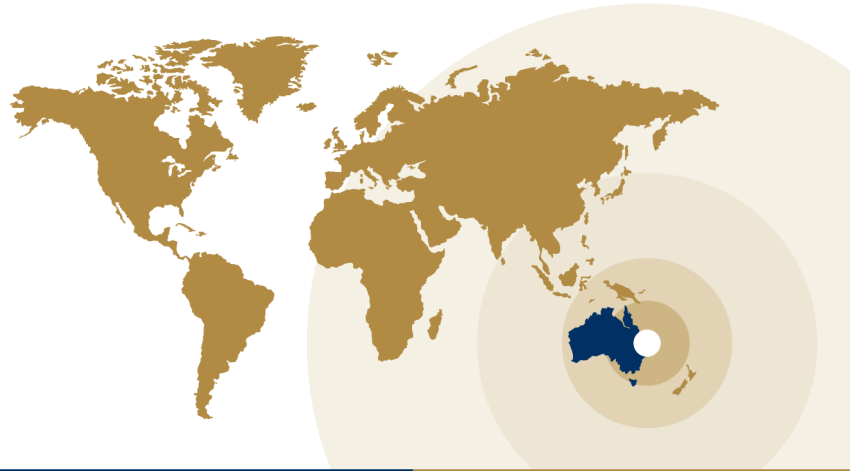


Make **CARE**
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CHARLTON BROWN®

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Training Division

CHC33015 Certificate III in Individualised Support

HLTAAP001

Recognise healthy body systems

Learning Materials

WELCOME

Welcome to this unit of study. As you work through the learning guide and assessment, you will be developing knowledge about this unit of study. If you do not understand an activity, ask questions and discuss any queries with your trainer, mentor or supervisor. It is important that you develop skills in a work situation, or, in a simulated situation which approximates the workplace as closely as possible.

We encourage you to contact us for assistance at any time. Simply call or email and CHARLTON BROWN® will be able to assist you.

COMPETENCY

In order to be assessed as competent (C), you will need to provide evidence which demonstrates that you have the essential knowledge and skills to successfully complete unit to the required standard.

Competency is simply being able to demonstrate that you can do the task, not just once, but with confidence, repeatedly. Please read the beginning of this unit, it will tell you that about the elements and the performance criteria you will be assessed against. It will also inform you of the knowledge and skills you require to successfully complete the unit. If you can already demonstrate that you can undertake these skills you should talk to your trainer.

Marking guide – at the end of each unit you will find a marking guide. This is designed to assist you

ASSESSMENT

1. Complete all the assessment tasks in the unit. You will find these in your Knowledge Assessment and Performance Evidence Books.
2. Have your supervisor sign the statement of validation that you can undertake these skills in the workplace.
3. Complete the Assessment Cover Sheet and sign all sections. Check the marking guide to ensure you have covered all elements of the assessment. The marking guide is used by the assessor to mark off your competency

The evidence you need to provide for an assessment of competence in this unit will be based on, but not limited to:

- Successful completion of assessment
- Verbal discussion and questioning by assessor
- Mentor / supervisor / workplace coach verification of skills
- Any other evidence you or your assessor have gathered
- Any other activities your assessor considers necessary

You are required to submit your work in a neat, orderly, detailed and organized manner. Use references in all your work.

This unit describes the skills and knowledge required to establish relationships, clarify needs, and then work collaboratively with people who are living with mental health issues. The unit applies to carers in contexts outside mental health sector, but who come into contact with people with mental health issues. The services and support provided are not mental health specific. This skills in this unit must be applied in accordance with Commonwealth and State/Territory legislation, Australian/New Zealand standard and industry codes of practice.

This unit describes the skills and knowledge required to work with basic information about the human body and to recognise and promote ways to maintain healthy functioning of the body.

This unit applies to any worker who needs to use and interpret information that includes references to client anatomy and physiology.

1. Work with information about the human body

- 1.1 Correctly use and interpret health terminology that describes the normal structure, function and location of the major body systems
- 1.2 Correctly use and interpret information that relates to the interrelationships between major components of each body system and other structures
- 1.1 Correctly use and interpret health terminology that describes the normal structure, function and location of the major body systems
- 1.2 Correctly use and interpret information that relates to the interrelationships between major components of each body system and other structures

2. Recognise and promote ways to support healthy functioning of the body

- 2.1 Review factors that contribute to maintenance of a healthy body
- 2.2 Evaluate how the relationships between different body systems affect and support healthy functioning
- 2.3 Enhance quality of work activities by using and sharing information about healthy functioning of the body

KNOWLEDGE EVIDENCE

The candidate must be able to demonstrate essential knowledge required to effectively complete tasks outlined in elements and performance criteria of this unit, manage tasks and manage contingencies in the context of the work role. This includes knowledge of:

- basic structure and functions of the body systems and associated components, including:
 - cells, tissues and organs
 - cardiovascular system
 - respiratory system
 - musculo-skeletal system
 - endocrine system
 - digestive system
 - urinary system
 - reproductive system
 - integumentary system
 - lymphatic system
 - nervous system, including sensory systems – eye and ear
 - the special senses – smell, taste, vision, equilibrium and hearing
 - immune system
- processes, conditions and resources required by the body to support healthy functioning
 - body regulation including:
 - maintenance of body temperature
 - fluid and electrolyte (including PH) balance

- elimination of wastes from the body
- maintenance of blood pressure
- protection from infection
- physical activity – active and passive

PERFORMANCE EVIDENCE

The candidate must show evidence of the ability to complete tasks outlined in elements and performance criteria of this unit, manage tasks and manage contingencies in the context of the job role. There must be evidence that the candidate has:

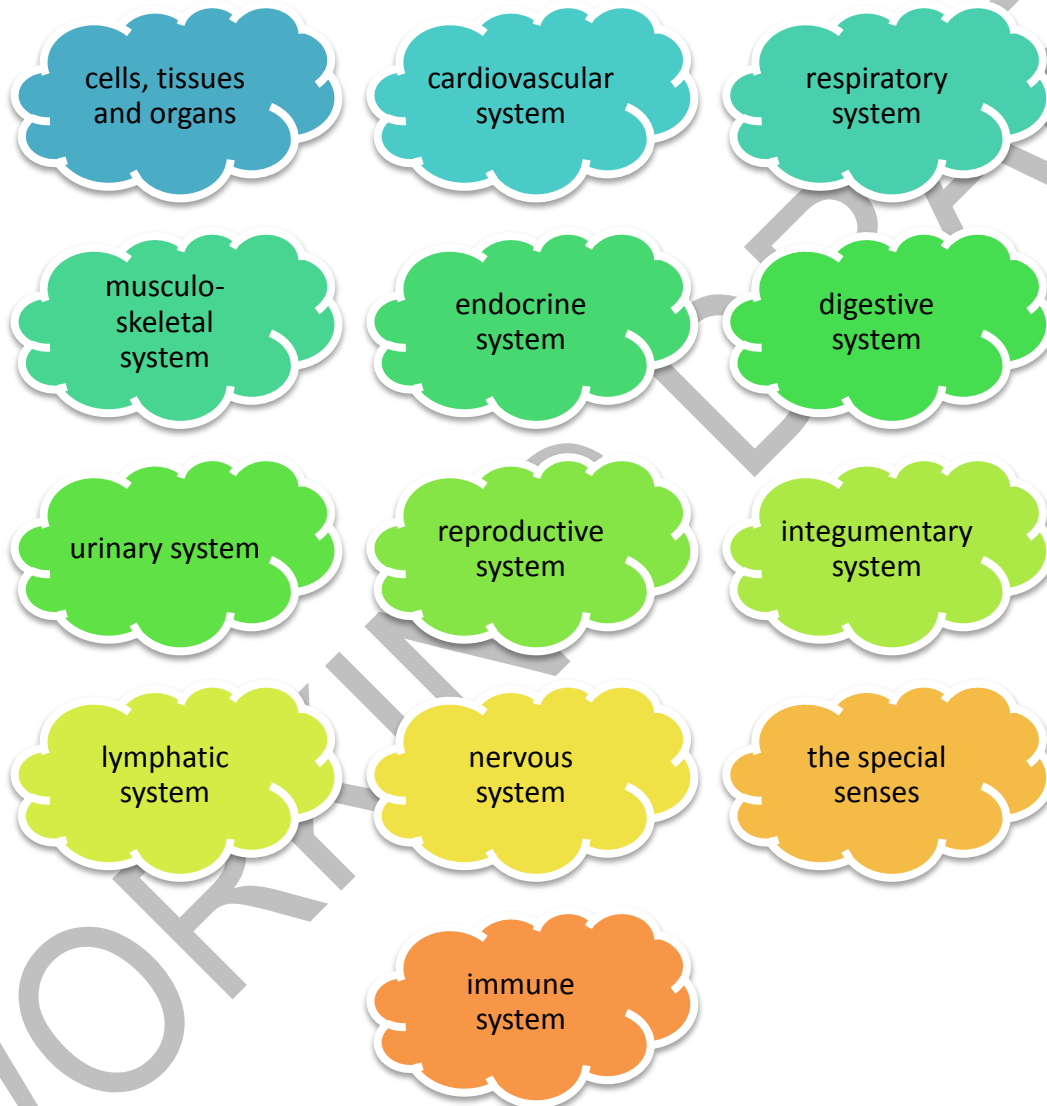
- worked effectively with information about the human body and its healthy functioning in at least 3 different situations

WORKING DRAFT

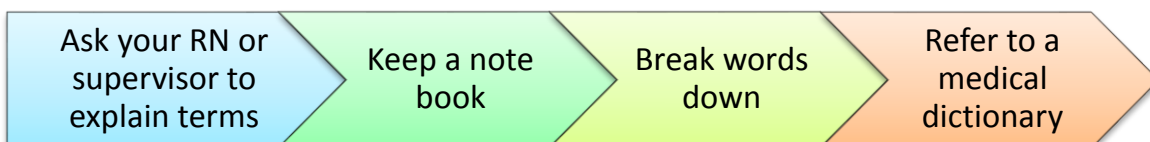
WORK WITH INFORMATION ABOUT THE HUMAN BODY

CORRECTLY USE AND INTERPRET HEALTH TERMINOLOGY THAT DESCRIBES THE NORMAL STRUCTURE, FUNCTION AND LOCATION OF THE MAJOR BODY SYSTEMS

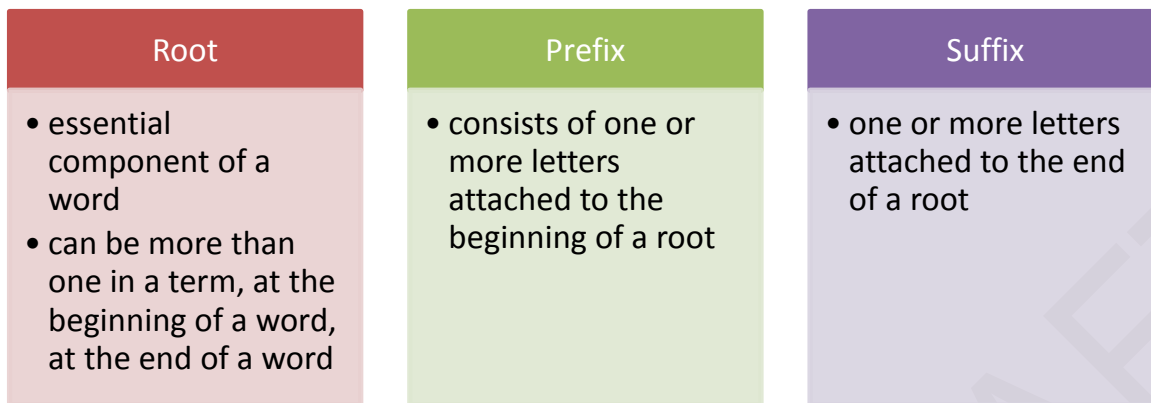
Basic structure and functions of the body systems and associated components, including:



Medical terms communicate a precise meaning. If a term is used incorrectly or misinterpreted, the consequences could range from misunderstanding to death. To learn medical and health terminology, you can:



A medical terminology is a combination of two or more parts that include:



Examples:

Medical area		Root examples			
Agents of infection – fungi		'myc' meaning 'fungus' as in 'mycosis'			
Body fluids – saliva		'sial' meaning 'saliva' as in 'sialogram'			
Body structure or anatomy – regions of the body		'pneumon' meaning 'lung' as in 'pneumonia'			
Chemical compounds – sugar		'gluc' meaning 'sugar' as in glucose'			
Colours		'leuk' meaning 'white' as in 'leukaemia'			
Physical factors – temperature		'therm' meaning 'heat' as in 'thermometer'			
Prefix	Meaning	Prefix	Meaning	Suffix	Meaning
a– or an-	without	hypo-	deficiency	-algia	pain
ab-	away from	inter-	between	-cele	swelling
ad-	towards	intra-	inside	-dema	swelling
anti-	against	pan-	all	-ectomy	surgical removal
asthen-	weakness or lack	poly-	many	-ism	condition
bi-	two	post-	after or behind	-itis	inflammation
endo-	within	pre-	before	-osis	disease or condition
edem-	swelling	sub-	below	-pathy	disease
epi-	upper	super- /supra-	above	-sclerosis	hardening
hyper-	excessive	trans-	across		

What is a cell?

