TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – COMPONENT 1/PAPER 1 SPECIFICATION

Pearson Edexcel GCSE
Physical Education (2016)

Component 1: Fitness and Body Systems (*Component code: 1PE0/01)
Written examination: 80 marks – 1 hour 30 mins ***36% of the qualification*** ***80 marks***
Content overview • Topic 1: Applied anatomy and physiology • Topic 2: Movement analysis • Topic 3: Physical training • Topic 4: Use of data
Assessment overview The assessment consists of multiple-choice, short-answer, long-answer and one extended writing question. Section A Questions are focused on Topic 1: Applied anatomy and physiology and Topic 2: Movement analysis. Section B Questions are focused on Topic 3: Physical Training. Section C One extended-response questions related to Topic 3 Physical Training. Topic 4: Use of data is embedded throughout the paper where appropriate. Students must answer all questions. Calculators may be used in the examination. Information on the use of calculators during the examinations for this qualification can be found in *Appendix 7: Calculators*.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – COMPONENT 1/PAPER 1 SPECIFICATION

Pearson Edexcel GCSE
Physical Education (2016)

Topic 1: Applied anatomy and physiology

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the key body systems and how they impact on health, fitness and performance in physical activity and sport through the following content.		
1.1 The structure and functions of the musculo-skeletal system	1.1.1	The functions of the skeleton applied to performance in physical activities and sports: protection of vital organs, muscle attachment, joints for movement, platelets, red and white blood cell production, storage of calcium and phosphorus
	1.1.2	Classification of bones: long (leverage), short (weight bearing), flat (protection, broad surface for muscle attachment), irregular (protection and muscle attachment) applied to performance in physical activities and sports
	1.1.3	Structure: cranium, clavicle, scapula, five regions of the vertebral column (cervical, thoracic, lumbar, sacrum, coccyx), ribs, sternum, humerus, radius, ulna, carpals, metacarpals, phalanges (in the hand), pelvis, femur, patella, tibia, fibula, tarsals, metatarsals, phalanges (in the foot), and their classification and use applied to performance in physical activities and sports
	1.1.4	Classification of joints: pivot (neck – atlas and axis), hinge (elbow, knee and ankle), ball and socket (hip and shoulder), condyloid (wrist), and their impact on the range of possible movements

Subject content		What students need to learn
	1.1.5	Movement possibilities at joints dependant on joint classification: flexion, extension, adduction, abduction, rotation, circumduction, plantar-flexion, dorsi-flexion and examples of physical activity and sporting skills and techniques that utilise these movements in different sporting contexts
	1.1.6	The role of ligaments and tendons, and their relevance to participation in physical activity and sport
	1.1.7	Classification and characteristics of muscle types: voluntary muscles of the skeletal system, involuntary muscles in blood vessels, cardiac muscle forming the heart, and their roles when participating in physical activity and sport
	1.1.8	Location and role of the voluntary muscular system to work with the skeleton to bring about specific movement during physical activity and sport, and the specific function of each muscle (deltoid, biceps, triceps, pectoralis major, latissimus dorsi, external obliques, hip flexors, gluteus maximus, quadriceps, hamstrings, gastrocnemius and tibialis anterior)
	1.1.9	Antagonistic pairs of muscles (agonist and antagonist) to create opposing movement at joints to allow physical activities (e.g. gastrocnemius and tibialis anterior acting at the ankle -plantar flexion to dorsi flexion; and quadriceps and hamstrings acting at the knee, biceps and triceps acting at the elbow, and hip flexors and gluteus maximus acting at the hip – all flexion to extension)
	1.1.10	Characteristics of fast and slow twitch muscle fibre types (type I, type IIa and type IIx) and how this impacts on their use in physical activities
	1.1.11	How the skeletal and muscular systems work together to allow participation in physical activity and sport
1.2 The structure and functions of the cardio-respiratory system	1.2.1	Functions of the cardiovascular system applied to performance in physical activities: transport of oxygen, carbon dioxide and nutrients, clotting of open wounds, regulation of body temperature
	1.2.2	Structure of the cardiovascular system: atria, ventricles, septum, tricuspid, bicuspid and semi-lunar valves, aorta, vena cava, pulmonary artery, pulmonary vein, and their role in maintaining blood circulation during performance in physical activity and sport
	1.2.3	Structure of arteries, capillaries and veins and how this relates to function and importance during physical activity and sport in terms of blood pressure, oxygenated, deoxygenated blood and changes due to physical exercise

