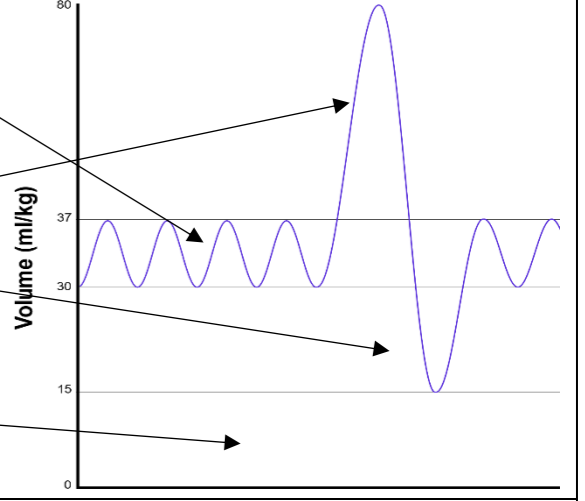
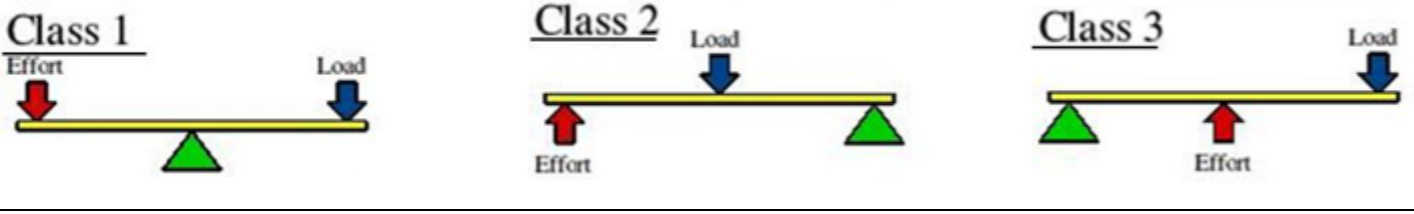


KNOWLEDGE ORGANISER (AO1, AO2 & AO3)

<p>Movement at a joint: flexion – decrease in the angle of the bones at a joint e.g. During the preparation phase of a football kick (knee bending) extension – increasing the angle of bones at a joint e.g. During the execution phase of a football kick (knee straightening) abduction – movement away from the midline of the body e.g. During the execution (outwards phase) of a straddle jump in trampolining. adduction – movement towards the midline of the body e.g. during the stroke butterfly, dragging the arms back through the water rotation – movement around an axis e.g. during a cricket bowl as the humorous turns in the shoulder socket (leg break) plantar flexion – pointing the toes at the ankle/increasing the ankle angle e.g. During the execution phase of a basketball jump shot dorsi flexion – toes up at the ankle/decreasing the ankle angle e.g. During the preparation phase of a set shot in basketball</p>	<p>Spirometer trace A measure of lung volumes, which includes:</p> <ul style="list-style-type: none"> - tidal volume – volume of air inspired or expired/exchanged per breath Increases during exercise - inspiratory reserve volume – the amount of air that could be breathed in after tidal volume Decreases during exercise - expiratory reserve volume – the amount of air that could be breathed out after tidal volume Decreases during exercise - residual volume – the amount of air left in the lungs after maximal expiration. Remains the same during exercise 
<p>Synovial joint - An area of the body where two or more bones meet (articulate) to allow a range of movements.</p> <ul style="list-style-type: none"> - synovial membrane – secretes synovial fluid - synovial fluid – provides lubrication to assist with movement / preventing friction - joint capsule – encloses/supports the joint - bursae (sacks of fluid) – reduce friction - cartilage – prevents friction/bones rubbing together. Absorbs shock e.g. when a performer is jumping during a jump shot. - ligaments – attach bone to bone. Restricts movement to prevent dislocation 	<p>Aerobic - With oxygen. When exercise is not too fast and is steady, the heart can supply all the oxygen that the working muscles need. Summarised as: glucose + oxygen → energy + carbon dioxide + water.</p>
<p>Agonist (prime mover) - Muscle or group responsible for the movement (contracting).</p>	<p>Anaerobic - Without oxygen. When exercise duration is short and at high intensity, the heart and lungs cannot supply blood and oxygen to muscles as fast as the respiring cells need them. Summarised as: glucose → energy + lactic acid</p>
<p>Antagonist - Acts to produce the opposite action to the agonist (relaxing). They work in antagonistic pairs.</p>	<p>Aerobic training zone The aerobic training zone allows the aerobic system to be trained. To define aerobic training zone: 1. Calculate maximum heart rate (220 bpm) minus age: 220-age 2. Work at 60-80% of maximum heart rate. The aerobic training zone- 80-90% of MHR.</p>
<p>Isotonic contraction - Muscle contraction that results in limb movement:</p> <ul style="list-style-type: none"> - Concentric contraction - shortening of the muscle e.g. execution phase of a chest pass. - Eccentric contraction - lengthening of the muscle e.g. downwards phase of a squat during the preparation phase of a basketball set shot. 	<p>Excess post-exercise oxygen consumption (EPOC) - Sometimes referred to as oxygen debt (now an outdated term), EPOC refers to the amount of oxygen needed to recover after exercise. EPOC enables lactic acid to be converted to glucose, carbon dioxide and water (using oxygen). It explains why we continue to breathe deeply and quickly after exercise.</p>
<p>Flexion/extension (forwards and backwards movement e.g. forward summersault) = Transverse axis /Sagittal Plane Abduction/adduction (side to side movement e.g. cartwheel) = Sagittal axis /Frontal plane Rotation = longitudinal axis / transverse plane</p>	<p>Stroke volume-The volume of blood pumped out of the heart by each ventricle during one contraction. Heart rate- the number of times the heart beats per minute</p>
<p>Levers - A rigid bar (bone) that turns about an axis to create movement. Each lever contains:</p> <ul style="list-style-type: none"> -a fulcrum - fixed point (joint) -effort (from the muscle(s) to move it) - load/resistance (from gravity). <p>1st Class = When the triceps are the agonist e.g. football throw in/ chest pass in basketball or netball/ header in football 2nd Class= Plantar-flexion and dorsi-flexion at the ankle e.g. sprint start position at the ankle 3rd Class= All other movements</p>	<p>Cardiac output -The amount of blood ejected from the heart in one minute Cardiac output=stroke volume x heart rate (Q=SV X HR)</p>
	<p>During exercise= SV increases and HR increases this causes Q to increase Long term effect of a trained athlete at rest = SV increases due to hypertrophy of the cardiac muscle. This causes HR to decrease, Q will therefore stay the same. A lower resting heart rate below 60bpm is called bradycardia.</p>