The cell is the basic unit of the body structure. There are a number of different type (around 200) cells within the human body. Each cell is composed of:

Nucleus

- centre of the cell
- control centre of the cell

Cytoplasm

- surrounds the nucleus, and inside the plasma membrane
- site of most cellular activities

Cell membrane

- fragile, transparent barrier or the outer covering that separates them from the surrounding environment

Protoplasm

- all the structures, substances and water within the cell. It is a semi-liquid substance

Chromosomes

- threadlike structures within the nucleus
- contain genes which control the physical and chemical traits inherited by children from parents

To know more about the composition of a cell, please watch this video:

Mitosis

- process by which a cell reproduces by dividing in half
- needed for growth and repair of body tissues
- results in the formation of two daughter nuclei with exactly the same genes as the mother nucleus
 - when the nucleus divides, each daughter cells end up with exactly the same genetic information as the original mother cell

Specialised cells of the body

Cells that cover or line the body organs	Epithelial cell - shaped like honeycomb of beehives, which allows the cell to pack together in sheets
Cells that connect body parts	Fibroblast - makes and secretes protein building blocks of cable-like fibres Erythrocyte (red blood cell) - carries oxygen around the body
Cells that gather information and controls the body functions	Nerve cell (neuron) - receives messages and transmits them to other structures in the body
Cells that move organs and body parts	Skeleton muscle and smooth muscle cells - elongated cells that can shorten forcefully and move the bones or change the shape of internal organs
Cells that fight disease	Macrophage - this cell moves through tissue to reach infection sites where it digests the infectious micro-organism
Cells that store nutrients	Fat cell - a large spherical shape
Cells of reproduction	Oocyte (female) - an egg cell and the largest cell of the body Sperm (male) - a long, streamlined cell built for swimming to the egg for fertilization.

Tissues

- Groups of cells that are similar in structure and function and the four types of which are:

Epithelial Tissue – is the lining, covering and glandular tissue of the body; forms various glands in the body; line the nose, mouth, respiratory tract, stomach and intestines

Connective Tissue – is found everywhere in the body; it anchors, connects and supports other body tissues; example os these are bones, tendons, ligaments and cartilage

Tissues

Muscle Tissue – allows the body to move by stretching and contracting; the three types of which are: Skeletal muscle tissue, Cardiac muscle, Smooth muscle

Nerve tissue - receives and carries impulses from one part of the body to another

Organs

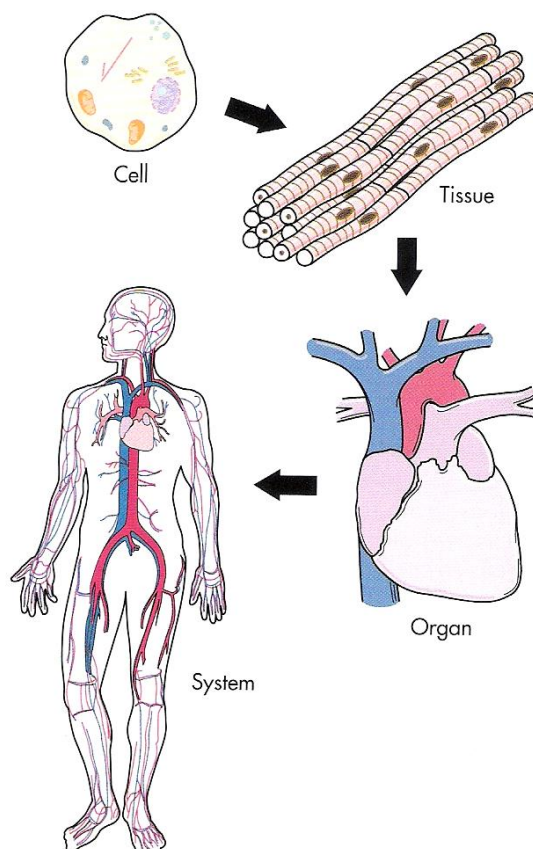
- Groups of tissues
- Performs one or more functions
- Examples of organs are:
 - heart
 - liver
 - lungs
 - brain
 - kidneys

Systems

- formed by groups of organs working together to perform special functions
- Examples of systems are:
 - Musculoskeletal system
 - Nervous system

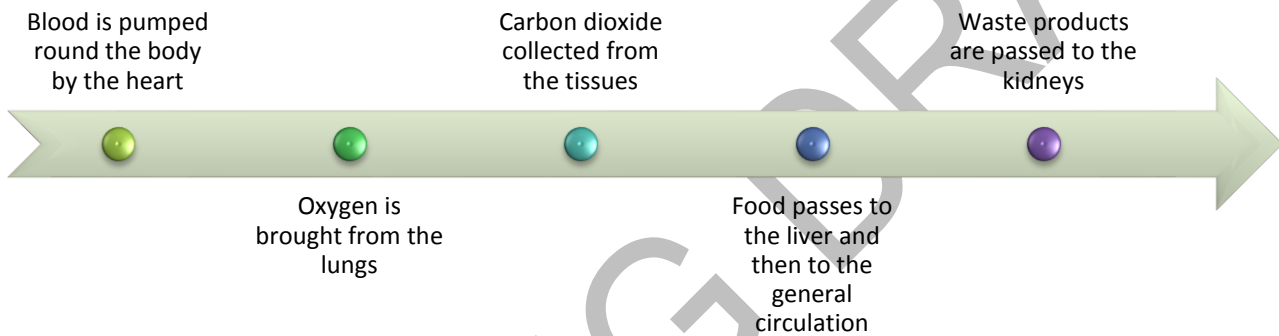
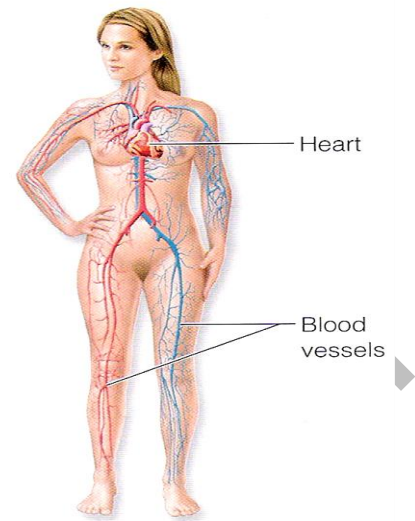
To know more about body cells, tissues, organs and systems, kindly watch this video:
https://www.youtube.com/watch?v=NOasipk_YjU

The organisation of the body



The Cardiovascular System

- an organ system that permits blood to circulate and transport nutrients (such as amino acids and electrolytes), oxygen, carbon dioxide, hormones, and blood cells to and from the cells in the body to:
 - provide nourishment
 - help in fighting diseases
 - stabilize temperature and pH (acidity)
 - maintain homeostasis (balance)
- includes the heart, blood vessels, lymphatic vessels, lymph nodes, spleen and the blood being the principle transporter
- involves the following process:



Blood is the only fluid tissue in the body. Blood consists of liquid called **plasma** and cells. Plasma carries water, nutrients, waste products and fibrinogen, which helps the blood clot. It also carries gamma globulin that helps protect against some infections.

There are three kinds of blood cells:

Red blood cells – erythrocytes

- produced in the bone marrow and carry oxygen to the cells and carbon dioxide away
- Haemoglobin – is what gives blood its colour

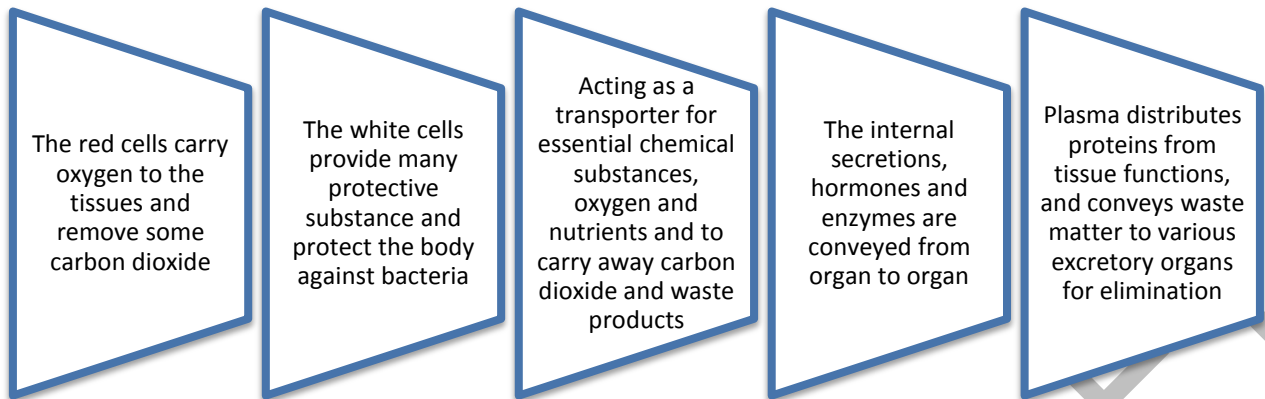
White blood cells – leucocytes

- produced in the lymph glands, spleen, liver, lymphatic tissue and bone marrow
- they protect the body by surrounding and ingesting germs and other micro-organisms

Platelets – thrombocytes

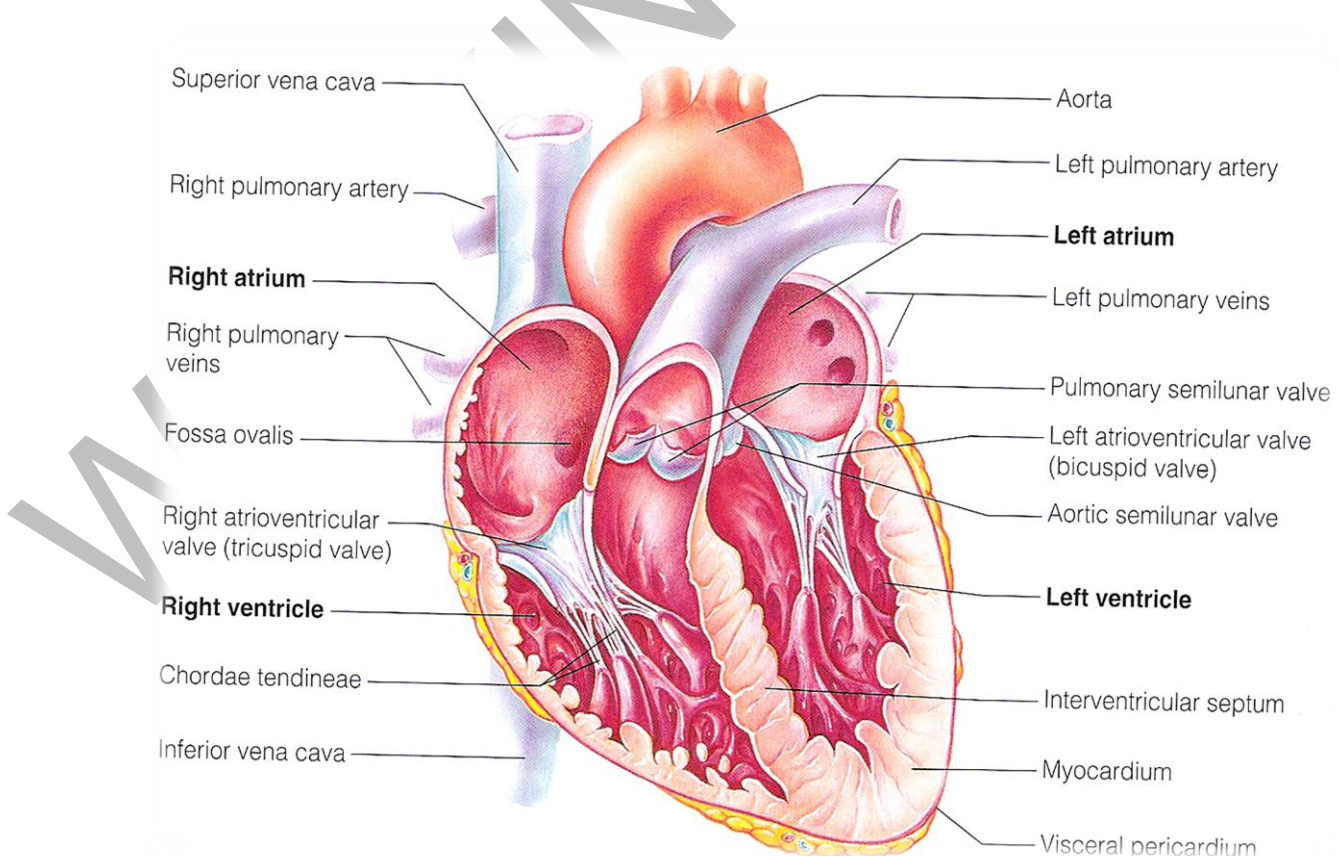
- produced in the bone marrow and important in blood clotting

The functions of blood include:



The heart

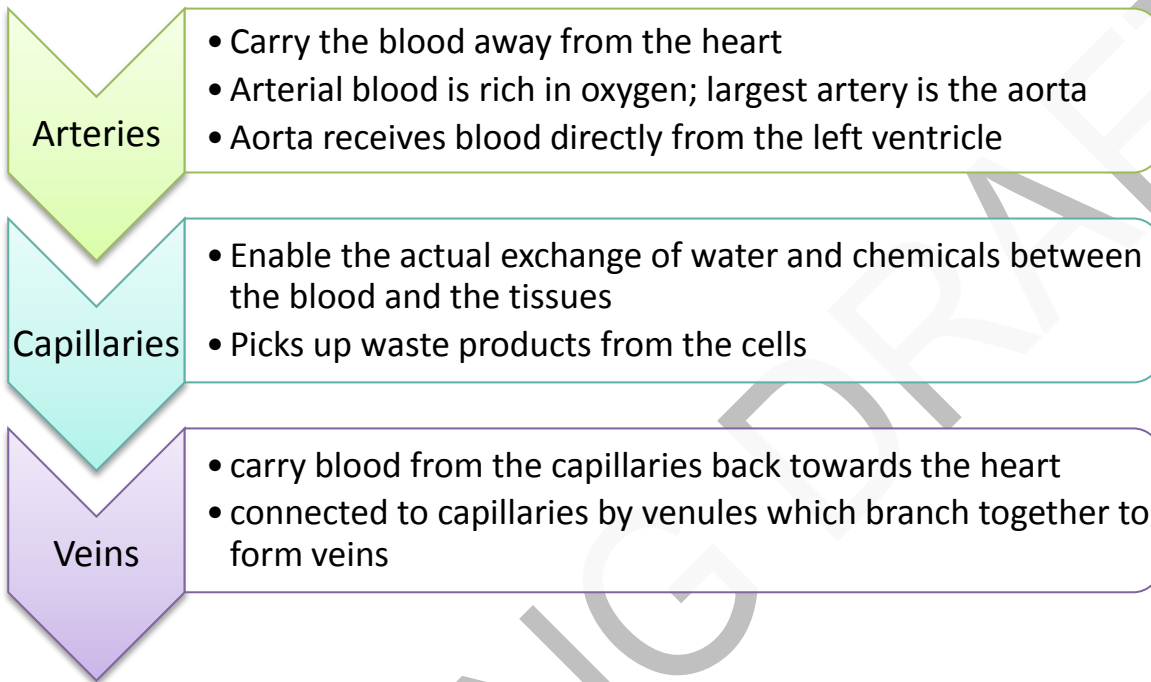
- is a muscle and pumps blood through the blood vessels to the tissues and cells
- located in the middle to lower section of the chest cavity towards the left side
- hollow and has three layers:
 - Pericardium - is the outer layer, which is a thin sac covering the heart
 - Myocardium - is the second layer and the thick muscle portion of the heart
 - Endocardium - is the thin layer and is the membrane lining the inner surface of the heart
- is divided into two ventricles, each of which has two chambers:
 - the upper chamber or atrium and the lower chamber or ventricle
 - blood flows in one direction only – from the atrium to the ventricle