Subject content		What students need to learn
	1.2.4	The mechanisms required (vasoconstriction, vasodilation) and the need for redistribution of blood flow (vascular shunting) during physical activities compared to when resting
	1.2.5	Function and importance of red and white blood cells, platelets and plasma for physical activity and sport
	1.2.6	Composition of inhaled and exhaled air and the impact of physical activity and sport on this composition
	1.2.7	Vital capacity and tidal volume, and change in tidal volume due to physical activity and sport, and the reasons that make the change in tidal volume necessary
	1.2.8	Location of main components of respiratory system (lungs, bronchi, bronchioles, alveoli, diaphragm) and their role in movement of oxygen and carbon dioxide into and out of the body
	1.2.9	Structure of alveoli to enable gas exchange and the process of gas exchange to meet the demands of varying intensities of exercise (aerobic and anaerobic)
	1.2.10	How the cardiovascular and respiratory systems work together to allow participation in physical activity and sport
1.3 Anaerobic and aerobic exercise	1.3.1	Energy: the use of glucose and oxygen to release energy aerobically with the production of carbon dioxide and water, the impact of insufficient oxygen on energy release, the by-product of anaerobic respiration (lactic acid)
	1.3.2	Energy sources: fats as a fuel source for aerobic activity, carbohydrates as a fuel source for aerobic and anaerobic activity
1.4 The short- and long-term effects of exercise	1.4.1	Short-term effects of physical activity and sport on lactate accumulation, muscle fatigue, and the relevance of this to the player/performer
	1.4.2	Short-term effects of physical activity and sport on heart rate, stroke volume and cardiac output, and the importance of this to the player/performer
	1.4.3	Short-term effects of physical activity and sport on depth and rate of breathing, and the importance of this to the player/performer
	1.4.4	How the respiratory and cardiovascular systems work together to allow participation in, and recovery from, physical activity and sport: oxygen intake into lungs, transfer to blood and transport to muscles, and removal of carbon dioxide
	1.4.5	Long-term effects of exercise on the body systems – see 3.4.1–3.4.4
	1.4.6	Interpretation of graphical representations of heart rate, stroke volume and cardiac output values at rest and during exercise

Topic 2: Movement analysis

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the basic principles of movement and their effect on performance in physical activity and sport through the following content.		
2.1 Lever systems, examples of their use in activity and the mechanical advantage they provide in movement	2.1.1	First, second and third class levers and their use in physical activity and sport
	2.1.2	Mechanical advantage and disadvantage (in relation to loads, efforts and range of movement) of the body's lever systems and the impact on sporting performance
2.2 Planes and axes of movement	2.2.1	Movement patterns using body planes and axes: sagittal, frontal and transverse plane and frontal, sagittal, vertical axes applied to physical activities and sporting actions
	2.2.2	Movement in the sagittal plane about the frontal axis when performing front and back tucked or piked somersaults
	2.2.3	Movement in the frontal plane about the sagittal axis when performing cartwheels
	2.2.4	Movement in the transverse plane about the vertical axis when performing a full twist jump in trampolining

Topic 3: Physical training

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the principles of training and different training methods in order to plan, carry out, monitor and evaluate personal exercise and training programmes, through the following content.		
3.1 The relationship between health and fitness and the role that exercise plays in both	3.1.1	Definitions of fitness, health, exercise and performance and the relationship between them
3.2 The components of fitness, benefits for sport and how fitness is measured and improved	3.2.1	Components of fitness and the relative importance of these components in physical activity and sport: cardiovascular fitness (aerobic endurance), strength, muscular endurance, flexibility, body composition, agility, balance, coordination, power, reaction time, and speed

Subject content		What students need to learn
	3.2.2	Fitness tests: the value of fitness testing, the purpose of specific fitness tests, the test protocols, the selection of the appropriate fitness test for components of fitness and the rationale for selection
	3.2.3	Collection and interpretation of data from fitness test results and analysis and evaluation of these against normative data tables
	3.2.4	Fitness tests for specific components of fitness: cardiovascular fitness – Cooper 12-minute tests (run, swim), Harvard Step Test; agility – Illinois agility run test; strength – grip dynamometer; muscular endurance – one-minute sit-up, one-minute press-up; speed – 30 m sprint; power – vertical jump; flexibility – sit and reach
	3.2.5	How fitness is improved – see section 3.3.1–3.3.3
3.3 The principles of training and their application to personal exercise/ training programmes	3.3.1	Planning training using the principles of training: individual needs, specificity, progressive overload, FITT (frequency, intensity, time, type), overtraining, reversibility, thresholds of training (aerobic target zone: 60–80% and anaerobic target zone: 80%–90% calculated using simplified Karvonen formula, i.e. (220) – (your age) = MaxHR; (MaxHR) x (60% to 80%) = aerobic training zone; (MaxHR) x (80% to 90%) = anaerobic training zone)
	3.3.2	Factors to consider when deciding the most appropriate training methods and training intensities for different physical activities and sports (fitness/sport requirements, facilities available, current level of fitness)
	3.3.3	The use of different training methods for specific components of fitness, physical activity and sport: continuous, Fartlek, circuit, interval, plyometrics, weight/resistance. Fitness classes for specific components of fitness, physical activity and sport (body pump, aerobics, Pilates, yoga, spinning). The advantages and disadvantages of different training methods
3.4 The long-term effects of exercise	3.4.1	Long-term effects of aerobic and anaerobic training and exercise and the benefits to the muscular-skeletal and cardio-respiratory systems and performance
	3.4.2	Long-term training effects: able to train for longer and more intensely
	3.4.3	Long-term training effects and benefits: for performance of the muscular-skeletal system: increased bone density, increased strength of ligaments and tendons, muscle hypertrophy, the importance of rest for adaptations to take place, and time to recover before the next training session

