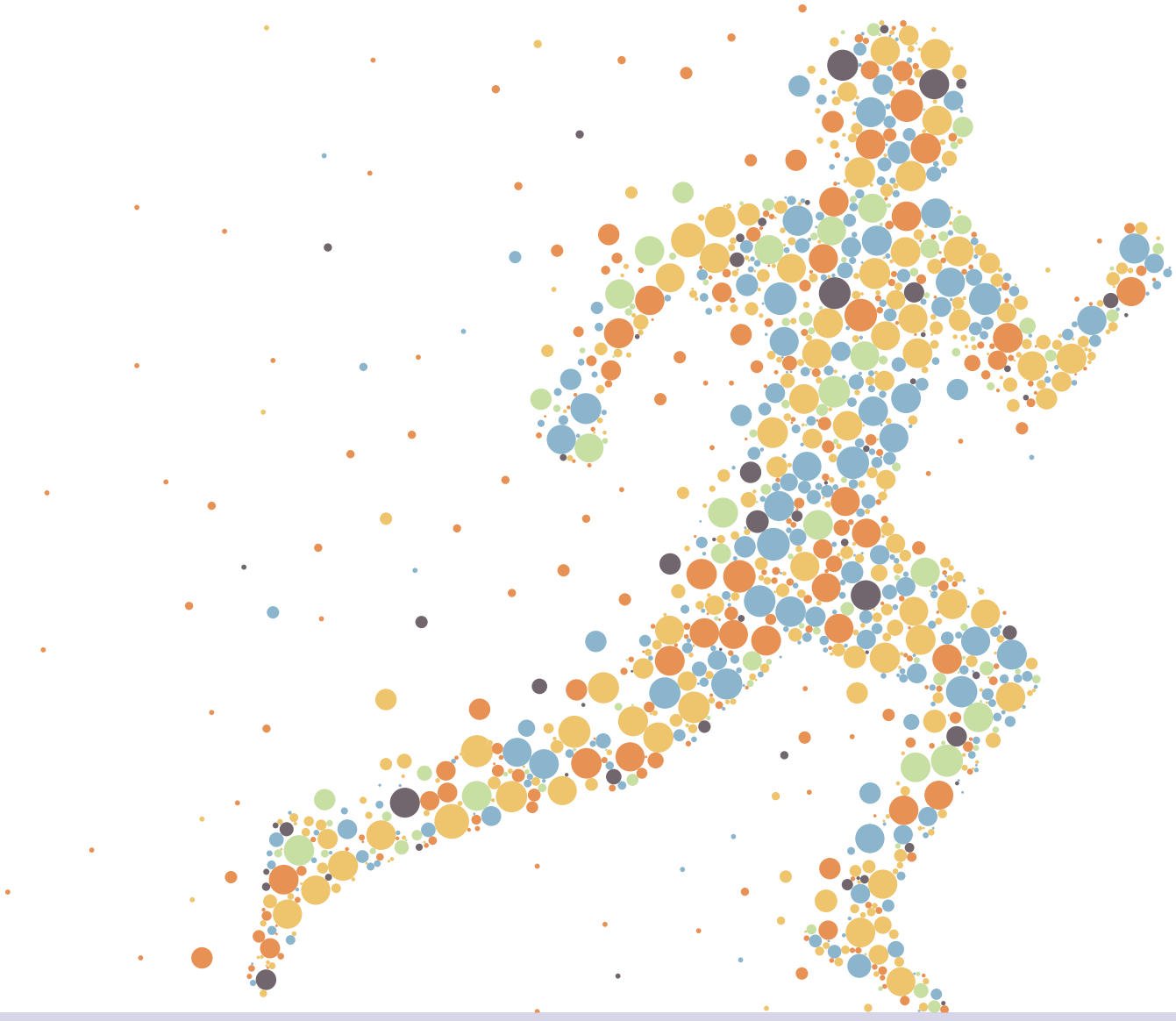
Anaerobic Respiration

Explanation	Equation
Anaerobic respiration does not require oxygen and takes place in the cytoplasm of cells. It produces less ATP and results in the formation of lactic acid, which can cause muscle fatigue. Anaerobic respiration is useful for short bursts of intense activity, such as sprinting, when oxygen supply is limited.	Word equation: Glucose → Lactic acid + ATP Chemical equation: C6H12O6 → 2C3H6O3 + ATP

Uses of Energy in the Body

- Cell division, growth and repair e.g. wound healing
- Passage of nerve impulses e.g. from brain to muscles to move hand away from hot surface
- Contraction of muscle tissue e.g. heart pumping, lifting weights, walking
- Maintenance of homeostasis e.g. sweating when hot, shivering when cold
- Anabolism e.g. building muscle tissue, producing hormones
- Basal Metabolic Rate (BMR) - the minimum energy required to keep essential functions running at rest, such as breathing, circulation, and maintaining body temperature



A4 HOMEOSTATIC MECHANISMS KNOWLEDGE ORGANISER

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Homeostatic Mechanisms

Definition of homeostasis

The ability of the body to maintain a stable internal environment despite changes in external conditions.

Definition of negative feedback

A negative feedback system helps the body stay balanced (homeostasis) by reversing changes.

Thermoregulation

Temperature regulation is essential to keep the body at around 37°C, ensuring enzymes function properly and vital processes like metabolism, circulation, and nerve signalling work efficiently.

The hypothalamus is responsible for monitoring temperature and initiating negative feedback mechanisms

Body reaction when too cold:

- Vasoconstriction of the blood vessels to conserve heat
- Hairs stand on end to trap an insulating layer of air
- Shivering to generate heat from muscle contraction
- Metabolism speeds up to produce more energy which generates heat

Body reaction when too hot:

- Vasodilation of the blood vessels to lose heat
- Hairs lay flat so there is no insulating layer of air
- Sweating to lose heat through evaporation

Blood Glucose Regulation

The body needs to regulate blood glucose levels to ensure that cells receive a constant supply of energy while preventing damage from excessive sugar levels. This is essential for maintaining homeostasis.

Blood glucose regulation involves maintaining stable blood sugar levels through hormonal control:

- The hypothalamus detects blood glucose changes and signals the pancreas to respond
- If blood glucose is high, the pancreas releases insulin, which unlocks muscle and fat cells so that glucose can enter them and stimulates the liver to convert excess glucose into glycogen for storage
- If blood glucose is low, the pancreas releases glucagon, which signals the liver to break down glycogen into glucose and release it into the bloodstream

Osmoregulation

Osmoregulation is the process by which the body maintains the balance of water and solutes (such as salts) in the blood and tissues to ensure cells function properly.