Cardiac cycle

- cardiac cycle refers to the events of one complete heart beat during which both the atria and ventricles contract and then relax
- to see what cardiac cycle is, please watch this video: <http://study.com/academy/lesson/the-cardiac-cycle-phases-explanation-terms.html>

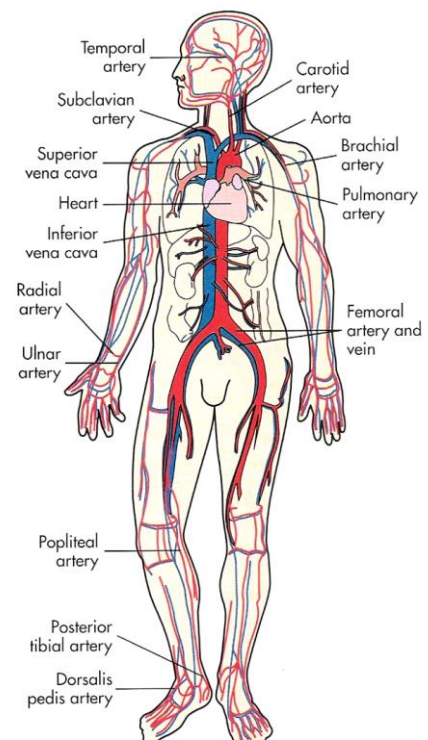
Blood flows to body tissues and cells through the blood vessels. There are three groups of blood vessels:



Pulmonary circulation is to carry blood to the lungs for gas exchange and then return it the left side of the heart. Systemic circulation supplies oxygen and nutrient rich blood to all body organs.

Summarised as follows:

- Venous blood, poor in oxygen, empties into the right atrium.
- Blood flows through the tricuspid valve into the right ventricle.
- The right ventricle pumps the blood into the lung to pick up oxygen.
- Oxygen-rich blood from the lungs enters the left atrium.
- Blood from the left atrium passes through the mitral valve into the left ventricle.
- The left ventricle pumps the blood to the aorta, which branches off to form other arteries.
- The arterial blood is carried to the tissues by arterioles and to the cells by capillaries.
- The cells and capillaries exchange oxygen and nutrients for carbon dioxide and waste products.
- Capillaries connect with venules.



- Venules carry blood that contains carbon dioxide and waste products.
- The venules form veins.
- Veins return blood to the heart.

Signs of cardiovascular system not working efficiently or of cardiac problems include:

- Chest pain
- Dizziness
- Lack of energy
- Tingling arms
- Numbness
- Weakness
- Headaches
- Pain in the limbs and other parts of the body.

If you suspect a client is having a heart attack, you should call emergency services immediately by dialling 000. Immediate medical attention can lessen the likelihood of a stroke or other negative side effects or death.

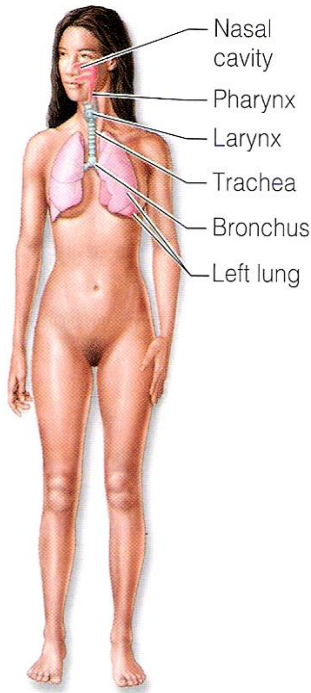
In health and community services facilities, call for the RN/ supervisor immediately, or follow your emergency plan.

Take note of the following medical terminologies:

Terminology	Meaning
Angina	Angina may indicate the presence of coronary artery disease. Discomfort is caused by an insufficient flow of blood to the heart
Aorta	An artery attached to the left ventricle of the heart. Oxygenated blood flows from the heart to the rest of the body via the aorta
Atria	The heart has two atria – the left and the right atrium. The left atrium receives deoxygenated blood whereas the right atrium receives oxygenated blood.
Cardiac arrest	Occurs when the heart fails to work properly and blood flow is stopped
Cardiomyopathy	Means that a person's heart muscle is not working efficiently and effectively. Signs and symptoms depend on the severity of the disease
Coronary artery disease	Caused by narrowing of the arteries, slowing the flow of blood to the heart
Heart murmur	Additional sound made by the heart. Can indicate that a person has a defective valve.
Pulmonary circuit	Consists of the blood vessels located between the right ventricle and left atrium of the heart
Stroke	Occurs when the flow of blood to the brain is stopped and brain damage occurs
Ventricles	The heart is divided into four chambers. The lower two chambers are the left and right ventricles. Blood is pumped from the atria into the ventricles

To know more about the cardiovascular system, please watch this video:
<https://www.youtube.com/watch?v=qUbhG-jweh0>

The Respiratory System



Keeps blood constantly supplied with oxygen and removes carbon dioxide; the gaseous exchanges occur through the walls of the air sacs of the lungs

The respiratory system includes the nose, pharynx, larynx, trachea, bronchi and their smaller branches, and the lungs. Air contains about 21% oxygen, and every cell in the body requires oxygen for survival.

The respiratory system is concerned with breathing which functions to take oxygen from the air into the blood and carry it to the tissues. The waste product, carbon dioxide, is carried by the blood from the body tissues to the lungs and breathed out in the expired air.

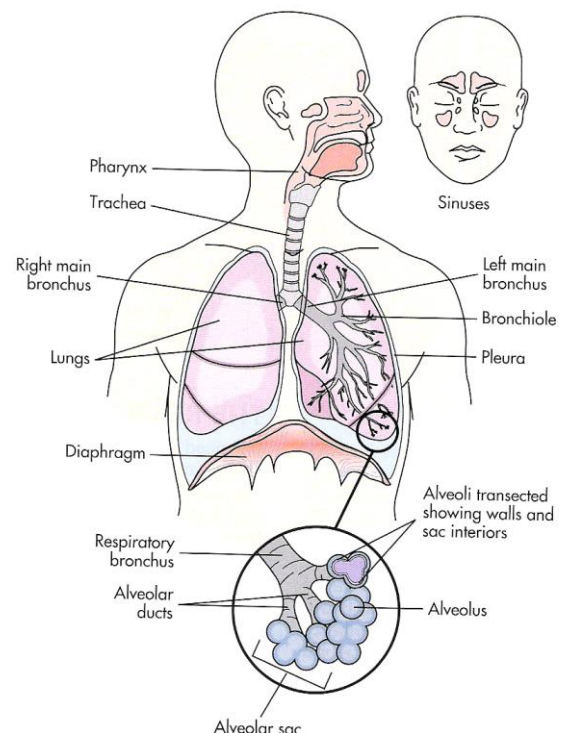
Respiration rate is how many breaths a person takes in one minute. 'In and Out' equals one breath. During observation/assessment respiration rate also takes into consideration the rate of breath, depth, pattern and use of accessory muscles.

An adult respiration rate range is 12-20 breaths per minute. Children and the elderly vary to adults. Ways of measuring lung capacity and breathing is done by using a test called *peak flow*. Peak flow rate measures how hard someone can blow out air.

The process of supplying the cells with oxygen and removing carbon dioxide from them is called *respiration*. Respiration involves *inhalation* (breathing in) and *exhalation* (breathing out) is also used.

In breathing, the air is filtered by the hairs in the nose and warmed and moistened by contact with the mucous surfaces. The air then passes through the pharynx to the larynx and through the trachea, which removes particles of dust and pollen. A piece of cartilage called the *epiglottis* acts like a lid over the larynx. The epiglottis prevents food from entering the airway during swallowing. During inhalation, the epiglottis lifts to let air pass over the larynx. Air passes from the larynx into the *trachea* (*wind pipes*).

The trachea divides into the *right bronchus* and *left bronchus* before they enter the lungs. The bronchi further divide many times into smaller branches called *bronchioles*. The bronchioles subdivide and end in tiny one-celled air sacs called *alveoli*.



Alveoli are supplied by capillaries. Oxygen and carbon dioxide are exchanged between the alveoli and capillaries. Alveoli pick up carbon dioxide from the blood in the capillaries for exhalation. Blood in the capillaries pick up oxygen from the alveoli then returns to the left side of the heart.

The two lungs are situated in the thoracic cavity. The lungs are divided into lobes, three lobes in the right lung and two lobes in the left lung. The lungs are covered by a two-layered sac called the *pleura*. One layer is attached to the lung and the other layer is attached to the chest wall. The pleura secrete a very thin fluid that fills the space between the layers. This fluid prevents the layers rubbing together during inhalation and exhalation.

Each lobe consists of a number of lobules. A small bronchial tube enters each lobule and divides and subdivides, its walls becoming thinner until it ends up in small dilated sacs – the air sacs of lung or alveoli. The base of the lungs is attached to the diaphragm, which expands and contracts in inspiration and expiration.

Terminology	Meaning
Asthma	Caused by a blocked or narrowed airways. Asthma makes breathing difficult
Bronchitis	Bronchi become inflamed or diseased, resulting in coughing, wheezing and general difficulty in breathing
Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease (COPD) is a general term that can refer to any one of many respiratory conditions. Bronchitis and emphysema are both examples
Emphysema	Damage to the lungs, unable to process gases efficiently and effectively. The person usually had trouble breathing and may suffer from fatigue
Lung cancer	Often caused by lifestyle choices such as exposure to toxins such as asbestos or smoking
Sleep apnea	Refers to a period where a person doesn't breathe. Refers to a number of conditions that prevent people from breathing for a short period of time while they are sleeping

To know more about the respiratory system, please watch this video: <https://www.youtube.com/watch?v=YUg-AVMh9Uc>

The Musculo-skeletal system

This system incorporates the two systems of the muscular and skeletal system. As support workers, it is essential to have a working knowledge of these systems. You may find yourself working with residents/ clients who may have:

- Low bone density
- Complete exercise as part of their care plan
- Have trouble communicating due to problems with facial muscles
- Have a shuffling gait and a hunching of the shoulders
- loss of muscle strength :
 - Experience trouble lifting or moving objects
 - Increased risk of injury around the home

- Problems being able to maintain the house and garden
- Increased risk of falls

Using this knowledge can ensure:

- The environment is free from hazards that could lead to trips and falls
- The environment is well lit to prevent falls
- Assist with safe transfer
- Provide appropriate care to compensate for muscle or bone weakness
- Assist clients to complete rehabilitation exercises
- Communicate effectively with residents/ clients with limited facial movement.

Terminology	Meaning
Muscular dystrophy	A condition that arises when the muscles waste away caused by a genetic disorder
Curvature of the spine	Any persistent , abnormal deviation of the vertebral column from its normal position
Osteoporosis	Increasing porosity and fragility of the bones
Arthritis	Any inflammatory condition of the joints
Muscular tremor	Minute regular involuntary contraction of individual muscles

To know more about the muscular-skeletal system, please watch this video:
<https://www.youtube.com/watch?v=g6sLwgUHwTk>

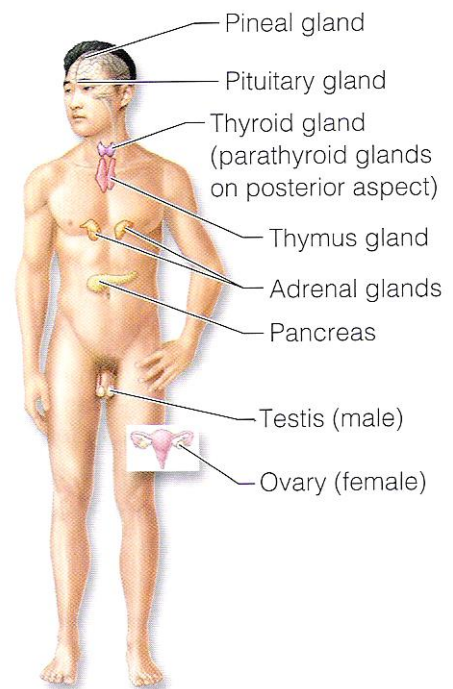
The Endocrine System

Glands secrete hormones that regulate processes such as growth, reproduction, and nutrient use (metabolism) by body cells

The endocrine system is made up of glands called the *endocrine glands*.

The glands secrete chemical substances called **hormones** into the bloodstream. Hormones regulate the activities of other organs and glands in the body.

The *master gland* is the **pituitary gland**. The pituitary gland is about the size of a pea and hangs by a stalk from the inferior surface of the hypothalamus of the brain. It has two functional lobes – *anterior pituitary* (glandular tissue) and the *posterior pituitary gland* (nervous tissue).