Subject content		What students need to learn
	3.4.4	Long-term training effects and benefits: for performance of the cardio-respiratory system: decreased resting heart rate, faster recovery, increased resting stroke volume and maximum cardiac output, increased size/strength of heart, increased capilliarisation, increase in number of red blood cells, drop in resting blood pressure due to more elastic muscular wall of veins and arteries, increased lung capacity/volume and vital capacity, increased number of alveoli, increased strength of diaphragm and external intercostal muscles
3.5 How to optimise training and prevent injury	3.5.1	The use of a PARQ to assess personal readiness for training and recommendations for amendment to training based on PARQ
	3.5.2	Injury prevention through: correct application of the principles of training to avoid overuse injuries; correct application and adherence to the rules of an activity during play/participation; use of appropriate protective clothing and equipment; checking of equipment and facilities before use, all as applied to a range of physical activities and sports
	3.5.3	Injuries that can occur in physical activity and sport: concussion, fractures, dislocation, sprain, torn cartilage and soft tissue injury (strain, tennis elbow, golfers elbow, abrasions)
	3.5.4	RICE (rest, ice, compression, elevation)
	3.5.5	Performance-enhancing drugs (PEDs) and their positive and negative effects on sporting performance and performer lifestyle, including anabolic steroids, beta blockers, diuretics, narcotic analgesics, peptide hormones (erythropoietin (EPO), growth hormones (GH)), stimulants, blood doping
3.6 Effective use of warm up and cool down	3.6.1	The purpose and importance of warm-ups and cool downs to effective training sessions and physical activity and sport
	3.6.2	Phases of a warm-up and their significance in preparation for physical activity and sport
	3.6.3	Activities included in warm-ups and cool downs

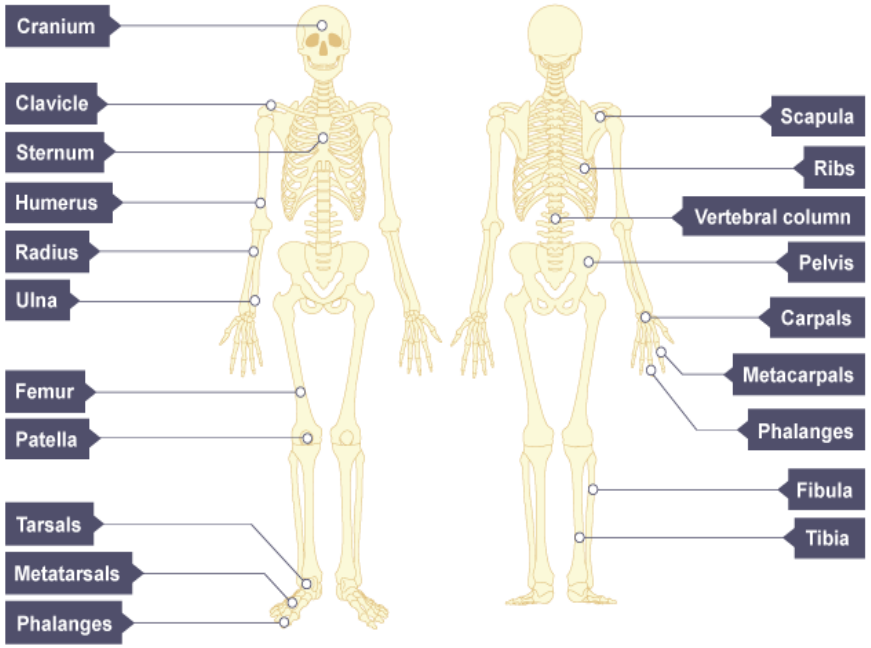
Topic 4: Use of data

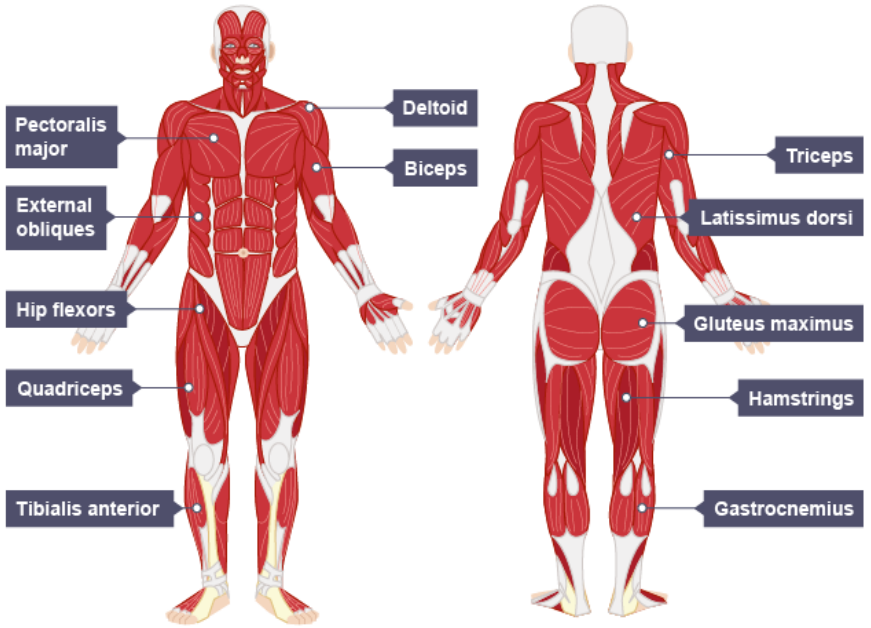
Subject content		What students need to learn
In this topic students will develop knowledge and understanding of data analysis in relation to key areas of physical activity and sport, through this content and linking it to other topics.		
4.1 Use of data	4.1.1	Develop knowledge and understanding of data analysis in relation to key areas of physical activity and sport
	4.1.2	Demonstrate an understanding of how data is collected in fitness, physical and sport activities – using both qualitative and quantitative methods
	4.1.3	Present data (including tables and graphs)
	4.1.4	Interpret data accurately
	4.1.5	Analyse and evaluate statistical data from their own results and interpret against normative data in physical activity and sport