- The hypothalamus detects changes in blood water levels
- If water levels are low, the pituitary gland releases more ADH (antidiuretic hormone), causing the kidneys to reabsorb more water, producing concentrated urine
- If water levels are high, the pituitary releases less ADH, so the kidneys reabsorb less water, producing dilute urine

B1 THE CARDIOVASCULAR SYSTEM KNOWLEDGE ORGANISER

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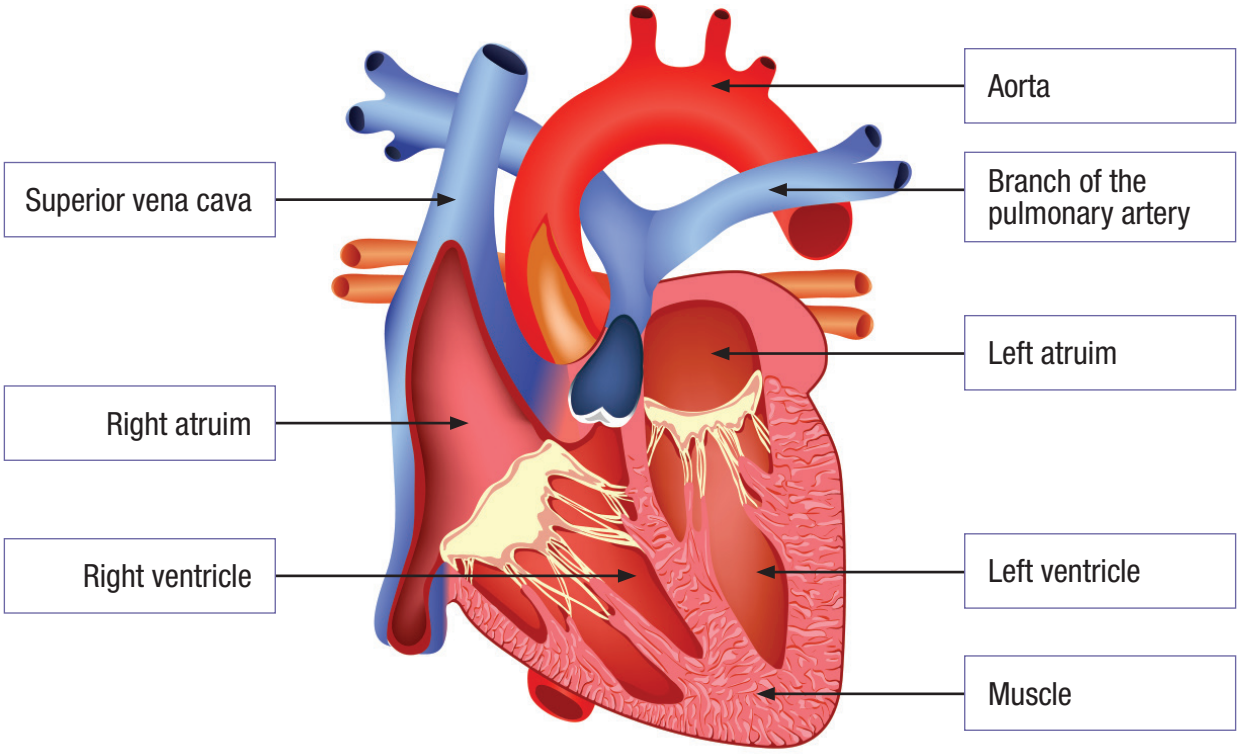
Structure



Heart

Function

- Pumping Blood: The heart, a muscular organ, contracts rhythmically to pump blood into the arteries, which then carry it to the rest of the body.
- Oxygen and Nutrient Delivery: Oxygenated blood, rich in oxygen and nutrients, is pumped from the heart to the body's tissues and organs.
- Waste Removal: Deoxygenated blood, carrying carbon dioxide and other waste products, is returned to the heart from the body's tissues.
- Circulatory System: The heart is the central organ of the circulatory system, working in conjunction with blood vessels (arteries, capillaries, and veins) to ensure efficient blood flow.
- Heart Rate and Blood Pressure: The heart also plays a crucial role in regulating heart rate and maintaining blood pressure, ensuring proper blood flow to all parts of the body

B1 THE CARDIOVASCULAR SYSTEM KNOWLEDGE ORGANISER

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Blood Flow through the Heart

- Deoxygenated blood from the body flows through the superior and inferior vena cava towards the heart.
- This blood enters the right atrium and flows through the tricuspid valve into the right ventricle.
- The ventricle pushes blood through the pulmonary valve into the pulmonary artery.
- The pulmonary artery carries blood to the lungs where it becomes oxygenated.
- It returns to the heart via the pulmonary vein.
- The blood then enters the left atrium and descends through the bicuspid (or mitral) valve into the left ventricle.
- The left ventricle then pumps blood through the aortic valve and into the aorta and to the rest of the body.
- Then the cycle begins again.

Cardiac Cycle

Atrial & Ventricular Diastole

- The resting phase
- All four chambers (atria and ventricles) are relaxed and filling with blood
- Ventricular pressure is low, allowing the AV valves to open, which allows blood to flow from the atria into the ventricles
- The semilunar valves are closed, preventing blood from flowing out of the ventricles

Atrial Systole

- The atria contract, increasing pressure inside them
- This forces any remaining blood from the atria into the ventricles
- As the pressure in the ventricles rises, it exceeds atrial pressure, causing the AV valves to close
- The semilunar valves remain closed, preventing blood from leaving the ventricles

Ventricular Systole

- The ventricles contract, increasing pressure inside them
- The AV valves remain closed, preventing backflow into the atria
- As the ventricular pressure becomes higher than the pressure in the arteries, the semilunar valves open, allowing blood to be ejected from the heart into the aorta and pulmonary artery

Blood Vessels

Structure	Function
Arteries	
• Thick, muscular walls • Narrow lumen	Carry blood away from heart, under high pressure, to organs and tissues.
Veins	
• Thinner, less muscular walls than arteries • Wide lumen • Valves	Carry blood back to the heart and lungs for oxygenation, under relatively low pressure.
Capillaries	
• Very thin, one-cell thick walls • Very narrow lumen	Allow exchange of gases, nutrients, and waste between blood and tissues.