<p>Mechanical advantage The efficiency of a working lever, calculated by: effort ÷ weight (resistance) arm</p> <p>1st Class = Low mechanical advantage: short effort arm/long resistance arm (more effort needed to overcome a resistance but greater range of movement and generates more speed)</p> <p>2nd Class= high mechanical advantage: long effort arm/short resistance arm (less effort needed to overcome a resistance but smaller range of movement and less speed)</p> <p>3rd Class= Low mechanical Advantage: short effort arm/long resistance arm (more effort needed to overcome a resistance but greater range of movement and generates more speed)</p>	<p>Cardiac cycle - The process of the heart going through the stages of systole and diastole in the atria and ventricles. Vena cava>Atrium>ventricle>Pulmonary artery>lungs>pulmonary vein>atrium>ventricle> aorta</p>
	<p>Blood pressure - The pressure that blood is under. Types of pressure: - diastolic - when the heart is relaxed- Blood fills into the atria - systolic - when the heart is contracting Atrial systole- the atrium contract and pumps blood into the ventricles Ventricular systole- the ventricles contract and pumps blood into the arteries</p>
	<p>Mechanics of breathing- inspiration: intercostal muscles contract, diaphragm contracts, increases chest cavity (decreases pressure) drawing air into the lungs. Changes during exercise pectorals and sternocleidomastoid contract. Expiration- intercostal muscles relax, diaphragm relax, decreases chest cavity (increases pressure) drawing air out Changes during exercise abdominals contract.</p>
	<p>Health - A state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. Ill health refers to being in a state of poor physical, mental and/or social well- being. Fitness -The ability to meet/cope with the demands of the environment.</p>

<p>Muscular endurance (similar to dynamic strength): Ability of a muscle or muscle group to undergo repeated contractions, avoiding fatigue. e.g. Middle-distance running, rowing or swimming</p>	<p>Static stretching – Holding a stretch still/held/isometric Advantages – Increases flexibility, everyone can do this, relatively safe Disadvantages- Can be time consuming, muscles are easier to stretch than others, over-stretching can cause injury</p>
<p>Reaction time - The time taken to initiate a response to a stimulus. e.g. the time from the initiation of the stimulus (e.g. starting gun in 100 m) to starting to initiate a response (e.g. starting to move out of the blocks in 100 m).</p>	<p>Weight training -The use of weights/resistance to cause adaptation of the muscles. Advantages – easily adapted for fitness e.g. muscular endurance or strength, relevant to all sports. Disadvantages- heavy weights can increase blood pressure, injury if incorrect technique. Repetitions -The number of times an individual action is performed. A set is a group of repetitions.</p>
<p>Flexibility – The range of movements possible at a joint. e.g. A gymnast needs good flexibility to be able to perform movements such as, the splits</p>	<p>One rep max - The maximal amount that can be lifted in one repetition by a muscle/group of muscles (with the correct technique). Muscular Endurance below 70% of 1 rep max (3 x 12-15reps) Strength above 70% pf 1 rep max (3 x 4-8reps)</p>
<p>Strength -The ability to overcome a resistance. This can be explosive, static or dynamic: - explosive – see Power - static – static ability to hold a body part (limb) in a static position. Muscle length stays the same/maximum force that can be applied to an immovable object -dynamic – see Muscular endurance for similarity.</p>	<p>Principles of training -SPORT Specificity -Making training specific to the sport being played movements used muscles used energy system(s) used.</p>
<p>Speed - The maximum rate at which an individual is able to perform a movement or cover a distance in a period of time, putting the body parts into action as quickly as possible. Calculated by: distance ÷ time e.g. Olympic sprinters are able to perform the 100M sprint in less than 10 seconds</p>	<p>Progressive overload Gradual increase of the amount of overload so that fitness gains occur, but without potential for injury. Overload is the gradual increase of stress placed upon the body during exercise training (more than normal) (FITT).</p>
<p>Coordination -The ability to use different (two or more) parts of the body together, smoothly and efficiently. e.g. hitting a cricket ball with a bat (hand-eye co-ordination)</p>	<p>FITT - is used to increase the amount of work the body does, in order to achieve overload. FITT stands for: - frequency – how often you train e.g. training twice a week and increasing this to three times a week -intensity – how hard you train e.g. speed, level, intensity or weight e.g. from 20 reps to 22 reps -time – the length of the training session e.g. training for 45mins per session to 50mins. - type – the specific method, e.g. continuous training.</p>
