

Knowledge Organiser – GCSE PE: Paper 1 – Physical training

Components of fitness and fitness tests		
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Flexibility	The range of movement at a joint	Sit and reach test

Principles of training	
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Knowledge Organiser- GCSE PE: Paper 1 – The Skeletal System

Functions of the skeleton	
Protection	Flat bones protect the vital organs e.g. cranium protects the brain
Movement	Where two or more bones meet is a joint. Bones attach to muscles via tendons to create movement
Support	The skeleton allows the body to stand upright and provides a framework for muscle attachment.
Blood cell production	Blood cells are produced in the bone marrow of long bones
Posture	Provides a framework for the body and gives the body the right shape
Mineral Storage	Bones store minerals such as calcium and phosphorous for strong bones and iron to aid oxygen transportation.

Types of bone		
Long bones	Usually long in length. Contains bone marrow.	E.g. Humerus, femur
Short bones	Compact spongy bones found in the hands and feet.	E.g. Tarsals, phalanges
Flat bones	Protect the vital organs.	E.g. Vertebrae
Irregular bones	Do not have a fixed shape.	E.g. Coccyx, Sacrum

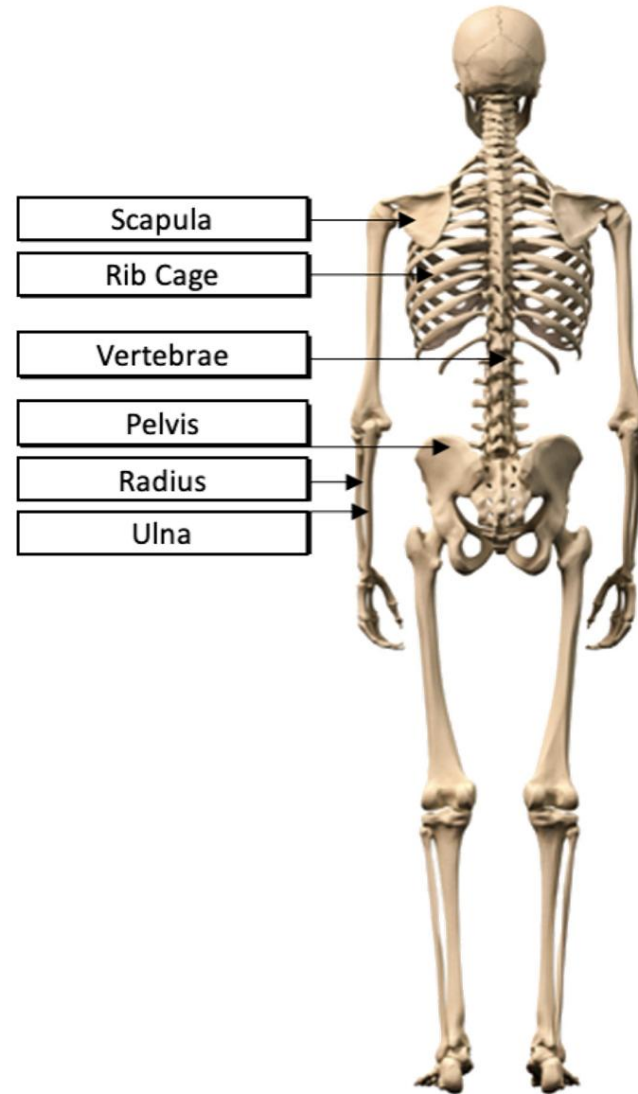
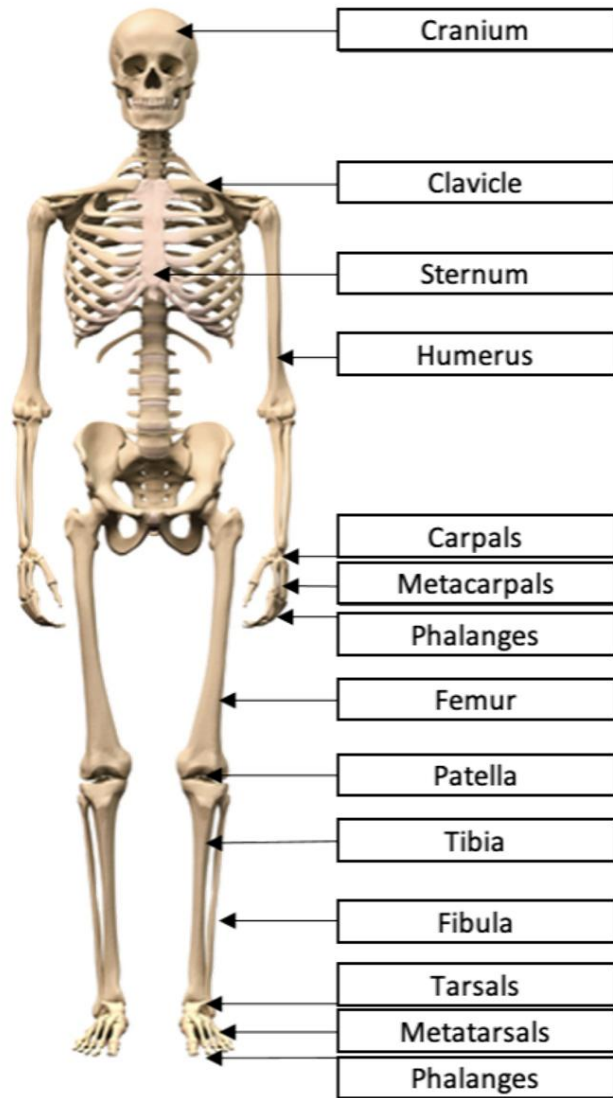
Long term effects of exercise on the skeletal system	
Increased bone density	Bones become stronger and denser and are less likely to break.
Increased strength of tendons	Ligament strength increases enabling the joint to become stronger and is less likely to become injured.
Increased strength of ligaments	Tendon strength increases enabling the joint to become stronger and is less likely to become injured.