B1 THE CARDIOVASCULAR SYSTEM KNOWLEDGE ORGANISER

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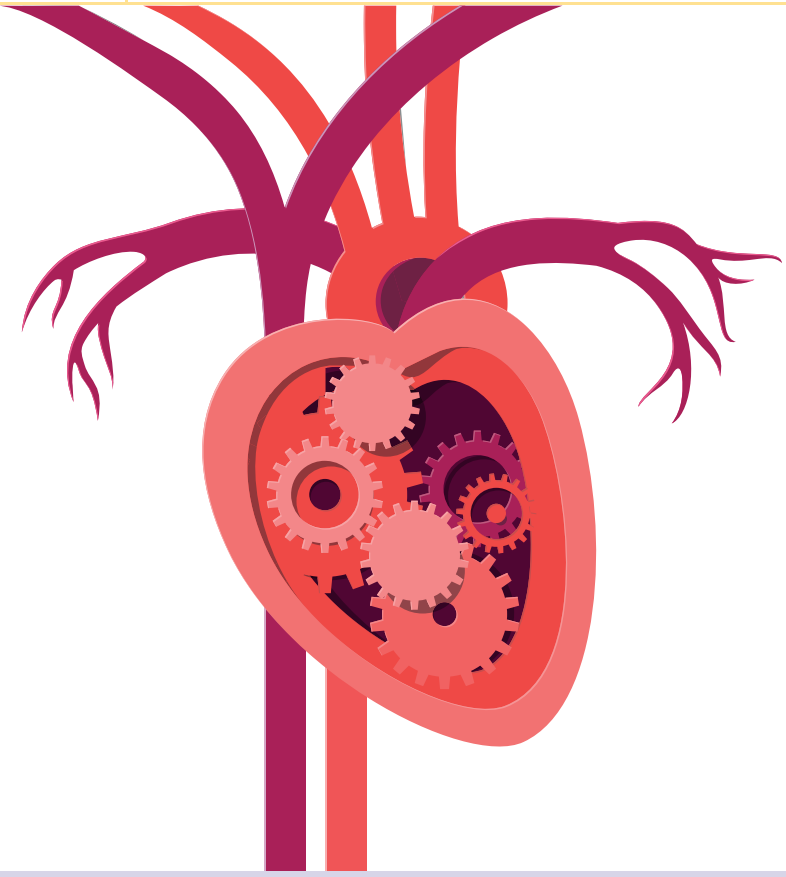
Blood

Structure	Function
Plasma	
• Liquid component of blood • Mostly water	• Transports nutrients, gases, hormones and waste products • Keeps body warm • Helps maintain pH • Helps maintain blood pressure
Red Blood Cells	
• Biconcave shape, giving them a large surface area • Flexible membrane, to enable them to pass through narrowest capillaries • Lacking a nucleus, to maximise storage capacity	Transport oxygen throughout the network of blood vessels.
White Blood Cells	
• All have a nucleus • Differ in shape and composition according to type • Many can change shape to engulf and destroy pathogens (phagocytosis)	Defend the body against infection.
Platelets	
• Small cell fragments • No nucleus	Clot the blood for repair after injury and to prevent excessive bleeding.



B2 THE RESPIRATORY SYSTEM KNOWLEDGE ORGANISER

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Respiratory System

Structure	Function
Trachea	
• Tube • Supported by rings of cartilage • Lined with ciliated epithelial tissue	• Carriers air to/from lungs • Filters out dust and pathogens • Warms and moistens air
Lungs	

• Large spongy organs that fill with air
• Contains bronchi, bronchioles and alveoli
	• Gas exchange:
	  • Supplying oxygen to the blood
	  • Removing carbon dioxide

Bronchi & Bronchioles	
• Left and right bronchi are tubes supported by cartilage • Bronchioles are the smaller branches off the bronchi, supported by smooth muscle (no cartilage present)	• Bronchi direct air flow into right and left lungs • Bronchioles direct air flow into the alveoli
Alveoli	
• Clusters of tiny air sacs • Thin, single-cell walls	Site of gas exchange, allowing oxygen to enter the blood and carbon dioxide to leave.

Ventilation

Site & Mechanism of Gaseous Exchange

- Gaseous exchange at the alveoli occurs by diffusion between the air in the alveoli and the blood in surrounding capillaries
- Oxygen from inhaled air diffuses across the thin walls of the alveoli into the capillaries, where it binds to haemoglobin in red blood cells and is transported to body tissues
- At the same time, carbon dioxide from the blood diffuses into the alveoli and is expelled from the body during exhalation
- The large surface area, thin walls, and moist lining of the alveoli facilitate this efficient exchange of gases

Process of Inhalation/Exhalation

Inhalation:
- The intercostal muscles contract, pulling the ribs upwards and outwards
- At the same time, the diaphragm contracts and moves downwards, increasing the volume of the chest cavity
- This results in decreased pressure and causes air to be drawn into the lungs

Exhalation:
- The intercostal muscles relax, allowing the ribs to move downwards and inwards
- At the same time, the diaphragm relaxes and moves upwards
- This reduces the volume of the chest cavity
- This results in increased pressure and forces air out of the lungs

B3 THE NERVOUS SYSTEM KNOWLEDGE ORGANISER

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Central Nervous System (CNS)

Structure	Function
• Brain • Spinal cord	• Receives information from body • Processes information to formulate responses • Transmits information to bring about changes

Peripheral Nervous System (PNS)

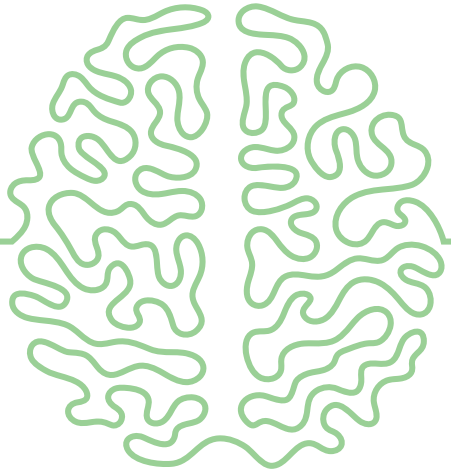
Structure	Function

• Nerves that branch off from brain and spinal cord
• Ganglia – clusters of neurones that act as relays between CNS and PNS
	• Somatic
	  ◦ Controls voluntary movement
	Autonomic
	• Controls involuntary functions e.g.
	  ◦ Heart rate
	  ◦ Digestion
	  ◦ Breathing
	• Both
	  ◦ Relay sensory information to CNS
	  ◦ Transmit motor commands from the CNS

Autonomic Nervous System (ANS)

Structure	Function

Millions of neurones that connect the brain/spinal column to the organs	Regulates internal organs and is not under conscious control
	Sympathetic
	• 'Fight or flight' response
	  ◦ Accelerates heart rate
	  ◦ Dilates the pupils
	  ◦ Increases breathing rate
	  ◦ Temporarily reduces digestion
	  ◦ Prioritises energy for movement
	Parasympathetic
	• 'Rest and digest' response
	  ◦ Conserves energy
	  ◦ Slows heart rate
	  ◦ Contracts the pupils
	  ◦ Allows digestion to resume normally



B4 THE ENDOCRINE AND RENAL SYSTEMS KNOWLEDGE ORGANISER

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Role of Hypothalamus

- Controls the endocrine system
- Monitors internal conditions e.g. temperature
- Produces releasing hormones which act on the pituitary
  - Pituitary then knows what hormones to release to signal action in the organs