Assessment information

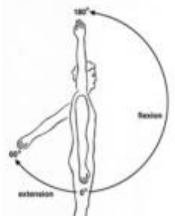
- First assessment: May/June 2018.
- The assessment is 1 hours and 30 minutes.
- The assessment is out of 80 marks.
- Students must answer all questions.
- The assessment consists of multiple-choice, short-answer, and one extended writing question.
- For the nine-mark extended writing question, students will be expected to draw on their knowledge and understanding in relation to the question, apply their knowledge and understanding and come to a reasoned judgement in order to answer the specific requirement of the question.
- Calculators may be used in the examination. Information on the use of calculators during the examinations for this qualification can be found in *Appendix 7: Calculators*.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.1.1-11: MUSCULOSKELETAL SYSTEM



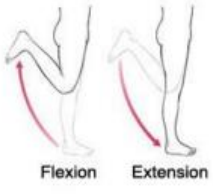


Flexion and extension at the shoulder
- The **Deltoid** causes flexion at the shoulder
- The **Latissimus dorsi** causes extension at the shoulder



Flexion and extension at the elbow
- The **Biceps** cause flexion at the elbow
- The **Triceps** cause extension at the elbow

Flexion and extension at the knee
- The **Hamstrings** cause flexion at the knee
- The **Quadriceps** cause extension at the knee

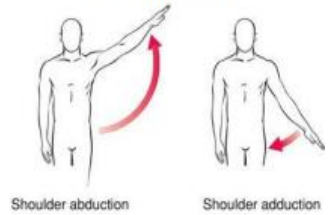


Flexion and extension at the hip
- The **Hip Flexors** cause flexion at the hip
- The **Gluteals** cause extension at the hip

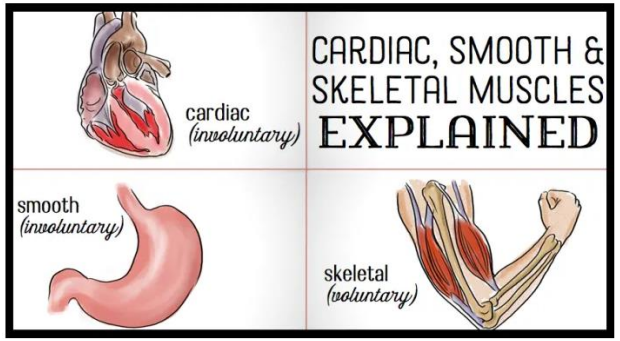
Flexion and extension at the ankle
- The **Tibialis Anterior** causes dorsiflexion at the ankle
- The **Gastrocnemius** cause plantar flexion at the ankle

Rotation of the Shoulder
- The **Rotator Cuff** causes rotation at the shoulder

Abduction and Adduction at the shoulder
- The **deltoid** causes abduction at the shoulder
- The **Pectorals / Latissimus Dorsi** cause adduction at the shoulder



	Function	Example in sport
Deltoid	Abduction of the shoulder (moving the arm outwards and away from the body)	Outward arm action in a jumping jack
Pectoralis major	Adduction of the shoulder (moving the arm towards the body); Shoulder horizontal flexion (moving the arms forwards in front of the body)	Upwards phase of a press up
Triceps	Extend the elbow (straightening the arm)	Shooting in netball
Biceps	Flex the elbow (bending the arm)	Drawing a bow in archery
External obliques	Trunk rotation (turning the body sideways)	Turning the body to breathe to the side when performing front crawl in swimming
Latissimus dorsi	Shoulder adduction (moving the arm towards the body); Shoulder horizontal extension	Butterfly stroke in swimming
Hip flexors	Hip flexion (moving knee up towards the chest)	Performing a rugby conversion kick
Gluteus maximus	Hip extension (moving the leg backwards)	Pulling back leg before kicking a ball
Quadriceps	Extend the knee (straightening the leg)	Kicking a ball
Hamstrings	Flex the knee (bending the leg)	Performing a hamstring curl on a weights machine
Gastrocnemius	Plantar flexion of the ankle (pointing the toes downwards)	Standing on tiptoe to mark a goal shoot in netball
Tibialis anterior	Dorsiflexion of the ankle (bringing the toes up towards the shin)	Foot making contact with a football



There are three types of muscle in the body:

1. **smooth muscle** – found in the internal organs and blood vessels - this is involuntary
2. **cardiac muscle** – found only in the heart - this is involuntary
3. **skeletal muscle** – attached to the skeleton - this is voluntary

Involuntary muscles are not under our conscious control which means we can't make them contract when we think about it.

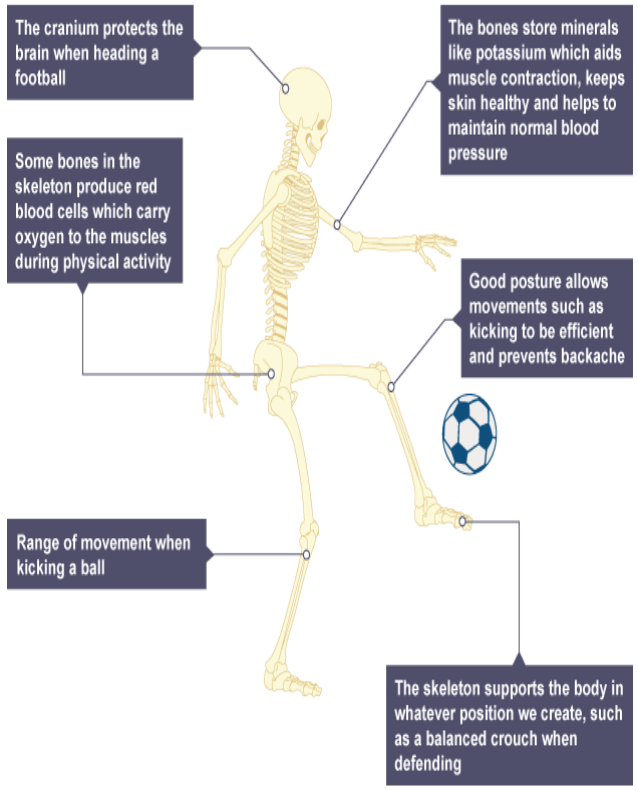
Voluntary muscles are under our conscious control so we can move these muscles when we want to.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.1.1-11: MUSCULOSKELETAL SYSTEM