The **anterior pituitary lobe** secretes:

- *Growth hormones* – needed for the growth of muscles, bones and other organs. It's required throughout life to maintain normal sized bones and muscles. Helps to maintain blood sugar homeostasis.
- *Thyroid-stimulating hormone* (TSH) – needed for the thyroid gland function
- *Adrenocorticotrophic hormone* (ACTH) – stimulates the adrenal gland.

The anterior lobe also secretes hormones that regulate the growth, development and functions of the male and female reproductive system.

The **posterior pituitary lobe** secretes *antidiuretic hormones* (ADH) and *oxytocin*. ADH prevents the kidneys from excreting excessive amounts of water. Oxytocin causes the uterine muscles to contract during childbirth.

The **thyroid gland** is located at the base of the throat. *Thyroid hormone* controls the rate at which glucose is 'burned' and converted to body heat and chemical energy. It is also important for normal tissue growth and development, especially in the reproductive and nervous system.

The **parathyroid glands** are in pairs (total of four) and found on the posterior surface of the thyroid gland (each side of the thyroid gland). Calcium is regulated by the parathyroid gland. They secrete *parathormone* (parathyroid hormone). Calcium is required for nerve and muscle function.

The **adrenal glands** are found on top of each kidney. This gland has two parts: the *adrenal medulla* and the *adrenal cortex*.

The *adrenal medulla* secretes *epinephrine* and *norepinephrine*. These hormones stimulate the body's response to quickly produce energy during emergencies: heart rate, muscle power, blood pressure and energies all increase.

The *adrenal cortex* secretes:

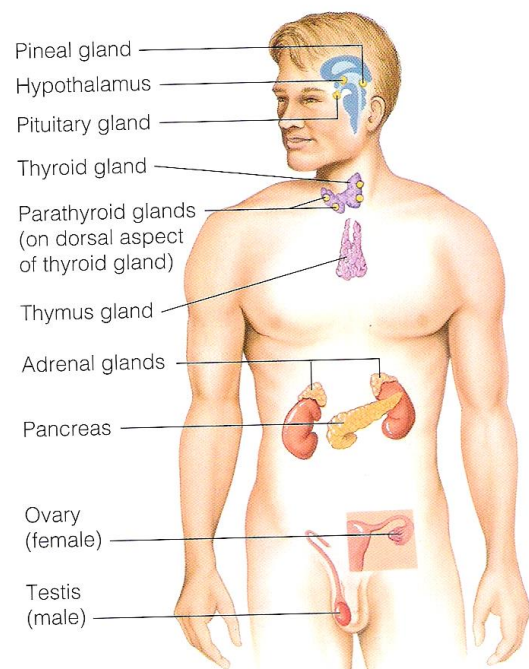
- *Glucocorticoids* regulates carbohydrates metabolism; including controlling the body's response to stress and inflammation
- *Mineralocorticoid* regulates the amount of water and salt that is absorbed and lost by the kidneys.
- Also secretes small amounts of male and female sex hormones

The **pancreas** secretes *insulin*. Insulin regulates the amount of sugar in the blood for use by the cells. Insulin is needed for the sugar to enter the cells.

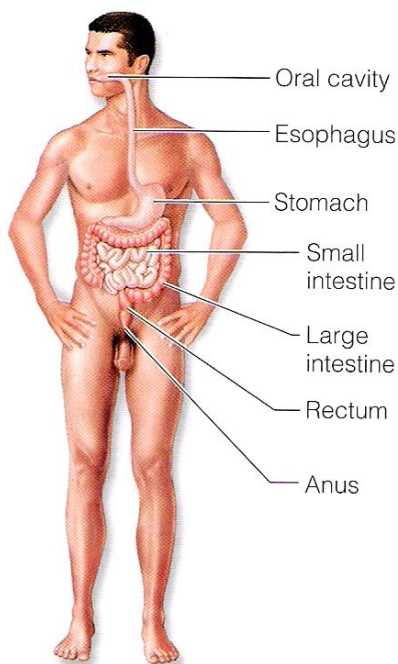
The *gonads* are the glands of human reproduction:

- Male – *testes* secrete *testosterone*
- Female – *ovaries* secrete *oestrogen* and *progesterone*.

To know more about the endocrine system, please watch this video:
<https://www.youtube.com/watch?v=nNLsXKKLSTs>



The Digestive System



Breaks food down into absorbable units that enter the blood for distribution to body cells; indigestible foodstuffs are eliminated as faeces.

The digestive system can be broken into two main groups:

1. Those forming the *alimentary canal* – performs the whole menu of digestive functions (ingestion, absorbs and defecates)
2. *Accessory digestive organs* (teeth, tongue, and several large digestive glands) assist the process of digestive breakdown in various ways.

The **alimentary canal**, also known as the **gastrointestinal (GI) tract**, is a continuous coiled, hollow muscular tube that winds through the ventral body cavity and is open at both ends.

Food is chewed and mixed with *saliva* in the mouth (oral cavity) and is swallowed, passing down the *pharynx* and *oesophagus* to the *stomach* where it is mixed with *gastric enzymes* and *hydrochloric acid*. It is held in the stomach by the *sphincter muscle*. Food leaves the stomach in a semi-liquid form called *chyme*. *Peristalsis* is involuntary muscle contractions which is how food moves through the oesophagus, stomach and through the small intestine.

Food is further broken down in the small intestine by intestinal and pancreatic enzymes and bile from the liver.

The small intestine has three parts: the *duodenum*; the *jejunum*; and the *ileum*. Nutrients are absorbed into the blood stream through the wall of the small intestine. Food passes to the large intestine or colon and water is removed, changing waste to a more solid form. Peristalsis moves the waste to the rectum where it is eliminated through the anus.

Metabolism is all the chemical reactions that take place in the body. Catabolic reactions break down complex compounds to release energy, anabolic reactions synthesise complex compounds to use energy.

The liver being the body's largest gland plays an important part in metabolism. The liver modifies the nutrients absorbed from the gut and stored elsewhere in the body to make them suitable for use in the tissues and modifies waste products and toxic substances to make them suitable for excretion in the bile or urine.

Terminology	Meaning
Cirrhosis	Disease of the liver causing a change to the bowel habits, nausea, vomiting and stomach pain
Constipation	Difficulty expelling faeces
Dysphagia	Difficulty swallowing

Faecal incontinence	Difficulty maintaining bowel control
Gastroenteritis	Inflammation of the gastrointestinal tract resulting in diarrhoea
Gingivitis	Diseased, damaged or inflamed gums
Reflux	Heart burn/ vomiting
Ulcers	Break down of the lining in the digestive system, can occur in the stomach, small intestines

Please click on this link for a thorough discussion about the digestive system.
<https://www.youtube.com/watch?v=eTMz1cblZc>

The Urinary System

Eliminates nitrogenous wastes from the body; regulates water, electrolyte, and acid-base balance of the blood

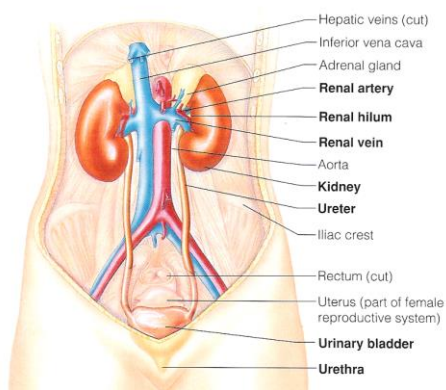
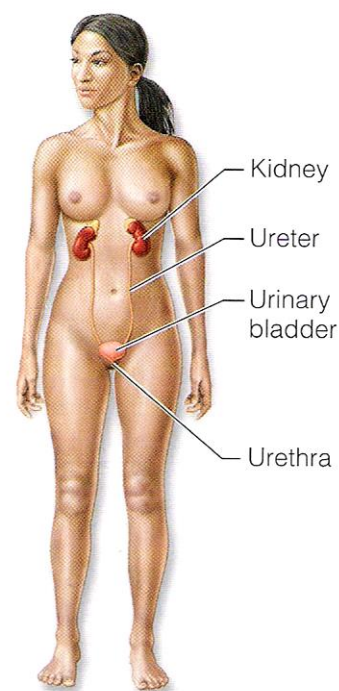
The function of the urinary system is to:

- Remove waste products from the blood
- Maintain water balance within the body

The urinary system includes: the *kidneys*; *ureter*; *urethra* and *bladder*.

The *kidneys* are two bean-shaped organs in the upper abdomen. They lie against the muscles of the back, on each side of the spine. They are protected by the lower edge of the rib cage.

The kidneys have a layer of cortex, which produces urine and a middle layer (*medulla*) of tubes that drain the urine towards the inner pelvis of the kidney. Each kidney has over a million tiny *nephrons*. The nephron has a convoluted tubule, which is a tiny coiled tubule. Each capsule convoluted tubule has a *Bowman's* capsule as one end. The capsule partially surrounds a cluster of capillaries called a *glomerulus*. Blood passes through the glomerulus and is filtered by the capillaries. The fluid portion of the blood is squeezed into the Bowman's capsule. The fluid then passes into tubule. Most of the water and other necessary substances are reabsorbed by the blood and recirculated through the body. The rest of the fluid and the water products form urine in the tubule. Urine flows through the tubule to a *collecting tubule*. All the collecting tubules within the millions of nephrons drain into the *renal pelvis* within the kidney. A tube, called the *ureter*, is attached to the renal pelvis of the kidney. The ureter carry urine form the kidneys to the bladder. The *bladder* is a hollow muscular sac situated towards the front in the lower part of the abdominal cavity.



Urine is stored in the bladder until the desire to urinate is felt. The need to urinate usually occurs when there is about 250ml of urine in the bladder. Urine passes from the bladder through the urethra. The opening at the end of the urethra is the *meatus*. Urine passes from the body through the meatus. Urine is a clear, yellowish

fluid.

Kindly watch this video for a thorough discussion of the urinary system.
<https://www.youtube.com/watch?v=lfGYd1wrTgE>

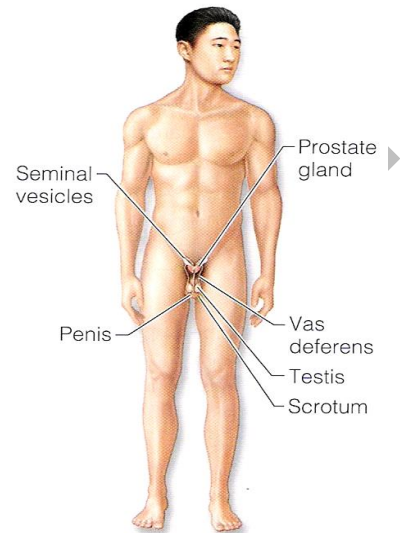
The reproductive System

Overall function of the reproductive system is production of offspring.

Female – Ovaries produce eggs and female sex hormones; remaining structures serve as sites for fertilization and development of the fetus. Mammary glands of female breast produce milk to nourish the newborn.

Overall function of the reproductive system is production of offspring.

Male – Testes produce sperm and male sex hormones; ducts and glands aid in delivery of viable sperm to the female reproductive tract.



Human reproduction results from the union of a female sex cell and a male sex cell. The structures of the male and female reproductive system are different. The differences allow for the process of reproduction.

Female Reproductive System

The female gonads are two almond-shaped glands called *ovaries*.

There is an ovary on each side of the uterus in the abdominal cavity. The ovaries contain *ova*, or eggs. *Ova* are the female sex cell.

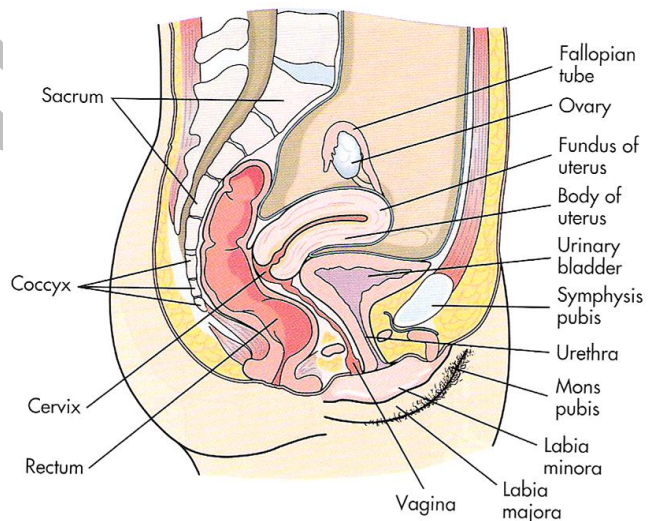
One ovum is released monthly during the reproductive years release of the ova from an ovary is called *ovulation*.

The ovaries also secrete the female hormones *oestrogen* and *progesterone*.

These hormones are required for the functioning of the reproductive system. They are also needed for the development of secondary sex characteristics in the female.

These include increase in breast size, pubic and auxiliary hair, slight deepening of the voice and widening and rounding of the hips.

When an ovum is released from an ovary, it travels through a *fallopian tube*. The fallopian tubes are attached at one end to the *uterus* and there are two, one on either side of the uterus. The ovum travels through the fallopian tube to the uterus.



The uterus is a hollow, muscular organ shaped like a pear. It is in the centre of the pelvis cavity, behind the bladder and in front of the rectum. The main part of the uterus is the *fundus*. The neck or narrow section of the uterus is the *cervix*. Tissue lining the uterus is called the *endometrium*. There are many blood vessels in the endometrium. When sex cells from the female and male unite into one cell, that cell implants into the endometrium where it grows into a baby. The uterus serves as a place for the unborn baby to grow and receive nourishment.

The cervix of the uterus projects into a muscular canal called the *vagina*. The vagina opens to the outside of the body. It is located just behind the urethra. The vagina receives the penis during sexual intercourse. It also is the birth canal. Glands in the vaginal wall keep it moistened with secretions.

Menstruation

Even though the uterus is the receptacle in which the young embryo implants and develops, it is only receptive to implantation only for a very short period each month. This is seven days after ovulation. If pregnancy does not occur, the endometrium breaks up and is discharged through the vagina to the outside of the body. This process is called *menstruation*. Menstruation occurs about every 28 days. It is also called the *menstrual cycle*.