Control & Regulation of Growth

Thyroid

- Controls metabolism
- Thyroxine contributes to growth and brain development

Testes & Ovaries

- Produce sex hormones that develop secondary sexual characteristics
  - Ovaries produce oestrogen and progesterone
  - Testes produce testosterone

Growth Hormone (GH)

- Stimulates bone, muscle and tissue growth, especially in childhood and adolescence

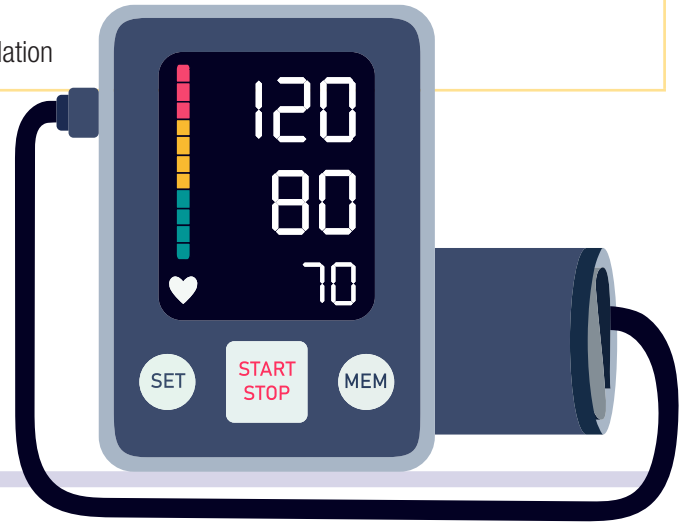
Blood Pressure Regulation

Adrenal Glands

- Situated on top of kidneys
- Produce aldosterone

Aldosterone

- Increases sodium reabsorption in the kidneys, which leads to water retention, thus increasing blood volume and blood pressure
- Constricts blood vessels, further contributing to blood pressure regulation



B4 THE ENDOCRINE AND RENAL SYSTEMS KNOWLEDGE ORGANISER

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Blood Sugar Regulation

Pancreas

- Releases insulin when blood glucose is high
- Releases glucagon when blood glucose is low

Liver

- Stores excess glucose as glycogen

Insulin

- Facilitates uptake of glucose from the blood by muscle, fat and liver cells

Glucagon

- Converts stored glycogen back into glucose

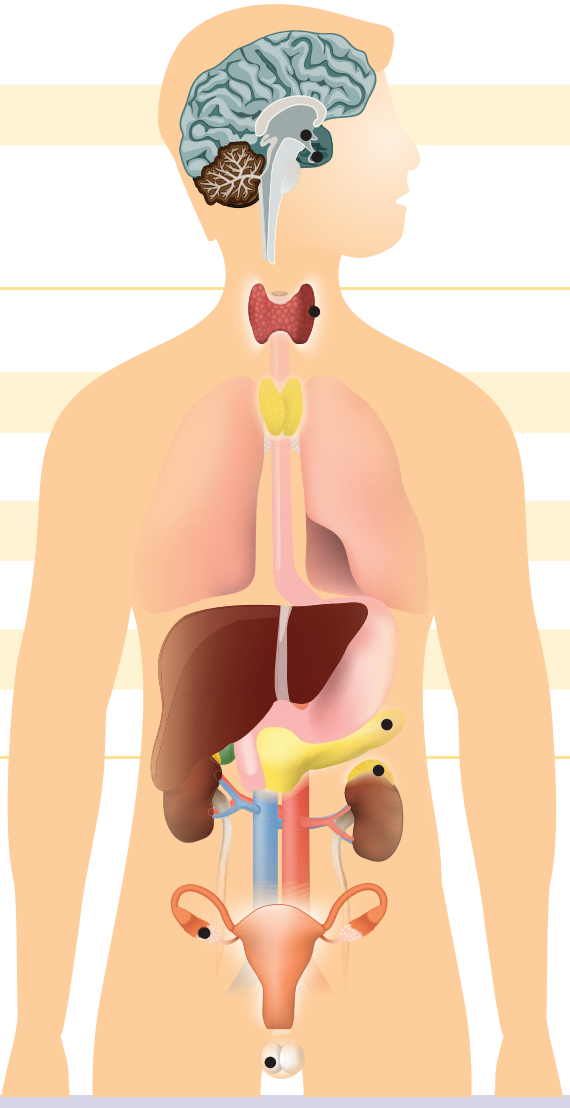
'Fight or Flight' Response

Adrenal glands

- Situated on top of kidneys
- Produce adrenaline

Adrenaline

- Prepares body for a "fight or flight" response in stressful situations
- Increasing heart rate, blood pressure and breathing rate
- Releases energy for muscles



Osmoregulation

Pituitary Gland

- Releases ADH if water levels are too low

Anti-Diuretic Hormone (ADH)

- Signals the kidneys to retain water

Kidneys

- Adjust how much water is reabsorbed based on levels of ADH

B5 THE MUSCULOSKELETAL SYSTEM KNOWLEDGE ORGANISER

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Ligaments

Structure	Function

• Strong
• Flexible
• Connective tissue that forms bands
	• Connect bones to other bones at joints
	• Stabilise the joint
	  ◦ Prevent excessive movement at the joint
	  ◦ Facilitate controlled movement at the joint

Tendons

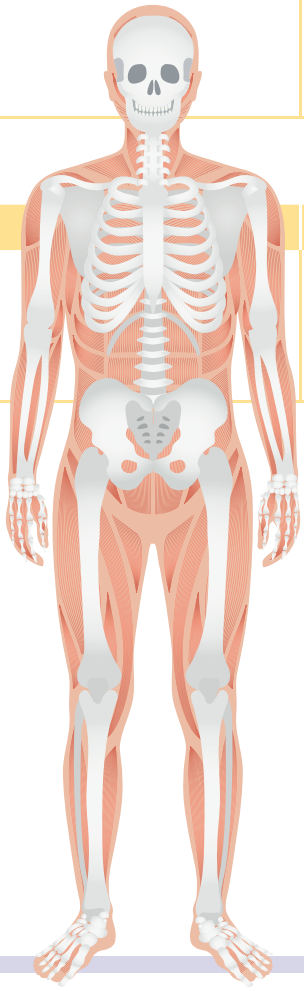
Structure	Function
• Fibrous connective tissue • Mainly collagen	• Attach muscles to bones • When muscles contract, tendons transfer the force to bones, enabling movement at joints

Cartilage

Structure	Function
• Flexible, smooth structure • Made of collagen and elastin	• Reduces friction and absorbs shock in joints • Supports soft tissues and allows flexibility • Provides smooth surfaces for joint movement