The main functions of the skeletal system

The skeleton has five main functions:

1. **Movement** – the skeleton allows movement of the body as a whole and its individual parts. The bones act as levers and also form joints that allow muscles to pull on them and produce joint movements.
2. **Support and protection** – the bones of the skeleton provide support for the body and also protect the organs found within it. For example, the cranium protects the brain, the ribs offer protection to the heart and lungs, the vertebrae protect the spinal cord and the pelvis offers protection to the sensitive reproductive organs.
3. **Production of blood cells** – certain bones in the skeleton contain red bone marrow and the bone marrow produces red blood cells, white blood cells and platelets. Examples of bones that contain marrow are the pelvis, sternum, vertebrae and clavicle.
4. **Storage of minerals** – the bones themselves are made of minerals and act as a mineral store for calcium and phosphorous, which can be given up if the body requires the minerals for other functions.
5. **Attachment of muscles** – the bones of the skeleton provide surfaces for the attachment of muscles. This is why bones are often irregular shapes and have bony points and grooves to provide attachment points.



Type of bone	Example in body	Description
Long	Femur	Cylindrical in shape and found in the limbs. Their main function is to act as a lever.
Short	Carpals	Small and compact, often equal in length and width. These types of bone are designed for strength and weight bearing.
Flat	Ribs	Have a flat surface. Their function is for protection for the internal organs of the body.
Irregular bones	Vertebrae	Complex individual shapes, variety of functions including protection and muscle attachment.

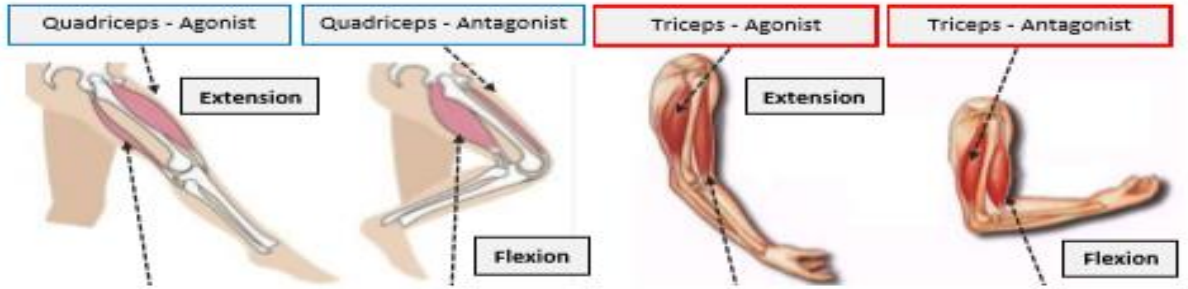
Antagonistic muscle pairs

The following groups of muscles are antagonistic pairs:

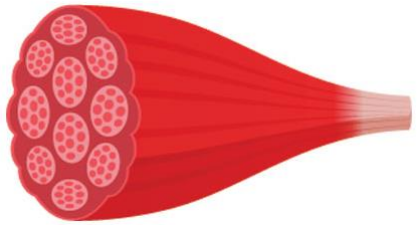
Biceps	Triceps
Hamstrings	Quadriceps
Gluteus maximus	Hip flexors
Gastrocnemius	Tibialis anterior
Pectoralis major	Latissimus dorsi

The two roles that muscles play in creating movement:	Describe the role of the muscles in an antagonistic pair:
Agonist:	The muscle or group of muscles that contract to create movement (prime mover)
Antagonist:	The muscle or group of muscles that relax to allow movement to happen

Task: At both the knee and the elbow joint, label the muscles involved and the agonist/antagonist