Features of a joint	
Ligaments	Connect bone to bone and help to keep the joint stable
Tendons	Connect muscle to bone and let muscles pull bones which causes movement
Cartilage	This stops bones rubbing together
Synovial fluid	This lubricates/ oils the joint to allow easy fluid movement.

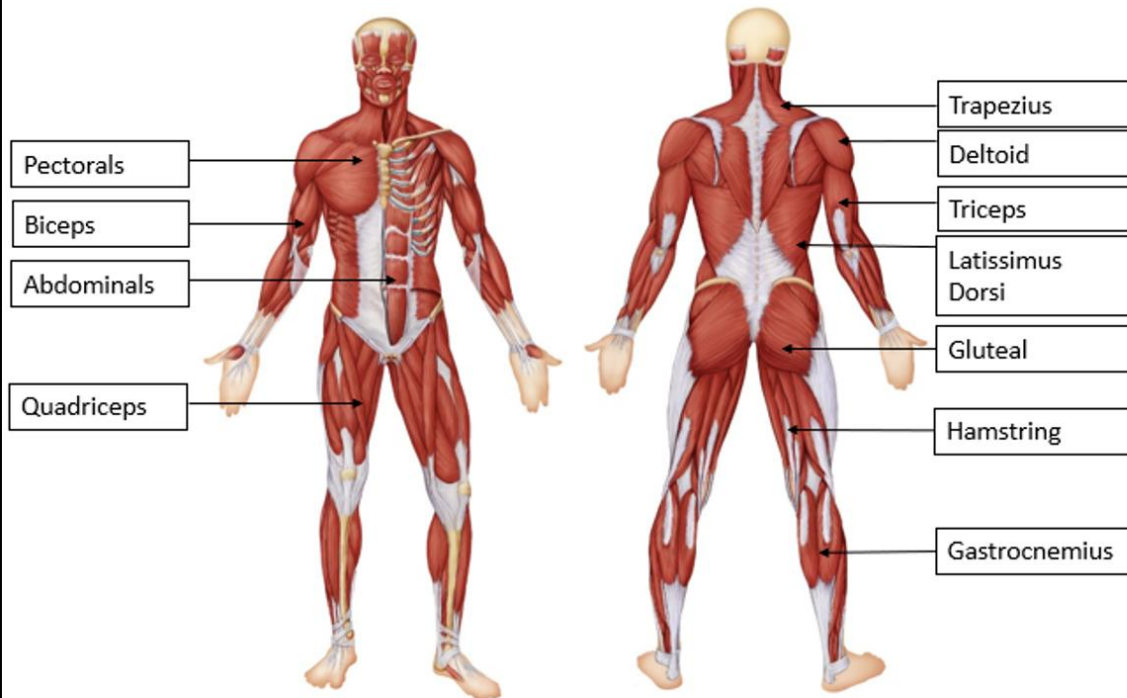
Types of joints	
Ball and socket	Found in the hip and shoulder and allows all ranges of movement.
Hinge	Found in the knee and elbow and only allows flexion and extension.