Bone

Structure	Function
• Hard, dense structure • Comprised of calcium and collagen	• Provides structural support and protection • Forms the skeleton, supports body weight • Acts as a lever for muscles to create movement



B5 THE MUSCULOSKELETAL SYSTEM KNOWLEDGE ORGANISER

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Muscles

Function	Example
Antagonistic Pairs	
• Allow for smooth and controlled movement by working in opposition • One muscle (the agonist) contracts to move a joint while the other (the antagonist) relaxes to allow the movement • And vice versa	Biceps and triceps: • When you bend your elbow (bicep curl), the biceps contract (agonist) and the triceps relax (antagonist). • When you straighten your elbow, the triceps contract (agonist) and the biceps relax (antagonist).
Synergist	

• Assist the prime mover (agonist) in performing a movement
  ◦ By adding extra force
  ◦ Reducing unnecessary movement
  ◦ Providing stability
	Shoulder joint stabilisation:
	• The rotator cuff muscles act as synergists, stabilising the shoulder joint and allowing the biceps brachii to exert greater force.

Fixator	
Prevent unwanted or excessive movement at a joint, ensuring that the agonist muscle can focus on its primary function.	Abdominals: • Can act as fixators to stabilise the body for hip and knee movements

Joints

Structure	Function	Example
Fibrous		
• Dense connective tissue, primarily collagen • No joint cavity	• Either fixed, or permit slight movement • Provide stability and protection	Sutures in the skull which connect the skull bones
Cartilaginous		
• Joints where bones are joined by cartilage • No joint cavity	• Allow for slight movement • Suitable for areas requiring stability and shock absorption, rather than free movement	Intervertebral discs in the spine
Synovial		

• Joint cavity filled with lubricating synovial fluid
• Articular cartilage
• Joint capsule
• Synovial membrane
	• Most mobile type of joint
	• Facilitate smooth, free movement between bones by allowing bones to slide or rotate
		• Ball and socket joint, e.g.
		  ◦ Hip
		  ◦ Shoulder

B6 THE FUNCTION OF OTHER BODY SYSTEMS KNOWLEDGE ORGANISER

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Immune System

The immune system's primary role is to defend the body against harmful substances and infections, distinguishing between "self" and "non-self" to protect against pathogens, cancer cells, and other threats.

Lymphatic System

Responsible for fluid balance, immune function, and the transport of fats and nutrients. This system also filters lymph and removes waste.

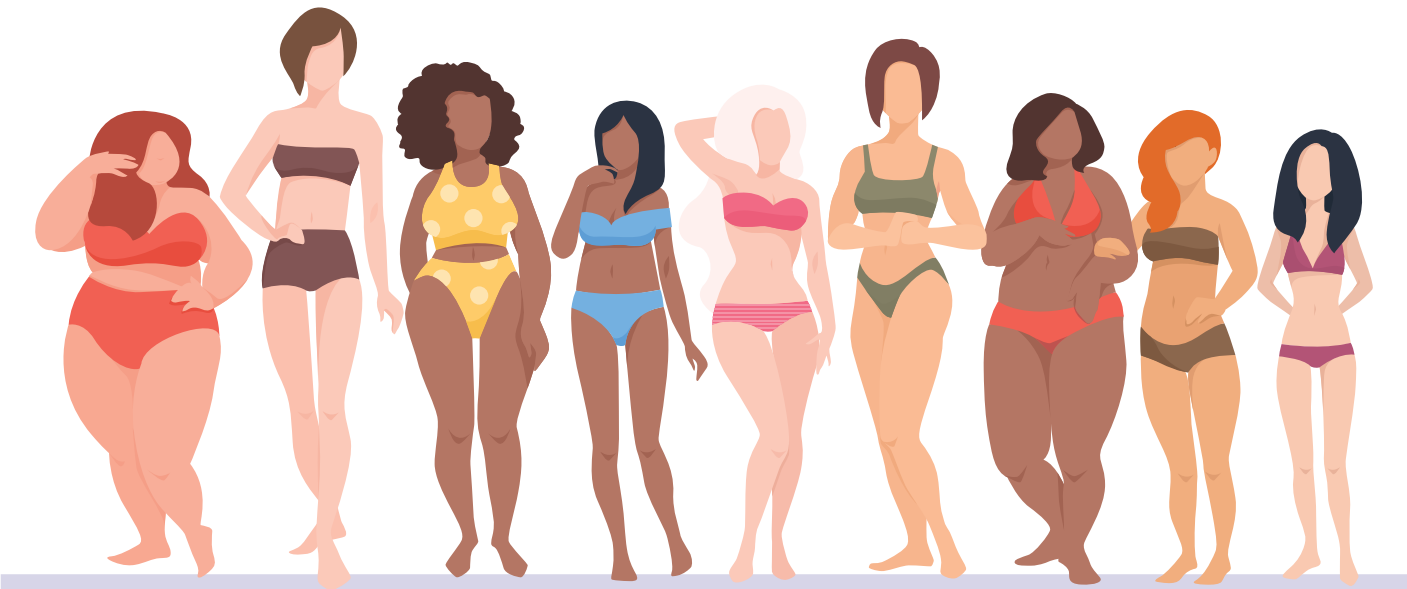
Reproductive Systems

Female

Breasts	Uterus	Ovaries	Vagina
• Produce nutritionally complete milk for infants • Secretes antibodies and immune factors in breastmilk to protect infants from infection	• Supports development of embryo and foetus during pregnancy • Where the placenta develops to support the embryo and foetus	• Produce egg cells for reproduction • Release oestrogen and progesterone to regulate female reproductive system	• Connects uterus to outside of body • Receives penis during intercourse • Passage for passing of menstrual blood • Passage for birth of baby during childbirth

Male

Penis	Testes
• Delivers sperm into the female vagina during intercourse • Passage for passing of urine	• Produce sperm cells for reproduction • Release testosterone to regulate male reproductive system