Fertilisation

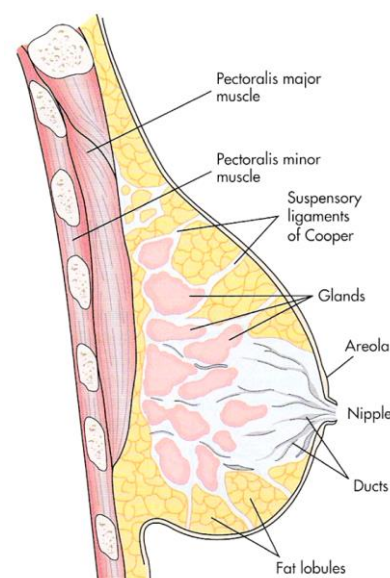
For reproduction to occur a male sex cell (sperm) must unite with a female sex cell (ovum). The uniting of the sperm and ovum into one cell is called *fertilisation*. A sperm has 23 chromosomes and an ovum has 23 chromosomes. When the two cells unite, the fertilized cell has 46 chromosomes.

During intercourse, millions of sperm are deposited into the vagina. Sperm travel up the cervix, through the uterus and into the fallopian tubes. If fertilisation occurs the cell travels down the fallopian tube to the uterus and implants into the thick endometrium and grows during pregnancy.

The *mammary glands (breasts)* secrete milk after childbirth. They are on the outside of the chest. They are made up of glandular tissue and fat. The milk drains into ducts that open onto the nipple.

The external genitalia of the female are referred to as the *vulva*:

- The *mons pubis* is a round fatty pad over a bone called the *symphysis pubis*. In the adult female, the mons pubis is covered with hair.
- The *labia majora* and *labia minora* are two folds of tissue located on each side of the vaginal opening.
- The *clitoris* is a small organ composed of erectile tissue. The clitoris becomes hard when the woman is sexually stimulated.



The structure of the male reproductive system

The *testes (testicles)* are the male sex glands. Sex glands are also called *gonads*. The two testes are oval glands. Male sex cells, called *sperm cells*, are produced in the testes.

Testosterone, the male hormone, is also produced in the testes. This hormone is required for the functioning of the reproductive organs. Plus is also needed for the development of the male secondary sex characteristics: facial hair; pubic and axillary hair; hair on the arms, chest and legs; deepening of the voice; and increase in neck and shoulder size. The testes are suspended between the thighs in a sac called the *scrotum*; this is made up of muscle and skin.

Sperm travels from the testis to the *epididymis*. The epididymis is a coiled tube on top and to the side of the testis. From the epididymis, sperm travel through a tube called the *vas deferens*. Eventually each vas deferens joins a *seminal vesicle*. The two seminal vesicles store sperm and produce semen.

Semen is a fluid that carries the sperm from the male reproductive tract. The ducts of the seminal vesicles unite to form the *ejaculatory duct*. The ejaculatory duct passes through the *prostate gland*. This gland secretes fluid into the semen. As the ejaculatory ducts leave the prostate, they join the *urethra*. The urethra is the outlet for both urine and semen. The urethra is contained within the penis.

The penis is outside the body and has erectile tissue. When a man becomes sexually excited, blood fills the erectile tissue. This causes the penis to become enlarged, hard and erect. This erect penis can enter the vagina of the female reproductive tract. The semen, which contains sperm, is then released into the vagina.

Terminology	Meaning
Acute incontinence	Acute loss of control of the bladder (or bowel) can occur as a result of an injury or illness (can be cured)
Chronic incontinence	Develops over time and can be managed
Cystitis	Infection of the urinary tract that can be caused by sexual activity or poor hygiene
Dialysis	A process involving removing blood from the body, removing waste from the blood and then returning the blood to the body
Enuresis	Bed wetting. As cognitive ability declines a person may begin to wet their bed, or anyone with disabilities unable to get out of bed to the toilet in time.
Haematuria	Occurs when there is blood in the urine
Incontinence	Inability to control bowel or bladder functions
Renal	Relates to the kidneys
Urologist	Doctor who specializes in the urinary tract

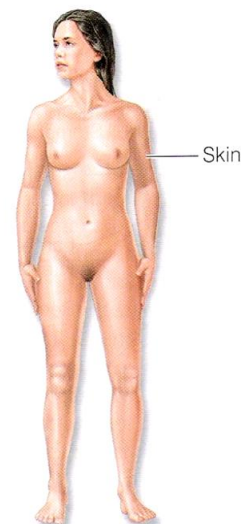
For a thorough discussion about the reproductive system, please watch this video:

<https://www.youtube.com/watch?v=xTkhhXqxb8>

The integumentary system

Forms the external body covering; protects deeper tissue from injury; synthesizes vitamin D; location of cutaneous (pain, pressure, etc) receptor and sweat and oil glands

The skin is called Integument, which simply means “covering”.



The Integumentary system consists of the skin, hair and nails, and is the largest body system.

WORKING DRAFT

The Integumentary system has many functions:

- It insulates and cushions the deeper body organs
- Protects the entire body from mechanical damage (bumps & cuts), chemical damage (acids) thermal damage (heat & cold), ultraviolet radiation (sunlight), and bacteria.
- It prevents excessive amounts of water from leaving the body
- Nerve endings in the skin sense both pleasant and unpleasant stimulation. There are nerve endings over the entire body. The skin senses cold, pain, touch and pressure, to protect the body from injury.
- It helps regulate body temperature. Blood vessels dilate (widen) when the temperature outside the body is high. More blood is brought to the body surface for cooling during evaporation. When blood vessels constrict (narrow), the body retains heat because less blood reaches the skin.

The skin is made up of epithelial, connective and nerve tissue. It also has oil and sweat glands. Sweat and oil glands, hair and nails are skin appendages.

Sweat glands are widely distributed in the skin. These glands help regulate the body temperature. Sweat is secreted through pores in the skin. As sweat evaporates, it cools the body. Sweat consists of water, salt and a small amount of wastes.

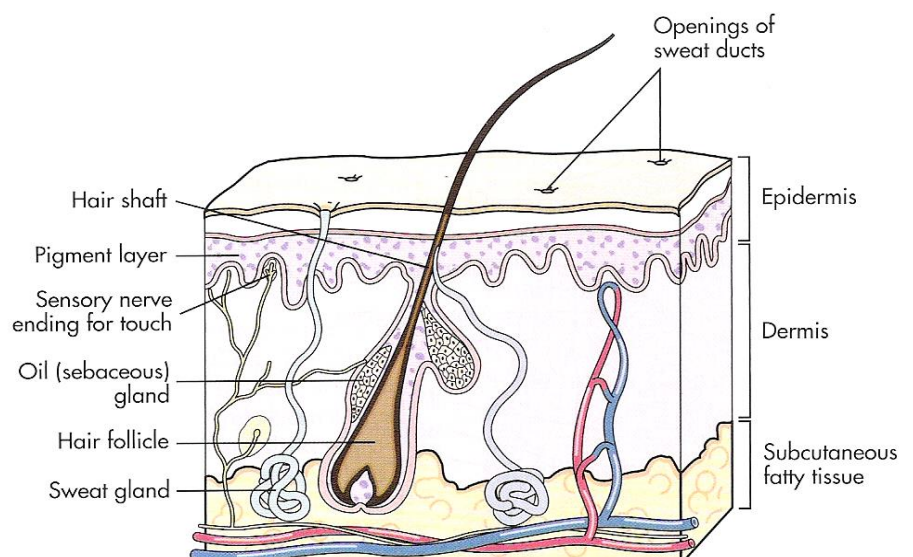
Oil glands lie near the hair shafts and secrete an oily substance into the space near the hair shaft. This oil travels to the skin surface, helping to keep the hair and skin soft and shiny.

Hair and Hair Follicles - There are millions of hairs scattered all over the body. The entire body except for the hands and soles of the feet are covered with hair. The hair in the nose, ears and eyes (eyelashes) protect these organs from dust, insects and other foreign objects.

Nails - Nails protect the tips of the fingers and toes. Nails help the fingers pick up and handle small objects. They are a scale like modification of the epidermis.

Nails have a *free edge*, a *body* (visible attached portion), and a *root* (embedded in the skin). The borders of the nail are overlapped by skin folds, called *nail folds*. The thick proximal nail fold is called the *cuticle*

Nails are transparent and colourless, appearing pink due to rich flow of blood in the underlying dermis, when the supply of oxygen in the blood is low; the nail beds take on a cyanotic (blue) cast. The visible portion of the nails is also composed of *keratinized, dead cells*.



There are two skin layers: the epidermis and the dermis:

- The **epidermis** is the outer layer. Contains living and dead cells. The dead cells once were deeper in the epidermis, being pushed outwards as other cells divide. Dead cells constantly flake off and are replaced with living cells. Living cells also die and flake off. Living cells of the epidermis contain pigment, called melanin which gives skin its colour. The epidermis has no blood vessels and few nerve endings.
- The **dermis** is the inner layer. It is made up of connective tissue. Blood vessels, nerves, sweat and oil glands and hair roots are found in the dermis. The blood vessels of the dermis play a role in maintaining temperature homeostasis (balance).

Skin colour

Three pigments contribute to skin colour:

- The amount and kind of *melanin* in the epidermis
- The amount of *carotene* deposited in the stratum corneum and subcutaneous tissue
- The amount of *oxygen-rich haemoglobin* in the dermal blood vessels

Additional Information

The older person in aged or community care tends to spend a lot of their time indoors. Vitamin D* deficiency can arise due to the fact that the older person does not spend any time in sunlight. Although when taking a person out into the sun ensure that hats, and protection is worn to prevent sunburn.

**Vitamin D is a nutrient that helps with the calcium absorption, Calcium is needed to build and maintain healthy bones. Vitamin D is also needed for healthy bone function.*

The appearance of a person's hair, nails, and skin can also be indicators of illness or disease. This is why it's important to record and report any changes to the conditions of the skin.

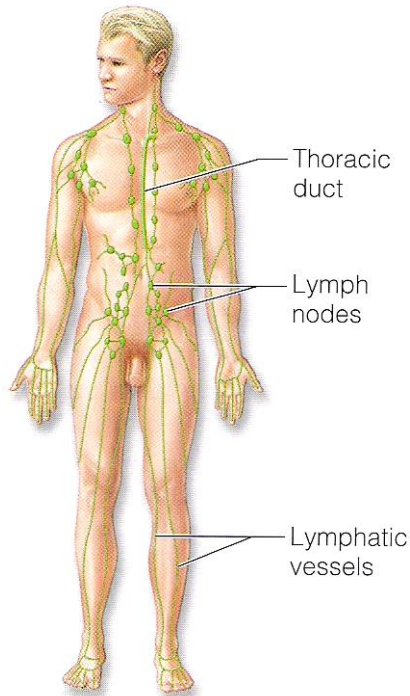
To assist in maintaining the condition of the Integumentary system, ensure that the resident/client:

- Eats a variety of food types
- Maintains personal hygiene
- Changes positions when sitting or lying to prevent pressure areas.

Terminology	Meaning
Boils	Inflammation of hair follicles and sebaceous glands
Burns	Burns are classified as to their severity (depth)
Carcinoma	Cancer of the skin
Contact dermatitis	Allergic reaction to chemicals on the skin
Dermis	The inner layer of the skin
Epidermis	The outer layer of the skin
Fungal infections	Common infections include Tinea and athlete's foot
Lesions	Damaged skin tissue
Melanoma	A type of skin cancer
Psoriasis	Characterised by a overproduction of skin cells
Sebum	Oily secretions
Ulcer	An inflamed lesion

Please watch this video for a thorough discussion about the integumentary system.
<https://www.youtube.com/watch?v=BVIIgHyNRdl>

The lymphatic system



Picks up fluid leaked from blood vessels and returns it to blood; disposes of debris in the lymphatic stream; houses white blood cells involved in immunity

The lymphatic system actually consists of two semi-independent parts:

- A meandering network of *lymphatic vessels*
- Various *lymphoid tissues* and *organs* scattered throughout the body.

Lymphatic vessels

As blood circulates through the body, exchanges of nutrients, wastes and gases occur between the blood and the interstitial fluid. The function of the lymphatic vessels is to form an elaborate drainage system that picks up excess tissue fluid, now called *lymph* and returns it to the blood. Lymph flows only towards the heart.

Lymph nodes

The lymph nodes help protect the body by removing foreign material from the lymphatic stream and by producing *lymphocytes* that function in the immune response.

The immune system defends against threats both internally and externally of the body. It protects the body from diseases. Infection is caused by microorganisms in the environment. Immunity means that the person is protected against diseases.

- *Specific immunity* is the body's reaction to a specific threat
- *Non-specific immunity* is the body's reaction to anything it does not recognise as a normal body substance.

Special cells and substances function to produce immunity

- *Antibodies* – normal body substances that recognise abnormal or unwanted substances.
- *Antigens* – abnormal or unwanted substances. Antigens cause the body to produce antibodies. These then attack and destroy antigens.
- *Phagocytes* – white blood cells that digest and destroy microorganisms and other unwanted substances.
- *Lymphocytes* – white blood cells that produce antibodies. Lymphocyte production increases as the body responds to an infection.
- *T lymphocytes (T cell)* are cells that destroy invading cells.
- *B lymphocytes (B cells)* cause the production of antibodies that circulate in the plasma.

For a thorough discussion about the lymphatic system, please watch this video:
<https://www.youtube.com/watch?v=X4Wn0j3eJrA>

The Nervous System

Fast-acting control system of the body; responds to internal and external changes by activating appropriate muscles and glands.