Movement at a joint	
Flexion	Decreasing the angle at a joint
Extension	Increasing the angle at a joint
Abduction	Movement away from the midline of the body
Adduction	Movement towards the midline of the body
Rotation	Turning of a body part about its axis
Circumduction	The circular <u>360 degree</u> movement at a joint

The structure of the skeletal system



Knowledge Organiser – GCSE PE: Paper 1 –The Muscular system



Type of muscle movement	
Agonist	The muscle that contracts
Antagonist	The muscle that relaxes
Fixator	The muscle that stabilises another pair of muscles working

Short term effects of exercise on the muscular system	
Increased muscle temperature	Blood flows to the muscle causing an increase in muscle temperature
Increased muscle elasticity	One muscle temperature increases muscles become more pliable and flexible which helps to reduce injury
Increased muscle fatigue	As muscles are <u>used</u> they begin to tire and a poison known as lactic acid begins to build up

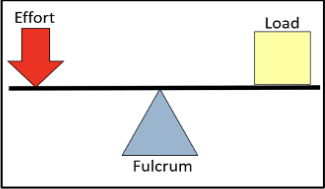
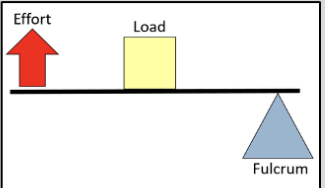
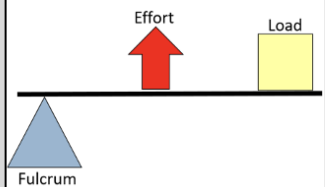
The structure and function of the muscular system	
Skeletal muscles	Often attached to bone . Voluntary muscles that require conscious control to move. <u>E.g.</u> Bicep
Smooth muscles	Muscle that is controlled by the nervous system . Found in the walls of the digestive system or arteries .
Cardiac muscle	Found in the wall of the heart . Works involuntarily continuously .

Long term effects of exercise on the muscular system	
Muscle hypertrophy	The muscle fibres grow larger and stronger
Improved muscular strength	Muscles become stronger.
Improved muscular endurance	Muscles can work for longer without becoming tired

Knowledge Organiser – GCSE PE: Paper 1 – Movement Analysis

Lever features	
Fulcrum	A fixed point , usually the joint
Load	The resistance usually the weight being moved
Effort	The force acting upon a joint, usually the muscle
Lever Arm	A rigid structure, usually the bone

Mechanical advantage	
Mechanical Advantage	A lever can overcome a load with little effort . If the effort arm is longer than the load arm there will be higher mechanical advantage .

Lever types		
First Class Levers	Has the fulcrum in the middle , an example is in the neck	
Second Class Levers	Has the load in the middle , an example is the ankle and extension at the elbow	
Third Class Levers	Has the effort in the middle , an example is the knee and flexion at the elbow	

Planes of movement	
Frontal Plane	Splits the body in to front to back
Sagittal Plane	Splits the body in to left and right
Transverse Plane	Splits the body in to top and bottom

Axis of rotation	
Frontal Axis	Goes through the body from front to back
Transverse Axis	Goes through the body from left to right
Longitudinal Axis	Goes through the body from top to bottom

Knowledge Organiser – GCSE PE: Paper 1 –The Cardiovascular system

The heart	
Atria	Where the blood collects when it enters the heart
Ventricles	Pumps the blood out of the heart
Septum	Separates the right hand and left hand of the heart
Tricuspid Valve	Separates the right atrium and right ventricle
Bicuspid Valve	Separates the left atrium and left ventricle
Blood vessels	
Vena Cava	Carries deoxygenated bloody back to the heart
Aorta	Carries oxygenated blood to the body
Pulmonary Vein	Carries oxygenated blood back to the heart
Pulmonary Artery	Carries deoxygenated blood to the lungs
Capillaries	One cell thick allows for gaseous exchange
Veins	Carry blood towards the heart, have a large lumen , carry blood at low pressure , have valves
Arteries	Carry blood away from the heart, have a small lumen , carry blood at high pressure
Cardiac output	
Heart Rate	Is measured in BPM and is the number of times the heart beats per minute
Stroke Volume	Is the amount of blood ejected from the heart in one beat , measured in ml
Cardiac Output	Is the amount of blood ejected from the heart in one minute , measured in l/min

Short term effects of exercise	
Increased heart rate	The heart beats faster to pump more blood around the body
Stroke volume increases	The heart ejects <u>more blood</u> per beat to get more blood around the body
Cardiac output increases	As stroke volume and heart rate have increased as will cardiac output
Blood pressure increases	The heart works harder to pump more blood around the body
Redistribution of blood flow	During exercise <u>blood flows</u> to where it is needed E.g. The working muscles .