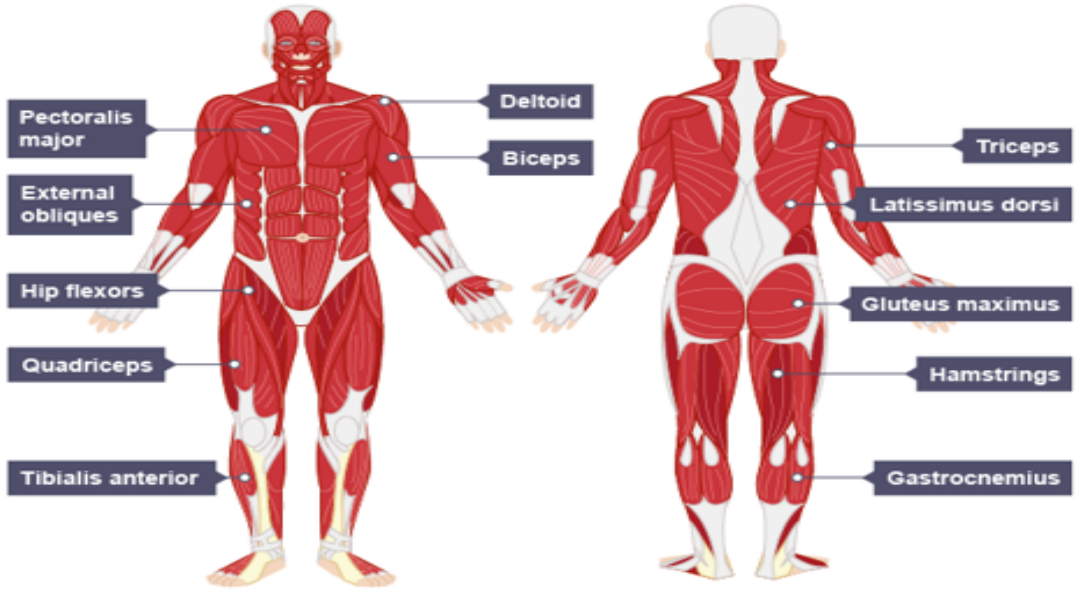


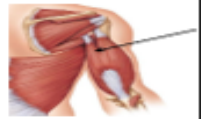
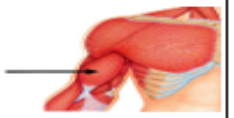
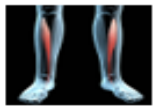
	Type I	Type IIa	Type IIx
Speed of contraction	Slow	Fast	Very fast
Force produced	Low	Medium	High
Resistance to fatigue	High	Medium	Low
Colour	Red	Pink	White



TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.1.1-11: MUSCULOSKELETAL SYSTEM

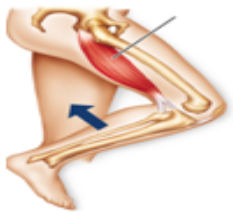
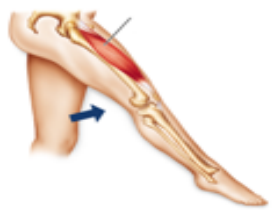
Location of major muscles:



External Obliques	Deltoid	Pectorals	Latissimus Dorsi	Triceps	Biceps
					
Flexion at the waist/trunk e.g. performing a sit-up & bending at the waist to during a throw-in in football	Moves the upper arm in all directions from the shoulder e.g. bowling in cricket & front crawl swimming	Adduction and flexion of the shoulder e.g. forehand drive in tennis & a hand off in rugby	Extension, adduction or rotation at the shoulder e.g. Butterfly in swimming & a rowing stroke	Extension of neck e.g. preparing to head a ball & stabilises the neck when getting punched in boxing	Flexion at the elbow e.g. bicep curl when lifting weights & preparing to throw a javelin in athletics
Gluteus Maximus	**Hip Flexors**	**Quadriceps**	**Hamstrings**	**Tibialis Anterior**	**Gastrocnemius**
					
Extension, adduction and rotation of the leg at the hip e.g. leg drive when sprinting & preparing to kick a ball	Flex the hip, help move the leg and knee move up towards the body, e.g. lifting knees when sprinting	Extension of the knee e.g. kicking a football or rugby ball & performing a jump shot in basketball	Flexion of the knee e.g. preparing to kick a football & bending knees before jumping	Pointing of the foot upward e.g.in the air when performing a ski jump	Pointing the foot downwards e.g. jumping up & pointing toes during a gymnastics performance

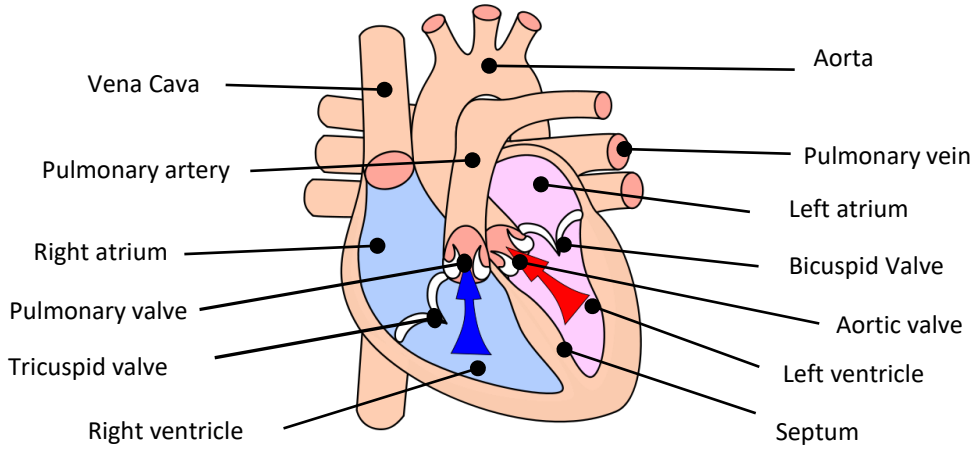
The roles of muscles in movement:

- Muscles work together to provide movement
- When one muscle contract the other muscle relaxes
- When muscle work like this it is called antagonistic pairs
- The muscle that contracts is called the agonist
- The muscle that relaxes is called the antagonist