<p>Balance -The maintenance of the centre of mass over the base of support. Reference can be made to whilst static (still) or dynamic (whilst moving). e.g. A snowboarder aims to not fall over when making a downhill descent</p>	<p>Reversibility Losing fitness levels when you stop exercising. This could be caused by gaps in training or due to an injury.</p>
<p>Agility -The ability to move and change direction quickly (at speed) whilst maintaining control e.g. A footballer needs to change direction quickly whilst dribbling the ball to outwit the defender</p>	<p>Tedium Boredom that can occur from training the same way every time. Variety is needed.</p>
<p>Power/explosive strength (anaerobic power)- The product of strength and speed, i.e. strength x speed. e.g. To perform a punch with power in boxing or a smash/spike in volleyball</p>	<p>Season - A period of time during which competition takes place or training seasons, dividing the year up into sectional parts for pre-determined benefits. Training seasons include: Pre-season (preparation) -period leading up to competition -usually using continuous/fartlek/interval training sessions to increase aerobic fitness -weight training to build up strength and muscular endurance -developing techniques specific to the sport in order to be fully prepared for matches at start of season and therefore be more successful. Competition season (peak) - playing season - taking part in matches every week - maintenance of fitness related to the activity but not too much training as it may cause fatigue, which would decrease performance - concentration on skills/set plays to improve team performance. Post season (transition) - Period of rest/active recovery/light aerobic work after the competition period (season).</p>
<p>Cardio-vascular endurance (aerobic power) - The ability of the heart and lungs to supply oxygen to the working muscles. e.g. long-distance runners, team sports performers, endurance cyclists and rowers</p>	<p>Delayed onset of muscle soreness (DOMS) - The pain felt in the muscles the day after exercise.</p>
<p>Interval training - Periods of training/work that are followed by periods of rest, e.g. work, rest, work, rest (see High intensity interval training) High intensity interval training (HITT) - It's an exercise strategy alternating periods of short intense anaerobic exercise with less intense recovery periods Advantages – It burns body fat and calories quickly, it can be altered to suit the individual, it can improve aerobic and anaerobic energy systems. Disadvantages- extreme work can lead to injury, high levels of motivation are needed to complete the work.</p>	<p>Qualitative - More of a subjective than an objective appraisal. Involving opinions relating to the quality of a performance rather than the quantity (eg score, placing, number). Quantitative - A measurement which can be quantified as a number, e.g. time in seconds or goals scored. There is no opinion expressed (qualitative). It is a fact.</p>
<p>Circuit training - A series of exercise stations whereby periods of work are interspersed with periods of rest. Advantages – Exercises can be simple, can be specific to components of fitness, can be varied depending on fitness level Disadvantages- Appropriate space is required, may require specialist equipment</p>	<p>Reliability - Relating to the consistency and repeatability of a test (i.e. to produce same or similar scores). Validity- The extent to which a test or method measures what it sets out to measure.</p>
<p>Continuous training -Involves working for a sustained period of time without rest. It improves cardio- vascular fitness. Sometimes referred to as a steady state training. Advantages – it can be done with little or no equipment, improves aerobic fitness, it is simple to do. Disadvantages- It can be boring (tedious), it can be time consuming, cause injury due to repetitive contractions</p>	
<p>Fartlek training - Swedish for 'speed play'. Periods of fast work with intermittent periods of slower work. Often used in running, i.e. sprint, jog, walk, jog, sprint, etc. Advantages – aerobic and anaerobic energy systems to be trained, good for sports that has a change of pace, easy to adapt Disadvantages- too easy to skip hard sections of the training</p>	
<p>Altitude training (traditional) - Training at altitude where there is less oxygen. The body adapts by making more red blood cells to carry oxygen. The additional oxygen carrying red blood cells is an advantage for endurance athletes returning to sea level to compete. Advantages – increases aerobic capacity Disadvantages- altitude sickness, benefits of training are lost quite quickly (red blood cells start to decrease again)</p>	
<p>Fatigue - Either physical or mental, fatigue is a feeling of extreme or severe tiredness due to a build-up of lactic acid or working for long periods of time.</p>	