Long term effects of exercise	
Red blood cells increase	More red blood cells are produced to carry oxygen around the body
Blood becomes less viscous	Blood produces more plasma making blood thinner and able to transport oxygen quicker around the body
Cardiac hypertrophy	The heart becomes bigger and stronger
<u>Drop in resting heart rate</u>	Due to cardiac hypertrophy the heart can pump more blood per beat
<u>Drop in resting blood pressure</u>	Due to cardiac hypertrophy the heart is not under pressure to pump as hard
Increased stroke volume	Due to cardiac hypertrophy the heart can pump more blood per beat
Quicker recovery rate	The heart rate gets back to resting heart rate quicker after exercise
Increased cardiac output	Due to an increased stroke volume cardiac output increases
Capillarisation	New capillaries are formed at the alveoli to enhance gaseous exchange

Knowledge Organiser – GCSE PE: Paper 1 –The Respiratory system

The lungs	
Nasal cavity	Where the air enters the respiratory system
Epiglottis	Small piece of cartilage at the back of the mouth that prevents food from going down the trachea .
Trachea	Known as the windpipe , connects the nasal cavity and bronchi
Bronchi	Splits in to two to serve the left and right lung with air
Bronchioles	Distributes air across all the lung to the alveoli
Alveoli	Air sacs that allow carbon dioxide to diffuse out from blood and oxygen to diffuse in , known as gaseous exchange
Intercostal muscles	Muscles between the ribs that allow for the chest cavity to expand when breathing .
Diaphragm	A sheet of muscle that separates the respiratory system from the digestive system. It contracts and relaxes to allow air to be inhaled and exhaled from the lungs.

Mechanics of breathing	
Inspiration	Diaphragm and intercostals contract, chest cavity increases, pressure decreases, air flows in
Expiration	Diaphragm and intercostals relax, chest cavity <u>decreases</u> , pressure increases, air is pushed out

Minute ventilation	
Tidal volume	The amount of air breathed in and out in one breath
Breathing rate	The number of breaths taken per minute
Minute ventilation	The amount of air breathed in and out in one minute

Aerobic and anaerobic respiration	
Aerobic Exercise	Exercise with oxygen , moderate intensity, long duration Glucose + Oxygen = Energy + Carbon dioxide + Water
Anaerobic Exercise	Exercise without oxygen , high intensity, short duration Glucose = Energy + Lactic acid

Short term effects of exercise	
Increased breathing rate	Breathing rate becomes deeper and quicker
Increased tidal volume	More air is breathed in and out in one breath
Increased minute ventilation	More air is breathed in and out in one minute

Long term effects of exercise	
Lung capacity increases	The lungs can take in more air
Respiratory muscles become stronger	The intercoastal muscles and diaphragm become stronger allowing more space in the chest cavity
Tidal volume and minute ventilation increases	More air can be inspired and expired
Increased functioning alveoli	Capillarisation takes place at the alveoli allowing more efficient gaseous exchange

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Knowledge organiser – Prevention of injuries

Components of a <u>warm up</u>	
Pulse raiser	Designed to gradually increase the heart rate
Stretching	Designed to increase range of movement at a joint
Mobilisation	Designed to move the joint through a full range of motion
Dynamic movements	An increase in intensity and change of direction and speed
Skill rehearsal	Practicing the skills to be used in the game

Benefits of a <u>warm up</u>	
Increase body temperature	Increases flexibility of joints
Warms ligaments and joints	Reduces change of strains
Increases blood flow and oxygen to muscles	Increased heart rate and blood flow
Increased speed of contractions	To prepare for the game intensity

Components of a cool down	
Low intensity exercise	Gradually decreases HR & temperature
Stretching	Mainly static stretches are used

Benefits of a cool down	
Return to natural state	Returns the body to its resting state
Reduce heart rate	Returns the heart to its resting rate
Reduce lactic acid	Helps to remove lactic acid and minimise stiffness
Remove waste products	Helps to remove waste such as water
Increase flexibility	Increases range of motion at the joint
Decrease blood pressure	Reduces risks of blood pooling

Hazards in sport	
Fitness Centre	Examples include free weights on the floor and tripping over mats
Sports Hall	Examples including walls and slipping on floors
Swimming pool	Examples include chemicals and slipping on floors
Playing field	Examples include debris and goals posts
Astroturf	Examples include carpet burns and moveable equipment

Reducing risks in sport	
PPE	Examples such as helmet in cricket and shin pads in football
Correct clothing	Examples such as studs in football and tight clothes in cycling
Appropriate competition	Examples such as age and skill level groups
Carrying equipment safely	Examples include using the knees to lift and don't move trampolines alone
Using warm up	Use the full 5 stage warm up