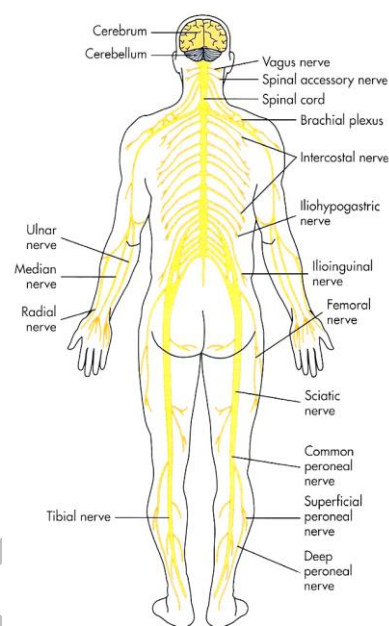
Please watch this video for a thorough discussion about the nervous system.

. <https://www.youtube.com/watch?v=aboVLnsCH44>

The nervous system is the master controlling and communicating system of the body. Every thought, action, and emotion reflects its activity. Its signalling device, or means of communicating with the body cells, is electrical impulses, which are rapid and specific and cause almost immediate responses.

The two main divisions of the nervous system are:

- The **peripheral nervous system** – involves the nerves throughout the body (fig.12)
- The **central nervous system** (CNC) – Consists of the brain and spinal cord (fig. 13)



Nerves carry messages or impulses to and from the brain. Nerves are connected to the spinal cord. Nerves are easily damaged and take a long time to heal. Some nerve fibres have a protective covering called *myelin sheath*. The myelin sheath also insulates the nerve fibre. Nerve fibres covered with myelin can conduct impulses faster than fibres without the protective covering.

The peripheral nervous system

The peripheral nervous system has 12 pairs of cranial nerves and 31 pairs of spinal nerves.

Cranial nerves conduct impulses between the brain and the head, neck, chest and abdomen. They conduct impulses for smell, vision, hearing, pain, touch, temperature and pressure. They also conduct impulses for voluntary and involuntary muscles.

Spinal nerves carry impulses from the skin, extremities and the internal body structures not supplied by the cranial nerves.

Some peripheral nerves with special functions for the *autonomic nervous system*. This system controls involuntary muscles and certain body functions. These functions include:

- The heartbeat blood pressure,
- Intestinal contractions and
- Glandular secretions occurring automatically.

The autonomic nervous system is divided into the *sympathetic nervous system* and the *parasympathetic nervous system*. These divisions balance one another. The sympathetic nervous system tends to speed up functions. The parasympathetic nervous system slows them down.

Sympathetic Nervous System Stimulates	Parasympathetic Nervous System Inhibits
When you are angry, frightened, excited or exercising the sympathetic system is stimulated	When you relax or when the sympathetic system has been stimulated for too long.

The central nervous system consists of the brain and spinal cord. The brain is covered by the skull.

The three main parts of the brain are:

1. The cerebrum,
2. The cerebellum and
3. The brainstem. (Fig. 13)

The **cerebrum** is the largest part of the brain. It is the centre of thought and intelligence. The cerebrum is divided into two halves, called the *right and left hemispheres*.

- The right hemisphere controls movement and activities on the body's left side.
- The left side hemisphere controls the right side.

The outside of the cerebrum is called the **Cerebral Cortex**. It controls the highest functions of the brain. These include reasoning, memory, consciousness, speech, voluntary muscle movement, vision, hearing, sensation and other activities. The *cerebellum* regulates and coordinates body movements. It controls balance and the smooth movements of voluntary muscles. Injury to the cerebellum results in jerky movements, loss of coordination and muscle weakness. Hypothalamus controls body temperature.

The **brainstem** connects the cerebrum to the spinal cord. The *midbrain, pons and medulla* are important structures within the brainstem. The midbrain and pons relay messages between the medulla and the cerebrum. The medulla controls heart rate, breathing, blood vessel size, swallowing, coughing and vomiting. The brain connects to the spinal cord at the lower end of the medulla. The spinal cord lies within the spinal column. It contains pathways that conduct messages to and from the brain and spinal cord. These are covered with three layers of connective tissue, called the *meninges*.

- The outer layer lies next to the skull. It is a tough covering called *dura mater*
- The middle layer is the *arachnoid*
- The inner layer is the *pia matter*

The space between the middle and inner layers is the *arachnoid space*. This space is filled with *cerebrospinal fluid*. Cerebrospinal fluid circulates around the brain and spinal cord. It protects the central nervous system by cushioning shocks.

Ageing and changes to the nervous system

As age increases the blood supply to the brain decreases, some neurons are lost and end organs degenerate. Although synthesis of information is slower, intelligence does not decrease. The cerebral processing is slower; this tends to show as slow reaction time. Short-term memory can also be affected.

The older person has a tendency to:

- Have short term memory difficulties and be more forgetful
- Be less sensitive to pain
- Slower reflexes

- Decreased sensory perception
- Become more preoccupied with the past

As support workers you can:

- Allow and encourage reminiscing
- Remind residents/ clients of tasks
- Be patient when things are repeated or forgotten.

Terminology	Meaning
Cerebellum	Located at the back of the head under the cerebrum Controls: <ul style="list-style-type: none"> • balance • facial control • speech • voluntary movement of the limbs and muscles
Cerebrum	Largest part of the brain and responsible for higher-level intellectual activities such as: <ul style="list-style-type: none"> • perception • problem- solving • planning • reasoning • using and understanding language
Motor control	Persons ability to control and direct their movements
Motor disorder	Arises as a result of any number of conditions that reduces a person's ability to control, and regulate their movements

Sense organs

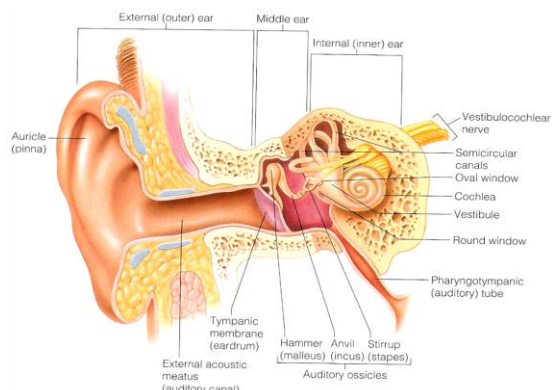
Special senses include: *smell, taste, sight, touch and hearing*. Receptors for smell are in the nose. Receptors for taste are called *taste buds* and are found in the tongue. Touch receptors are in the dermis, especially the toes and fingers.

The ear

Please watch <https://www.youtube.com/watch?v=GoxlCXeu8Z0&spfreload=10> for a thorough discussion about the human ear.

The ear is a sense organ. Its functions are hearing and balance. The ear is divided into three major areas:

- **External ear** (outer part) is called the *pinna* or *auricle*. Sound waves are guided through the external ear into the *auditory canal*. Glands in the auditory canal secrete a waxy substance called *cerumen*. The auditory canal extends about 2.5 centimetres to the eardrum. The *eardrum* (tympanic membrane) separates the external ear and the middle ear.



- The **Middle ear** is a small space. Contains the *eustachian tube* and three small bones called *ossicles*. The eustachian tube connects the middle ear and the throat. Air enters the eustachian tube so that there is equal pressure on both sides of the eardrum. The ossicles amplify sound received from the eardrum and transmit the sound to the inner ear. The three ossicles are: *malleus, incus and stapes*.
- The **Inner ear** consists of the *semicircular canals* and the *cochlea*. The cochlea contains fluid, which carries sound waves received from the middle ear to the auditory nerve. The auditory nerve then carries the message to the brain. The three semicircular canals are involved with balance. They sense the position of the head and changes position, and send messages to the brain.

Equilibrium means balance. This balance can be affected by a number of illnesses, diseases or disorders including:

- Ear infections
- Leakage in the ear
- Inflammation of the ear
- Meniere’s disease
- Stroke

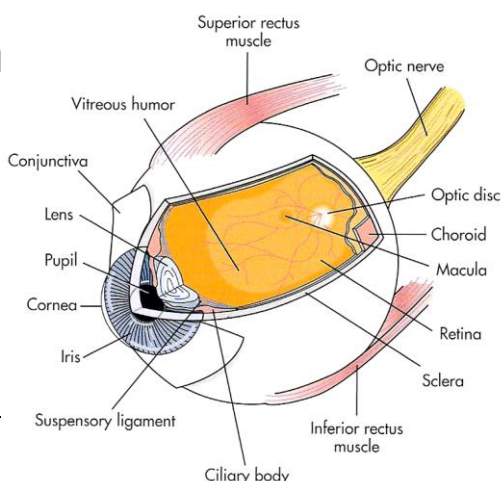
Balance disorders can cause vertigo, dizziness and nausea.

As support workers you can help by:

- Adhering to any special dietary requirements
- Assisting with rehabilitation exercises
- Ensuring floor surfaces are free of hazards
- Seeking assistance for adaptive devices like grab rails in the bathroom, toilet, walkways etc.

Terminology	Meaning
Audiologist	Doctor specializing in the ear
Labyrinthitis	Infection of the inner ear
Meniere’s disease	Disorder of the inner ear
Otolaryngologist	Specialist in ear, nose and throat
Perilymph fistula	Tear or other opening between the middle and inner ear that produces adverse effects such as vertigo
Vertigo	Condition relating to the inner ear that can make a person feel as if the world is spinning about them
Vestibular	Relates to the inner ear

The eye



Please watch this video for a full length discussion about the human eye. <https://www.youtube.com/watch?v=zyzphSTkW2U>

Receptors for vision are in the eyes. The eye can be easily injured. Bones of the skull, eyelids, eyelashes and tears protect the eyes from injury. The eye has three layers:

- The outer layer is the **sclera**; this is the white of the eye. Being made up of strong connective tissue.

- The second layer is the **choroid**; it is made up of blood vessels, the ciliary muscle and the iris. The *iris* gives the eye its colour. The pupil is in the centre of the iris. The pupil size varies with the amount of light entering the eye. The pupil will contract (narrow) in bright light and dilate (widen) in dim or dark places.
- The inner layer is the **retina**. It contains the receptors for vision and the nerve fibres of the optic nerve.

Light enters the eye through the *cornea*. This transparent part of the outer layer lies over the eye. Light rays pass through it to the *lens*, which lies behind the pupil. The light then is reflected to the retina, and from there these signals or images are carried to the brain by the optic nerve.

The *aqueous chamber* separates the cornea from the lens. The chamber is filled with a fluid called *aqueous humour*. This fluid helps the cornea keep its shape and position. The *vitreous body* is behind the lens. It's a gelatine-like substance that supports the retina and maintains the eye's shape.

Taste and smell

Taste and smell are receptors which react to chemicals. Taste buds are located in the oral cavity, (mouth), while smell receptors are found in the nasal cavity (nose).

Taste receptors only live for 1 to 2 weeks and are continually replaced. There are five primary taste sensations: sweet, sour, salty, bitter and umami (the response to salts of glutamic acids such as monosodium glutamate, MSG: a flavour enhancer). All other tastes come from a combination of these five basic tastes. Different parts of the tongue can detect all types of tastes.

The sense of smell is connected to memory which is why a smell can recall a memory or invoke an emotion. *Olfactory receptors* are high up in the nasal passage. The olfactory receptor cells are neurons equipped with *olfactory hairs*, long cilia that protrude from the nasal epithelium and are continuously bathed in mucus. When the olfactory receptors located on the cilia are stimulated by chemicals dissolved in the mucus, they transmit impulses. These odours are then interpreted.

The immune system

- is a system of many biological structures and processes within an organism that protects against disease
- to function properly, an immune system must detect a wide variety of agents, known as pathogens, from viruses to parasitic worms, and distinguish them from the organism's own healthy tissue
- can be classified into subsystems, such as the innate immune system versus the adaptive immune system, or humoral immunity versus cell-mediated immunity
- pathogens can rapidly evolve and adapt, and thereby avoid detection and neutralization by the immune system; however, multiple defense mechanisms have also evolved to recognize and neutralize pathogens

Kindly click on this link for a thorough discussion about our immune system.
<https://www.youtube.com/watch?v=24IYt5Z3eC4>

WORKING DRAFT

WORK WITH INFORMATION ABOUT THE HUMAN BODY

CORRECTLY USE AND INTERPRET INFORMATION THAT RELATES TO THE INTERRELATIONSHIPS BETWEEN MAJOR COMPONENTS OF EACH BODY SYSTEM AND OTHER STRUCTURES

INTERRELATIONSHIP IN THE BODY SYSTEMS

	Integumentary	Musculo-skeletal	Nervous	Endocrine	Cardio-vascular	Lymphatic	Respiratory	Digestive	Urinary	Reproductive
Integumentary	N/A	Protects the muscles Helps with Vitamin D intake	The skin acts as a receptor for vital information, such as temperature and pain for the nervous system	Absorbs Vitamin D used by the lymphocytes To help the immune system function effectively	The skin ensures that blood stays within the system	The skin contains special cells that support the role of lymphatic system	Hairs in the nose help filter air	Vitamin D helps the intestines absorb calcium	The skin helps with the removal of waste through sweating	The skin is a vital organ during foreplay The mammary glands produce colostrums and milk for babies
Musculo-skeletal	Moves the facial muscles to enable communication	N/A	Commands the limbs and body parts to move	Protect some of the organs in this system	Helps move blood throughout the system	Helps with the flow of lymphatic fluid Helps with immunity	Helps the lungs function	Allows the mouth to chew Protects some organs	Controls the movements of the bladder	Facilitates the movement of the foetus through the birth canal Helps with penile erection and subsequent ejaculation
Nervous	Regulates sweating Regulates temperature	Instructs the muscles how to move	N/A	Controls and stimulates glands in the endocrine system	Regulates heartbeat	Works in conjunction with the lymphatic system to respond to pathogens	Regulates respiration	Controls appetite and faecal movement	Control urinary function	Helps with lactation
Endocrine	Affects the growth and distribution of hair	Helps maintain and develop muscles	Make sure the cells in the body have the required	N/A	Hormones impact on heart rate	Helps activate the lymphatic system's immune	Hormones assist with air flow	Hormones affect the way food is digested	Hormones regulate urinary excretion	Hormones facilitate puberty, impact on sex

			balance of minerals, enabling the nervous system to function effectively			response				drive and regulat4s pregnancy and lactation
Cardio-vascular	Controls sweat production	Materials are delivered and removed to and from this system	Delivers oxygen Transports hormones to and from the brain and spinal cord	Transports hormones	N/A	Provides the lymphocytes		Transports nutrients	Helps maintain kidney function	Helps with the blood flow needed to maintain and sustain an erection
Lymphatic	N/A	Production and repair of muscles	N/A	Transports hormones used by the lymphatic system	Deals with pathogens in the blood	N/A	Removes waste from the lungs	Transports digested fats	Assists the kidneys	Immunity is passed onto the baby via the mother's milk
Respiratory	Provides oxygen to the various organs Removes carbon dioxide					N/A	Provides oxygen to the various organs Removes carbon dioxide			
Digestive	Provides nutrients							N/A	Provides nutrients	
Urinary	Disposal of waste							N/A	Disposal of waste	
Reproductive	Responsible for changes in the composition and distribution of hair	Facilitates growth and development	Stimulates sex drive	Communicate s with this system to regulate hormone levels in the body	Pregnancy is associated with an increase in blood volume	Protects sperm from the females immune system, which could otherwise be rejected by the lymphatic system	Sexual arousal can place greater demand on the respiratory system	Heartburn and constipation during pregnancy	Pregnancy can place pressure on the bladder and the urinary tract causing incontinence This can continue after birth – stress incontinence	N/A