B6 THE FUNCTION OF OTHER BODY SYSTEMS KNOWLEDGE ORGANISER

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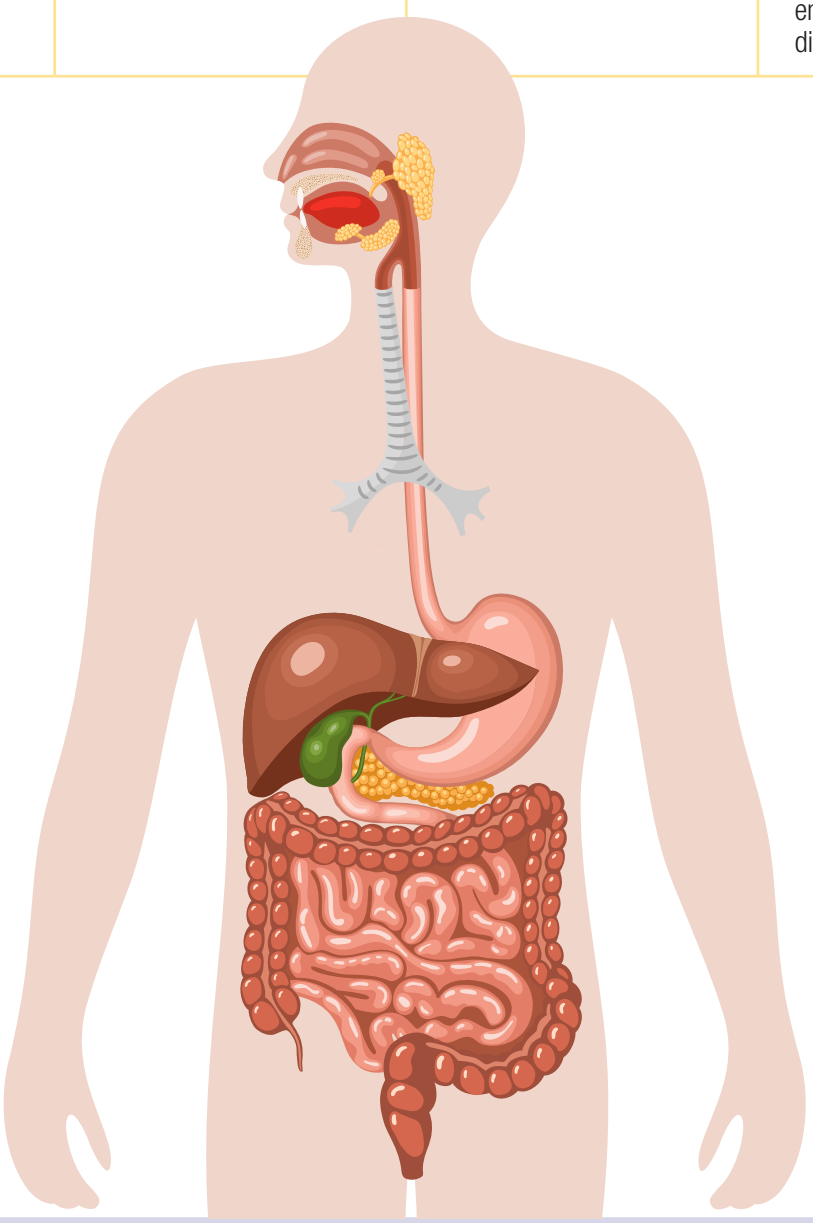
Digestive System

Alimentary Canal

Oesophagus	Stomach	Duodenum & Ileum	Colon
• Transports food from mouth to stomach using peristalsis	• Churns food for mechanical digestion • Releases digestive juices and enzymes for chemical digestion	Duodenum • Where bile and digestive enzymes help break down fats, proteins, and carbohydrates Ileum • Nutrients are absorbed into the bloodstream through the intestinal walls	• Absorbs water • Forms waste for excretion

Accessory Organs

Liver	Pancreas	Gallbladder	Salivary Glands
• Produces bile	• Produce digestive enzymes	• Storage site for bile	• Produce saliva containing enzymes to start chemical digestion



C1.1 CORONARY HEART DISEASE KNOWLEDGE ORGANISER

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Coronary Heart Disease

Causes

- Atherosclerosis (build up of deposits in arteries)
- Hypertension (high blood pressure)

Primary Effects

- Heart attack (insufficient supply of blood and oxygen to heart muscle)
- Angina (chest pain)
- Heart failure

Secondary Effects

- Shortness of breath
- Dizziness
- Nausea and vomiting

Affected Body Systems

Cardiovascular

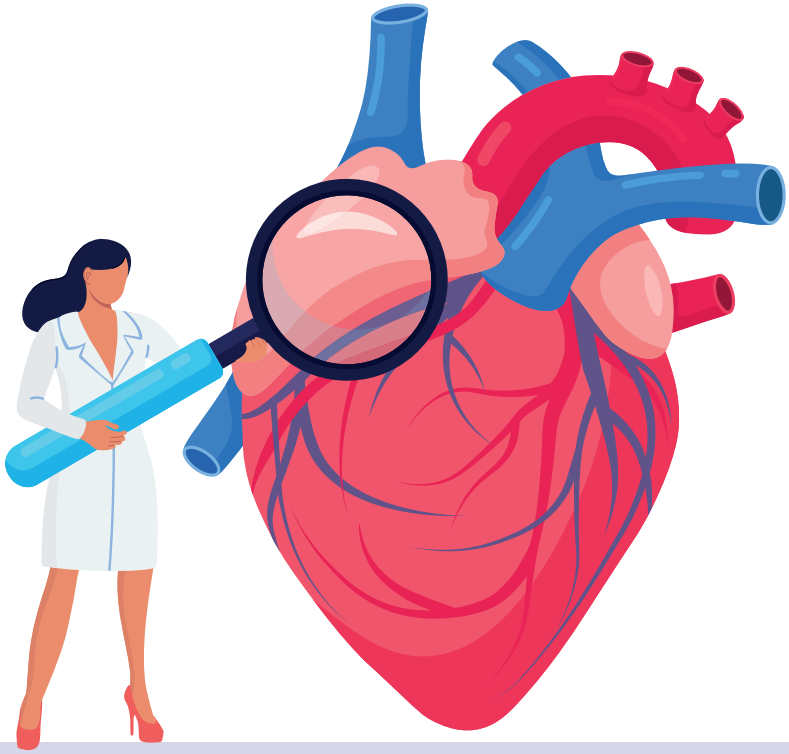
- Restricted blood flow and thus oxygen to the heart muscle
  - Angina
  - Heart attack
- Additional strain on the heart and blood vessels
  - Increased blood pressure
  - Heart failure

Respiratory

- Recued blood circulation leads to less oxygen delivery to lungs and tissues
- Body tries to compensate by increasing breathing rate

Digestive

- Poor circulation of blood and oxygen to digestive system and organs disrupts function



C1.2 STROKE KNOWLEDGE ORGANISER

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Stroke

Causes

- Blocked artery (ischaemic stroke) or
- Burst blood vessel (haemorrhagic stroke)

Primary Effects

- Brain damage
- Bleeding and clotting in the brain

Secondary Effects

- Muscle weakness
- Lack of co-ordination
- Dysphasia (language issues)
- Increased incidence of respiratory infections

Affected Body Systems

Cardiovascular

- Strong link with heart disease, e.g.
  - Atherosclerosis (ischaemic stroke)
  - Hypertension (haemorrhagic stroke)
- Brain damage may impact on blood pressure and heart rate regulation, causing further issues