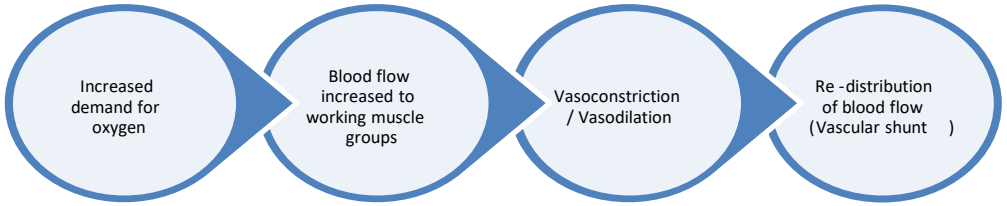
The biceps and triceps		The quadriceps and hamstrings		The muscles at the shoulder	
					
When we bend the elbow (flexion) the biceps contract and the triceps relax Agonist = Biceps Antagonist = Triceps	When we straighten the elbow (extension) the triceps contract and the biceps relax Agonist = Triceps Antagonist = Biceps	When we bend the knee the hamstrings contract and the quadriceps relax Agonist = Hamstrings Antagonist = Quadriceps	When we straighten the knee the quadriceps contract and the biceps relax Agonist = Quadriceps Antagonist = Hamstrings	Flexion of the shoulder Agonist: Back deltoid Antagonist: Front deltoid	Adduction of the shoulder Agonist: Latissimus dorsi Antagonist: Middle deltoid
				Extension of the shoulder Agonist: front deltoid Antagonist: back deltoid	Abduction of the shoulder Agonist: Middle deltoid Antagonist: Latissimus dorsi

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.2.1/2/3/4/5: CARDIOVASCULAR SYSTEM

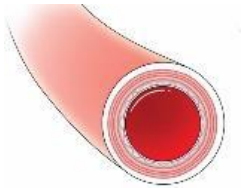
Deoxygenated blood = **BLUE** (Right side) Oxygenated = **RED** (Left side)



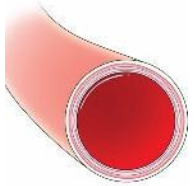
Vascular Shunting



Vasoconstriction –NARROWING



Vasodilation -EXPANDING



Function of the cardiovascular system

1. Transportation of oxygen,
2. Transportation of carbon dioxide
3. Transportation of nutrients
4. Clotting of open wounds
5. Regulation of body temperature

CONTROL BLEEDING

Arteries	Veins	Capillaries
1. Away from the heart 2. Oxygenated blood (except pulmonary artery) 3. Thick/elastic walls 4. High pressure	1. Back to the heart 2. Deoxygenated blood (except pulmonary vein) 3. Thin walls + larger lumen 4. Lower pressure 5. Valves	1. In the tissue 2. Site of gaseous exchange 3. Very thin walls

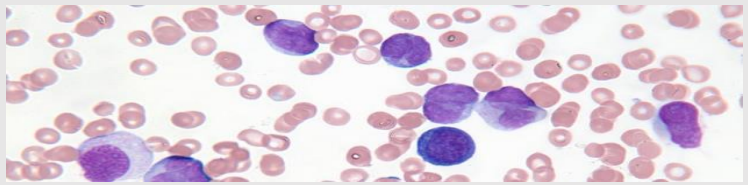
Components of blood-Red blood cells

Carry oxygen from the lungs to the working muscles + Removes CO_2.

Haemoglobin binds the oxygen.

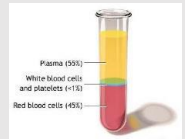
White blood cells

Are part of the immune system and **fight disease** and infection.



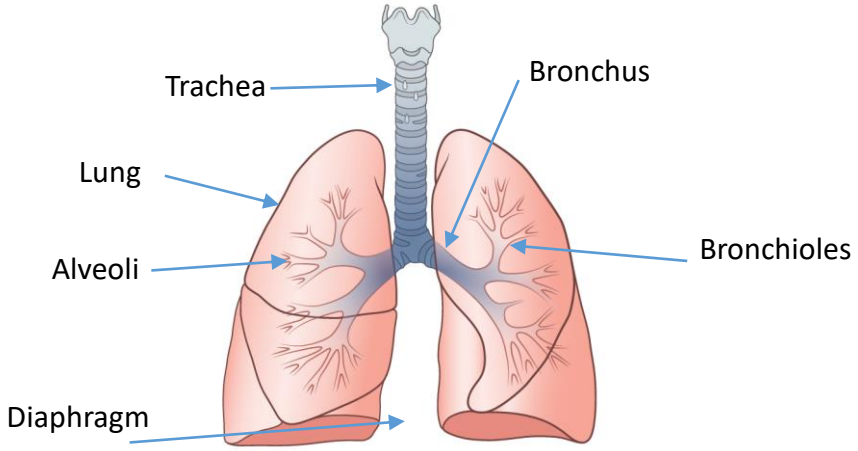
Platelets & Plasma

Platelets **clot blood** and form a scab around the site of injury. Plasma is the **liquid/fluid** part of blood that allows it to flow.