Activity 1:

1. Give at least 10 medical terminology that you should be aware of as a support worker. Define each.

2. Choose three (3) body systems and provide their interrelationships.

3. Briefly discuss the nervous system of the human body.

4. What is the organisation of a human body?

5. What is the function of the heart?

RECOGNISE AND PROMOTE WAYS TO SUPPORT HEALTHY FUNCTIONING OF THE BODY

REVIEW FACTORS THAT CONTRIBUTE TO MAINTENANCE OF A HEALTHY BODY

According to the World Health Organisation the definition of health is:

‘Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity’

Being free of illness and disease is not enough to make a person healthy. A person must also enjoy good physical, mental and social health. These factors that contribute to maintenance of a healthy body are interrelated and include:

Mind-body health	<ul style="list-style-type: none"> • person’s state of mind can influence their physical health
Spiritual health	<ul style="list-style-type: none"> • person’s sense of well-being
Medical self-care	<ul style="list-style-type: none"> • person’s ability to manage and take responsibility for their own health and well-being
Environmental health	<ul style="list-style-type: none"> • health of the client’s immediate living quarters (their home or facility) as well as the health of the wider environment
Nutritional health	<ul style="list-style-type: none"> • people enjoy eating, food plays an important role in fuelling the body’s system. There are many reasons why many don’t enjoy optimal nutrition
Social health	<ul style="list-style-type: none"> • people are social creatures. We all like to be valued and to value others. Unfortunately as people age or become disabled their social network diminishes

Activity

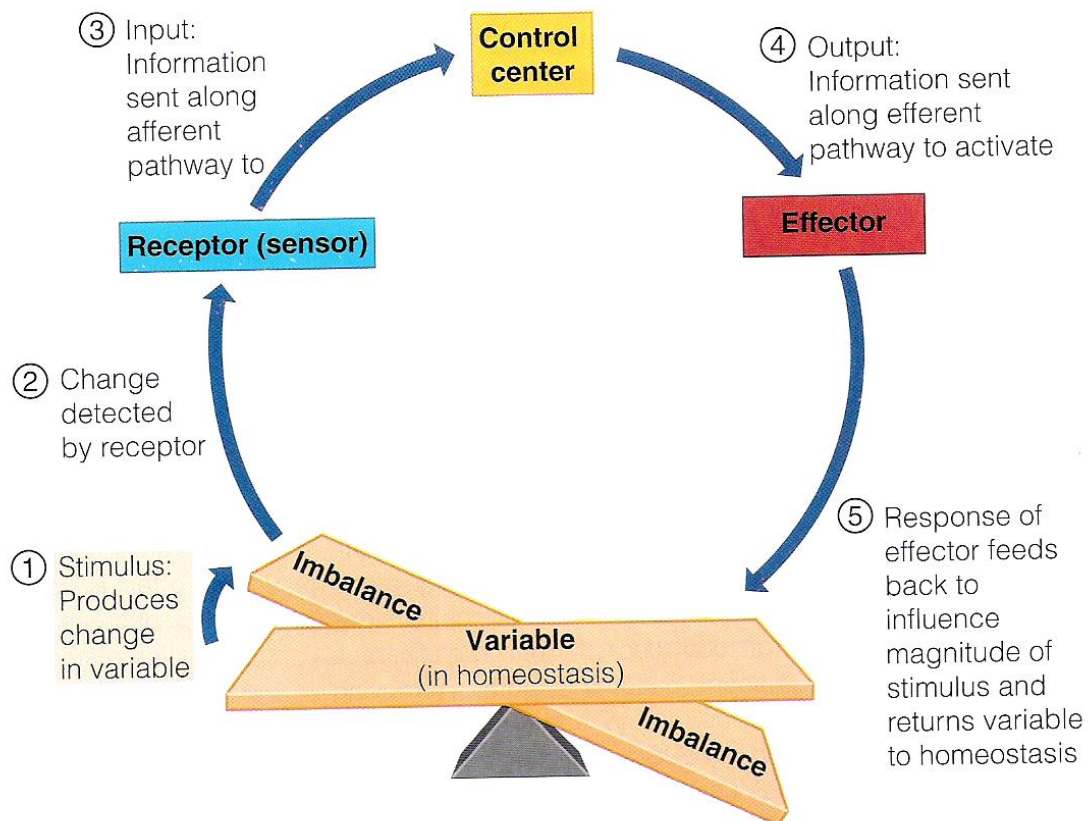
Considering the above list how do these areas impact on your life? How could they be different for the older person?

EVALUATE HOW THE RELATIONSHIPS BETWEEN DIFFERENT BODY SYSTEMS AFFECT AND SUPPORT HEALTHY FUNCTIONING

Body Regulation

Homeostatic control mechanisms

Please watch this video for a thorough discussion about homeostasis control mechanisms.
<https://www.youtube.com/watch?v=XZxuQo3yIII>



The elements of a homeostatic control system - communication between the receptor, control centre, and effector is essential for normal operation of the system.

Communication within the body is essential for homeostasis and is accomplished chiefly by the nervous and endocrine systems, which use electrical signals delivered by nerves or blood borne hormones, respectively as information carriers.

Most homeostatic control mechanisms are *negative feedback mechanisms*. Effect of the response to the stimulus is to shut off the original stimulus or reduce its intensity.

Positive feedback mechanisms are rare in the body because they tend to increase the original disturbance (stimulus) and to push the variable farther from its original value.

Homeostasis is so important that most disease can be regarded as a result of its disturbance, a condition called **homeostatic imbalance**. As we age, our body organs become less efficient, and our internal conditions become less and less stable. These

events place us at an increasing risk of illness and produce the changes we associate with ageing.

Body temperature regulation

Body temperature reflects the balance between heat production and heat loss. The body works best when its temperature remains within homeostatic limits. We need to get rid of heat generated by our internal reactions. As long as the external temperature is lower than body temperature, the skin surface loses heat to the air and to cooler objects in its environment.

During normal resting conditions, and as long as the environmental temperature is below 31 – 32 °C sweat glands continuously secrete unnoticeable amounts of sweat. When the body temperature rises, dermal blood vessels dilate and the sweat glands are stimulated into vigorous secretory activity.

Sweat becomes more noticeable and can account for the loss of up to 12L of body water in one day. Evaporation of sweat from the skin surface dissipates body heat and efficiently cools the body, thus preventing overheating.

Body fluids

There is a high proportion of water in the human body and many body functions require the presence of fluids to ensure balance. To maintain a well-hydrated body there needs to be a balance of fluid intakes and outputs. Most fluid comes from the food and liquids ingested, although a small amount comes from chemical reactions occurring in the cells and cellular metabolism.

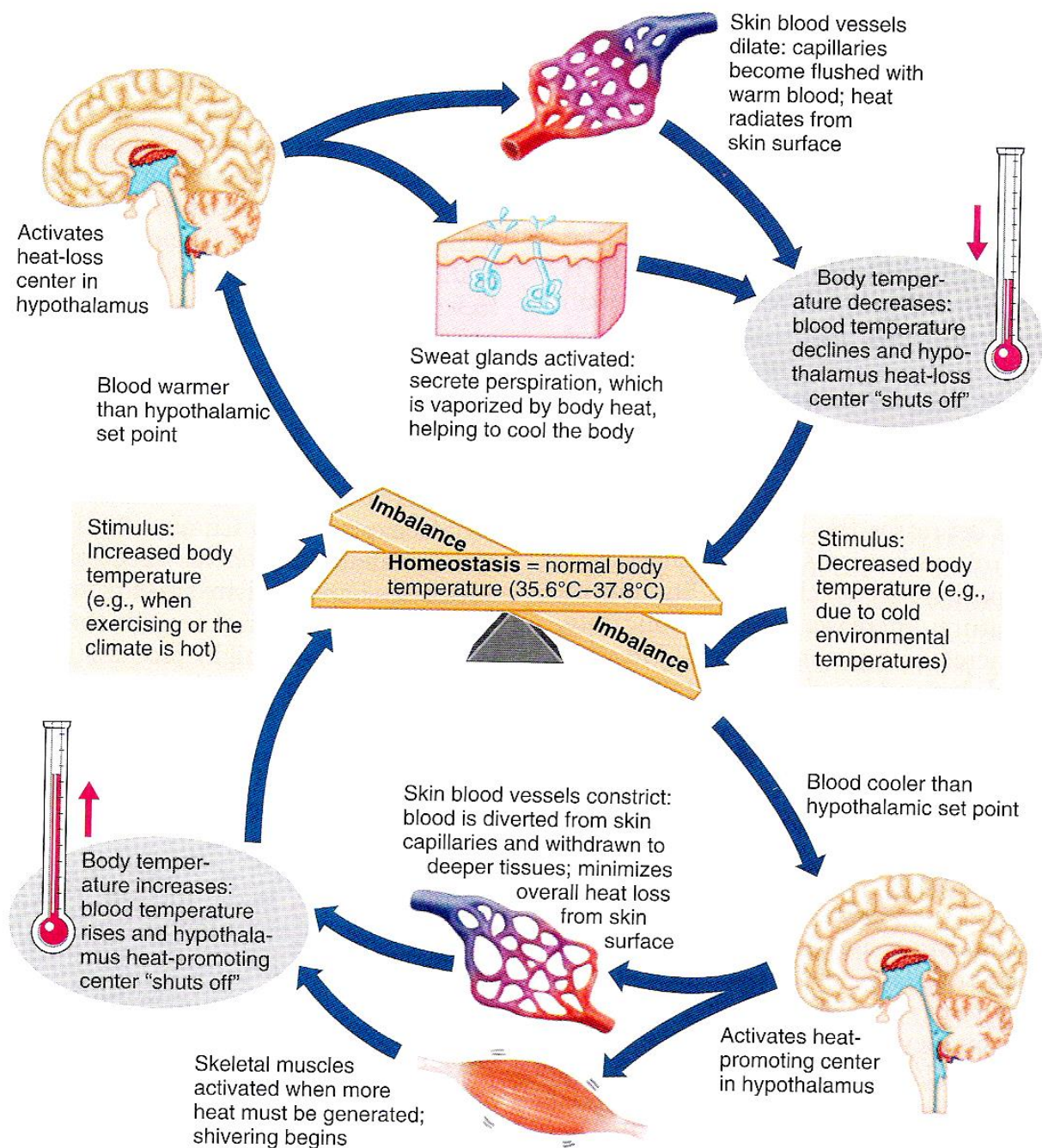
Water leaves the body as mentioned above from evaporation, also through respiration and in the faeces and urine. The kidneys play an important role in the body's ability to regulate the amount of water it loses.

Through interactions between the nervous, endocrine and the circulatory systems the body regulates the activities of the kidneys. If there is insufficient intake the water of the kidneys will reduce the output of water.

Elimination of wastes from the body

The body needs to rid itself of waste products to ensure a health operating system. The body produces carbon-dioxide which is removed via the respiratory system. The integumentary system removes wastes via the skin pores, while the kidneys remove water from the body. While the digestive system eliminates whatever the body cannot use via the rectum as faeces.

The mechanisms of body temperature regulation



Maintenance of blood pressure

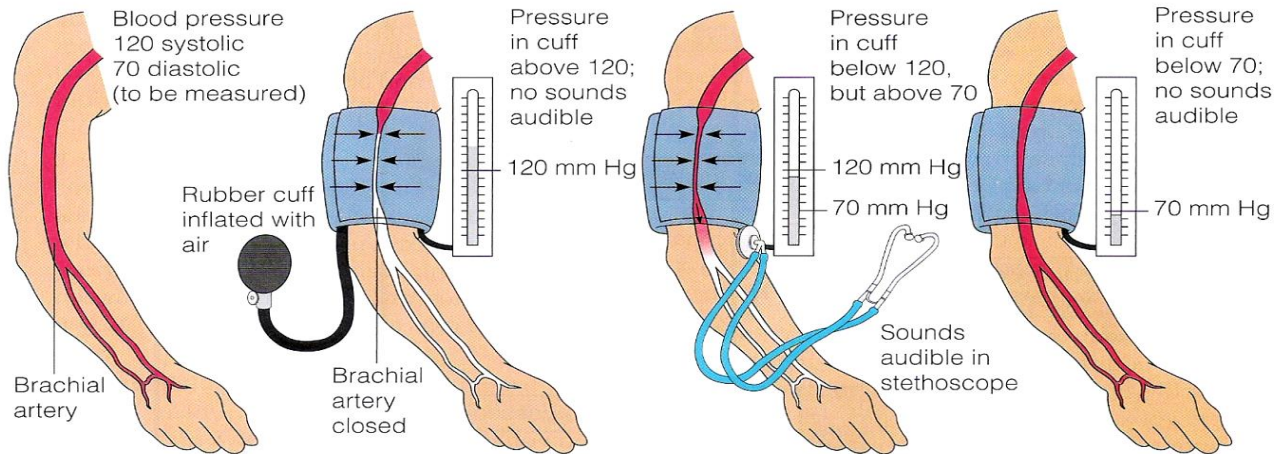
Blood pressure is the force of pressure blood exerts against the walls of the blood vessels in the cardiac cycle.