Nervous

- Damage to specific areas of the brain impacts functions controlled by that area e.g.
  - Broca's area, located in the left hemisphere's frontal lobe, is crucial for speech production and articulation

Musculoskeletal

- Damage to the motor areas of the brain affects mobility and muscle strength
- Poor control of swallowing muscles can lead to swallowing problems (dysphagia) which can lead to aspiration of food/drink, causing respiratory infections

C1.3 CHRONIC OBSTRUCTIVE PULMONARY DISEASE KNOWLEDGE ORGANISER

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Chronic Obstructive Pulmonary Disease

Causes

- Chronic exposure to irritants e.g. smoking, leading to:
  - Damage to the alveoli (emphysema)
  - Persistent inflammation of the airways (chronic bronchitis)

Primary Effects

- Breathlessness
- Excess mucus production and persistent cough
- Frequent chest infections
- Persistent wheezing
- Increased heart rate

Secondary Effects

- Weight loss
- Muscle weakness
- Reduced mobility

Affected Body Systems

Respiratory

- Damaged lung tissue and airway narrowing affect breathing and oxygenation

Cardiovascular

- Heart is working harder to compensate for reduced oxygen levels in blood

Digestive

- Strain on breathing and circulation burns additional calories leading to weight loss
- Frequent coughing, mucus and other respiratory symptoms depress appetite

Musculoskeletal

- Reduced blood oxygen levels decrease muscle activity

C1.4 ASTHMA KNOWLEDGE ORGANISER

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Asthma

Causes

A combination of genetic and environmental factors leading to inflammation and narrowing of the airways

Primary Effects

- Shortness of breath
- Wheezing
- Tight chest
- Coughing

In an asthma attack this becomes severe and constant leading to:

- Breathlessness
- Faster breathing and heartbeat
- Confusion
- Drowsiness and dizziness
- Fainting
- Blue lips and fingers

Secondary Effects

- Anxiety and depression
- Pneumonia
- Delays in growth (children)

Affected Body Systems

Respiratory

- Airway inflammation and build-up of mucus
  - Breathlessness
  - Coughing
- Bronchoconstriction
  - Tight chest
  - Wheezing
  - Poor oxygenation

Cardiovascular

- Heart is working harder to compensate for reduced oxygen levels in blood

C1.5 DIABETES TYPE 1 & 2 KNOWLEDGE ORGANISER

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Diabetes Type 1 & 2

Causes

- Type 1: the body produces insufficient insulin, or none at all
- Type 2: the body produces insufficient insulin and/or becomes insulin resistant

Primary Effects

- Uncontrolled blood sugar levels leading to weight change
- Blurred vision
- Feeling thirsty
- Hunger
- Mood changes
- Tiredness
- Excessive urination
- Itching
- Thrush infections
- Cuts and wounds heal slowly

Secondary Effects

- Heart disease and stroke
- Nerve damage
- Foot problems
- Vision loss
- Miscarriage and stillbirth
- Kidney problems
- Sexual problems

Affected Body Systems

Endocrine

- Type 1 Diabetes: The immune system attacks and destroys insulin-producing beta cells in the pancreas, leading to insufficient insulin
- Type 2 Diabetes: Cells become resistant to insulin, and the pancreas cannot produce enough insulin to compensate

Cardiovascular

- Chronic high blood sugar damages arteries
  - Hypertension
  - Atherosclerosis

Nervous

- Chronic high blood sugar damages nerves

Immune

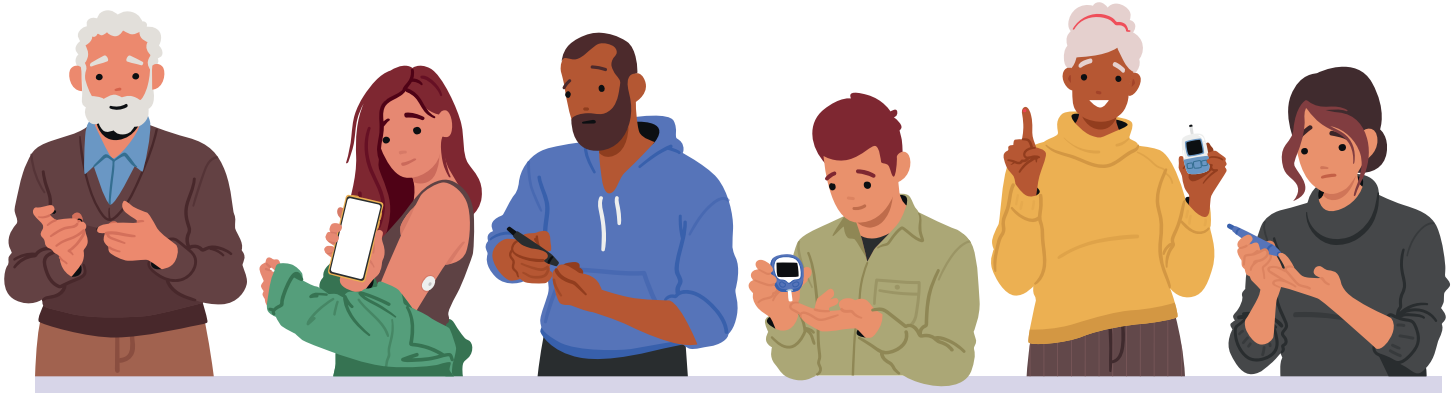
- Poor blood sugar control damages immune system

Digestive

- Nerve damage can affect nerves in digestive system, leading to issues e.g. slow stomach emptying

Reproductive

- Vascular and nerve damage leads to sexual problems
- Gestational diabetes risks maternal and foetal health



C1.6 DEMENTIA KNOWLEDGE ORGANISER

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Dementia (Alzheimer's Disease & Vascular Dementia)

Causes

- Alzheimer's disease: build-up of proteins within and around brain cells
- Vascular dementia: reduced blood flow to the brain caused by narrowing of blood vessels, strokes and transient ischaemic attacks (TIAs)

Primary Effects

- Disrupted cognitive function e.g.
  - Memory loss
  - Confusion
  - Difficulty concentrating
  - Difficulty finding the right words
  - Mood changes

Secondary Effects

- Significant slowness of thought and confusion
- Significant memory loss
- Significant problems concentrating
- Severe personality changes
- Depression
- Incontinence
- Difficulties swallowing (dysphagia) or coughing

Affected Body Systems

Nervous

- As brain damage progresses, cognitive symptoms worsen
- Can lead to depression and anxiety
- Ultimately leads to incontinence, swallowing and coughing issues

Cardiovascular

- Strong link between heart disease and vascular dementia
- Poor cardiovascular health further limits oxygen flow to brain, worsening symptoms

Respiratory

- Damage to brain regions linked to cough and swallow reflexes can lead to aspiration (inhalation of food/drink) which can lead to pneumonia
- Immune system weakens, making infections like pneumonia more likely