It is measured in two different amounts:

1. **Systolic blood pressure** – contraction when the blood pressure is the greatest.
2. **Diastolic blood pressure** –between contractions when the blood pressure is the lowest.

Blood pressure is dependent on a number of different body systems working together, the sympathetic nerves on the vascular system to cause vasoconstriction – narrowing of the blood vessels, the arteries and veins of the circulatory system for blood flow, the lymphatic system for the return of body fluids to the blood stream, hormones from the endocrine system and the actions of the skeletal muscles in returning blood in the veins and the kidneys of the urinary system in altering blood volume.

Blood pressure varies between individuals and is dependent on the strength of the heartbeat, the elasticity of the arterial walls, the volume and viscosity of the blood, the person's health, age and physical condition.



(a) The course of the brachial artery of the arm. Assume a blood pressure of 120/70 in a young, healthy person.

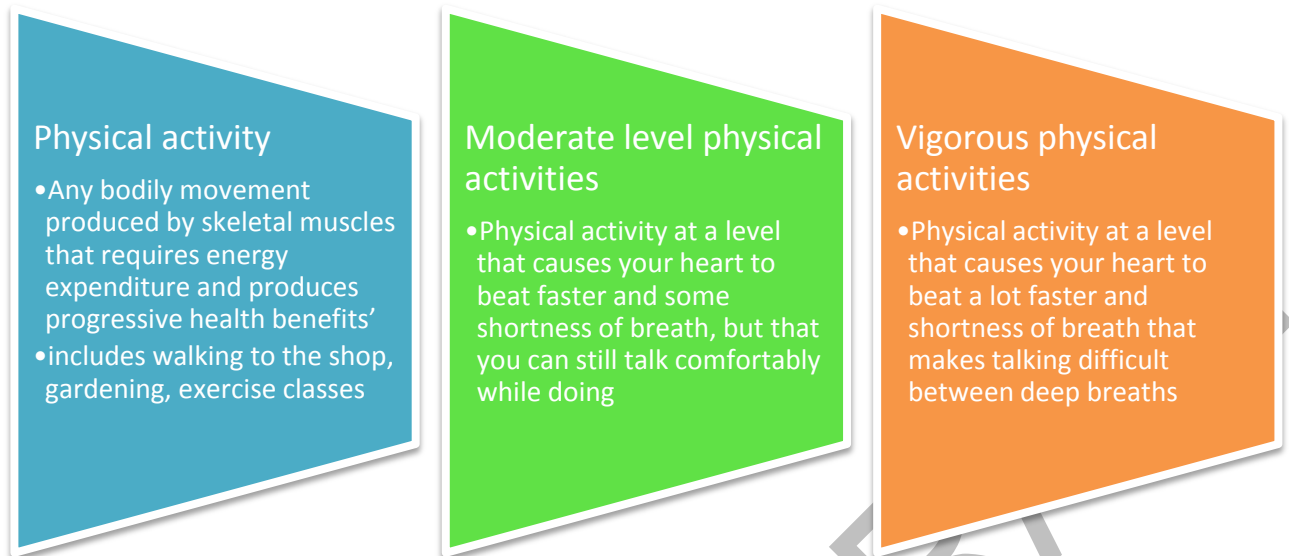
(b) The blood pressure cuff is wrapped snugly around the arm just above the elbow and inflated until the cuff pressure exceeds the systolic blood pressure. At this point, blood flow into the arm is stopped, and a brachial pulse cannot be felt or heard.

(c) The pressure in the cuff is gradually reduced while the examiner listens (auscultates) for sounds in the brachial artery with a stethoscope. The pressure read as the first soft tapping sounds are heard (the first point at which a small amount of blood is spurting through the constricted artery) is recorded as the systolic pressure.

(d) As the pressure is reduced still further, the sounds become louder and more distinct; when the artery is no longer constricted and blood flows freely, the sounds can no longer be heard. The pressure at which the sounds disappear is recorded as the diastolic pressure.

WOL

ENHANCE QUALITY OF WORK ACTIVITIES BY USING AND SHARING INFORMATION ABOUT HEALTHY FUNCTIONING OF THE BODY



Source: National Institute of Health Consensus Conference Statement, 1996 and Glasgow et al, 2005

Physical activity is important to maintaining a healthy body. The body needs to experience physical stressors daily in order to maintain good health; muscle develops when they are stressed. It has been well documented that the amount of and type of exercise that an individual takes part in is significant to their health and weight.

Excess body fat is harmful to the body in that it places more strain on joints, surrounding tissues and increases the risks of various diseases such as diabetes, heart disease and some cancers.

The National Physical Activity Guidelines for Australia were developed. For more detail information see the web site:

http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines#rec_older

These recommendations were developed with reference to the existing National Physical Activity Guidelines for Adults published by the Australian Government Department of Health and Ageing, namely:

Think of movement as an opportunity, not an inconvenience

Be active every day in as many ways as you can

Put together at least 30 minutes of moderate intensity physical activity on most, preferably all days

If you can, also enjoy some regular, vigorous activity for extra health and fitness

Older people

- refers to those aged over 65 years, and over 55 years for Aboriginal and Torres Strait Islanders

General advice when performing physical activities

- Consider physical activities as opportunities for fun with a partner, friends or family members.
- Eating healthy nutritious food in conjunction with being physically active will help to obtain the best health outcomes.
- Drink water during and after physical activity to avoid dehydration.
- A short period of warm up exercises/muscle stretching at the start and at the end of physical activity will help the body adjust to starting or finishing activities that place a physical demand on the body.
- Include some outdoors physical activity, although where possible keep this to a minimum in the hottest part of the day.
- Use appropriate safety and protection equipment to maximise safety and minimise risk of injury during physical activity, for example, use supportive footwear for walking, and a helmet for bicycle riding.



This can be achieved either through active or passive physical exercise to maintain a healthy body system.

Understanding the differences between active and passive exercise.

Active exercise

- Exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body
- Motion imparted to a part by voluntary contraction and relaxation of its controlling muscles

Passive exercise

- Motion imparted to a part by another person or outside force, or produced by voluntary effort of another segment of the patient's own body
- Motion imparted to a segment of the body by a therapist, machine, or other outside force.

Remember always consult a doctor before starting physical activity if:

- Physical activity causes pain in your chest
- You often faint or have spells of severe dizziness
- Moderate physical activity makes you very breathless
- You are at a higher risk of heart disease
- You are pregnant

Nutrition

A balanced diet means eating the right amount of foods from all food groups. Nutrition is a substance in food that is used by the body to promote normal growth, maintenance and repair. The nutrients divide into six categories. The **major nutrients** – carbohydrates, lipids and proteins – make up the bulk of what we eat. **Minor nutrients** – vitamins and minerals – while equally crucial for health are required in minute amounts. Water, which

accounts for about 60% of the volume of food we eat, is also considered to be a major nutrient. As part of general health, it is important to maintain a healthy weight range.






People who are underweight are at risk of:

- Starving their systems of nutrients
- Osteoporosis
- Organ failure
- Death

People who are overweight are at risk of:

- Type 2 diabetes
- Musculoskeletal problems
- Skin problems
- Cancer

The following is the dietary sources of the major nutrients required.

Group	Example foods	Major nutrients supplied in significant amounts	
		By all in group	By only some in group
 Fruits	Apples, bananas, dates oranges, tomatoes	Carbohydrate Water	Vitamins A,C, folic acid, minerals, iron potassium, fibre
 Vegetables	Broccoli, cabbage, green beans, lettuce, potatoes	Carbohydrate Water	Vitamins, A,C, E, K and B vitamins except B ₁₂ , minerals calcium, magnesium, iodine, manganese, phosphorus, fibre
 Grain produces	Breads, rolls, bagels, cereals, dry and cooked, pasta, rice, other grains, tortillas. Popcorn, crackers	Carbohydrate Protein Vitamins, thiamine (B ₁), niacin	Water Fibre Minerals, iron, magnesium, selenium
 Milk Products	Milk, yoghurt, cheese, ice cream	Protein, fat , Vitamins, B ₁₂ , minerals, calcium, phosphorous, water	Carbohydrate, Vitamin A, D
 Meat and meat alternatives	Fish, poultry, beef, pork, eggs, seeds, nuts, butters, soybeans, tofu, legumes	Protein, Vitamins, Niacin, B, minerals, iron, zinc	Carbohydrate, Fat, Vitamin B ₁₂ , Thiamine B ₁ , water, fibre

Getting the right nutrients

Older people often eat less, which can make getting enough of the right nutrients a challenge. Due to taste and smell changes food just may not be very appealing. Illness and medication can affect taste as well.

Poor teeth or dentures make chewing difficult.

Going shopping and cooking can impact because of arthritis, walking problems or lack of transportation. Loneliness and depression may add to disinterest and loss of appetite. The body may not use the nutrients it does get. *Example: many elderly get little exposure to sunlight and hence may not get enough Vitamin D which is required to process calcium.*

Even so, proteins, carbohydrates, fats, vitamins and minerals in food and plenty of water are still required.

Fluid Intake

As people age they tend to lose their feeling of thirst. Pale yellow urine is an indicator of a person not getting enough water. To encourage drinking more water, use a two-litre bottle that can be filled with water first thing in the morning and inform the person that they need to drink so it is empty by the end of the day.

Drinking at least one glass of water with each meal helps.

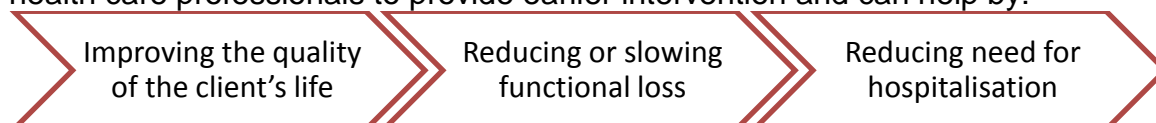
Tips to encourage clients increased fluid intake:

- Be aware of climatic and environmental conditions. On hot humid days, make extra effort to encourage the client to drink more.
- Chill your client's drinking water slightly or serve it at room temperature. If it's too cold the client's body has to work harder to digest the fluid.
- If your client doesn't like drinking water, encourage eating of fruits and vegetables with higher water contents – watermelon
- Carry water with your client when on outings or keep water beside them when indoors to keep fluids convenient
- Consider adding natural flavourings such as lemon juice to improve taste
- Encourage clients to take small sips often, rather than large gulps to avoid indigestion

Remember: Always check the client's care plan prior to applying the above suggestions to take into account any dietary limitations or concerns.

Regular medical Checks

Medical check-ups can assist in identifying diseases and conditions early. It enables health care professionals to provide earlier intervention and can help by:



Regular skin check-ups can highlight any irregularities in moles and freckles that may indicate skin cancer. Women should have regular pap smears and breast checks. Men should have regular prostate checks. These checks will look for irregularities.

Cognitive stimulation

The brain also requires exercise to prevent the decline of cognitive ability and to improve cognitive performance. Clients with good cognitive functions are more likely to be able to manage their own lives including medical care, giving the client a sense of worth and control.

Mental exercise can:

- Improve cognitive performance
- Prevent cognitive decline
- Help with self-esteem
- Help people make sound decisions.

As a support worker you can use this knowledge in your work by:

- Discouraging the clients from spending long periods of time in front of the television
- Engaging in conversation with the client
- Providing the client with appropriate puzzles
- Providing the client with books that reflect their interests
- Encouraging the clients to interact with others.

Not smoking

Tobacco smoking is the leading cause of preventable diseases. Sometimes people who have disabilities or illnesses that cause pain consume marijuana in an attempt to reduce their pain levels; however, as marijuana is often mixed with tobacco, the adverse effects are similar. A connection has also been made between marijuana use and a range of psychiatric conditions.



Drinking alcohol



Alcohol is a toxin that can do damage to the body's system. Drinking too much alcohol may:

- Damage the liver, thus impairing the digestive system
- Damage the blood vessels, which impairs the cardiovascular system
- Increase in likelihood of certain cancers
- Affect a person's ability to maintain relationships
- Lead to an acquired brain injury that impairs the nervous system.

The standard for excessive alcohol

consumptions varies between men and women and according to body, mass but safe levels are approximately for men - less than 28 drinks per week; and for women less than 14 drinks per week.

According to the National Health and Medical Research Council, there is a risk of alcoholism if:

- Males have 5 - 6 drinks daily
- Females have 3 – 4 drinks daily.

As a care worker you need to be able to recognise some of the symptoms but must never judge the client.

Symptoms include:

- Memory loss
- Poor grooming and hygiene
- No money for food and other necessities
- Broken capillaries (small blood vessels)
- Drinking alone

Activity 2:

1. What are the factors that contribute to maintenance of a healthy body?

2. What is health?

3. What is a physical activity?

4. Give at least five (5) examples of physical activity that can help maintain a healthy body.

5. What is nutrition?

WORKING DRAFT

SOURCES

Essentials of Human Anatomy & Physiology 9th edition by Elaine N. Marie
Pearson International Edition

The Australian Carer a training manual for aged care worker by Helen Croft
Edition 2008
Pearson Education Australia

Long-Term Care Assisting Aged Care and Disability by Karen Scott, Margaret Webb,
Sheila Sorrentino, Bernie Gorek
Edition 2007
Mosby Elsevier

The National Physical Activity Guidelines for AUSTRALIA WERE developed. For more
detail INFORMATION, see the web site:

http://www.health.gov.au/internet/main/publishing.nsf/Content/health-publth-strateg-phys-act-guidelines#rec_older



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