C1.7 ACQUIRED BRAIN INJURY KNOWLEDGE ORGANISER

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Acquired Brain Injury

Causes

- Traumatic: blow to the head or brain damage that occurs after birth
- Non-traumatic: caused by e.g. infection, disease, lack of oxygen

Primary Effects

- Concussion
- Unconsciousness and coma
- Amnesia
- Damage to blood vessels in the brain

Secondary Effects

Traumatic:
- Headaches and dizziness
- Memory loss
- Fatigue
- Personality changes

Both:
- Delayed growth and development (in children)
- Issues with balance and coordination
- Cognitive, sensory and physical impairments
- Irritability
- Sleep disturbance

Affected Body Systems

Nervous

- Damage to specific brain regions will affect functions controlled by those regions e.g. sleep

Cardiovascular

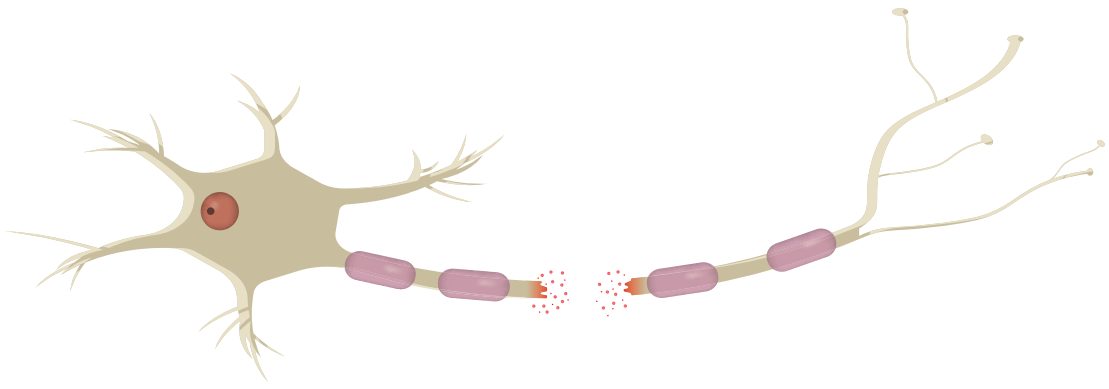
- Brain injuries can be caused by or may cause clotting issues in the brain
- Poor cardiovascular health makes these risks more likely

Respiratory

- Brain injury to respiratory centres can affect breathing

Musculoskeletal

- Damage to motor control areas in the brain can cause issues with balance, coordination and muscular strength, affecting mobility



C1.8.1 BREAST CANCER KNOWLEDGE ORGANISER

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Breast Cancer

Causes

An uncontrollable growth of abnormal cells, due to a combination of:

- Genetic factors – cancer-risk genes
- Lifestyle factors
  - alcohol consumption
  - overweight and obesity
- Environmental factors – exposure to radiation and oestrogen

Primary Effects on Reproductive System

- Changes in size or shape of one or more breasts
- Discharge from nipples
- Swelling in armpits
- Dimpling on breast skin
- Change in the appearance of the nipple

Secondary Effects on Interlinked Body Systems

- Metastasis: spreading to other parts of the body such as
  - Bones
  - Lungs
  - Liver
  - Brain
  - Leading to organ failure and death

C1.8.2 BOWEL CANCER KNOWLEDGE ORGANISER

tutor2u

Bowel Cancer

Causes

An uncontrollable growth of abnormal cells, due to a combination of:

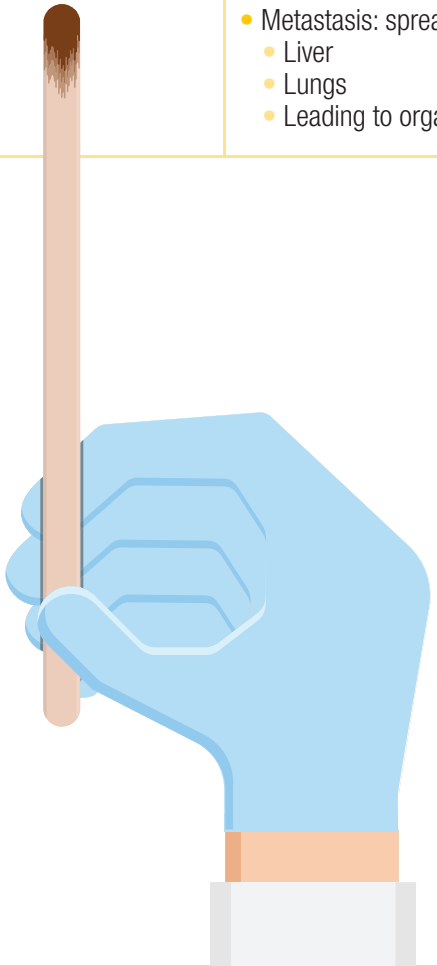
- Genetic factors – cancer-risk genes
- Lifestyle factors
  - Smoking
  - Consumption of red and processed meat
  - Alcohol consumption
  - Overweight and obesity
- Pre-existing conditions – inflammatory bowel disease

Primary Effects on Digestive System

- Changes in faeces
- Changes in occurrence of defaecating
- Bleeding from the anus/blood in stool
- Pain in the abdomen
- Bloating
- Weight loss

Secondary Effects on Interlinked Body Systems

- Effects on cardiovascular system:
  - Anaemia and persistent tiredness due to internal bleeding/ bleeding from the anus
- Effects on musculoskeletal system:
  - Loss of bone density/mass
  - Loss of muscle mass
- Metastasis: spreading to other parts of the body such as
  - Liver
  - Lungs
  - Leading to organ failure and death



C1.8.3 LUNG CANCER KNOWLEDGE ORGANISER

tutor2u

Lung Cancer

Causes

An uncontrollable growth of abnormal cells, due to a combination of:

- Genetic factors – cancer-risk genes
- Lifestyle factors
  - Smoking and tobacco use
- Environmental factors
  - Passive smoking
  - Exposure to certain chemicals and substances which are used in several occupations and industries such as arsenic and asbestos

Primary Effects on Respiratory System

- Persistent cough
- Recurrent chest infections
- Coughing up blood
- Pain when breathing or coughing

Secondary Effects on Interlinked Body Systems

- Effects on cardiovascular system:
  - Anaemia and persistent tiredness due to internal bleeding/ coughing up blood
  - Increased risk of blood clots
- Effects on digestive system:
  - Loss of appetite
  - Weight loss
- Effects on musculoskeletal system:
  - Loss of bone density/mass
  - Loss of muscle mass
- Metastasis: spreading to other parts of the body such as:
  - Brain
  - Bones
  - Liver
  - Adrenal glands
  - Leading to organ failure and death