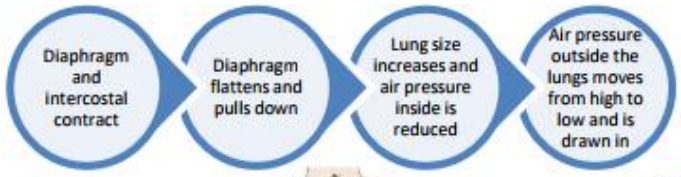


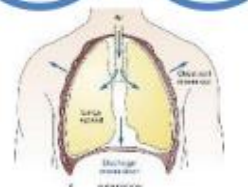
TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.2.6/7/8/9 : THE RESPIRATORY SYSTEM

Structure of the Respiratory System

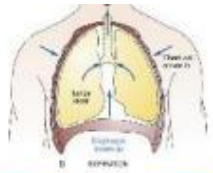


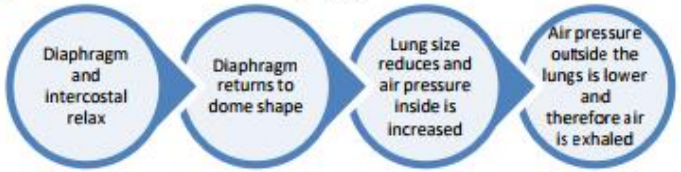
Inhalation





Exhalation





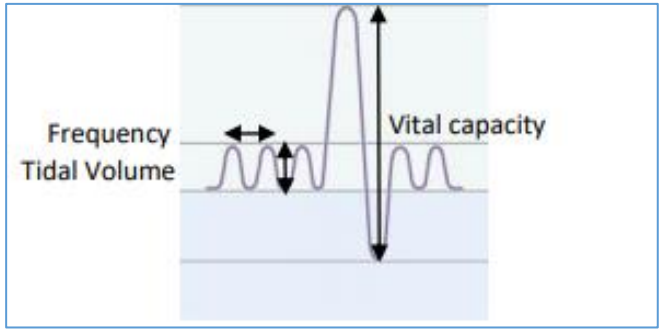
Respiratory Values

Tidal Volume – the amount of air inhaled and exhaled per breath Resting value = 500ml

Vital Capacity- The maximum amount of air exhaled following a maximal breath in.

Frequency – The number of breaths taken per minute. Resting value – 12-20 breaths

Minute Ventilation – The amount of air inhaled and exhaled per minute. Measured in litres.



Composition of inhaled and exhaled air

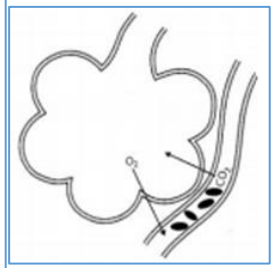
Gas	Inhaled air	Exhaled air
Oxygen	21%	16%
Carbon dioxide	0.04%	4%
Nitrogen	78%	78%

Gaseous exchange at the alveoli

- Diffusion is the movement of molecules from an area of high concentration to a low one.
- The alveoli have thin moist walls to allow diffusion to occur.
- Capillaries are closely wrapped around the alveoli to reduce the distance of diffusion and increase efficiency.

During inhalation:

- The concentration of oxygen is air is higher than the alveoli.
- The concentration of carbon dioxide in the blood is higher than that in the air.



During exercise : Gaseous exchange increases as the intensity of the activity increases to cope with:

- An increase demand for oxygen at working muscles
- An increase in carbon dioxide production and the need to rid this waste product.

Frequency ⇧ + Tidal Volume ⇧

Training increases total lung capacity and vital capacity readings.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.3.1-2 1.4.1-4: AEROBIC/ANAEROBIC/STE

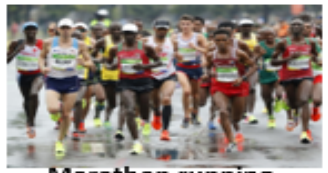
Aerobic & Anaerobic Exercise

Aerobic exercise:

- Uses oxygen for energy production
- Includes activities that are of a long duration
- Includes activities that are of a moderate intensity

Sports and activities:


Long distance cycling


Marathon running


Triathlon


Long distance rowing

Aerobic equation:

$$\text{Glucose} + O_2 \longrightarrow CO_2 + H_2O + \text{Heat} + \text{Energy}$$

Glucose and oxygen are used to release energy aerobically. This process produces carbon dioxide, water and heat (and energy)

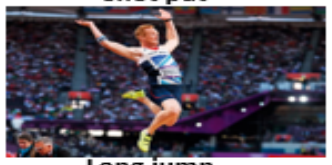
Anaerobic exercise:

- Does not use oxygen for energy production
- Include activities that are of a short duration
- Includes activities that are of a high intensity

Sports and activities:


Shot put


Sprinting


Long jump


Weight lifting

Anaerobic equation:

$$\text{Glucose} \longrightarrow \text{lactic Acid} + \text{Energy}$$

Lactic acid is produced as a waste product when carbohydrates are broken down without oxygen during anaerobic respiration

Energy Sources

Carbohydrates

- They are an energy source for both aerobic & anaerobic activities
- Doesn't need oxygen to break down into glucose
- Doesn't give as much energy as fats
- Quicker to break down and release more energy than fats

Fats

- They are an energy source for aerobic activities
- They require oxygen to break down the fat into energy (a type of glucose)
- They are slow to break down
- Once broken down they give large quantities of energy

Short Term Effects of Exercise

Short term effects of exercise are the ways your body responds as it starts to exercise. These changes happen so that the body can meet the increased demands to the exercise undertaken

Muscular System:

- Muscle fatigue
- Lactate accumulation
- Oxygen deficit

When we start to exercise there is a demand for energy.
When we work anaerobically, we get muscle fatigue and a build-up of lactic acid. This will create an oxygen deficit

Cardiovascular System:

- Increase in heart rate
- Increase stroke volume
- Increase blood pressure
- Increase cardiac output
- Vascular shunting occurs

Respiratory system:

- Increase depth of breathing
- Increase rate of breathing
- Increase gas exchange
- Increase in tidal volume
- Oxygen deficit

The cardiovascular system & respiratory system work together

When we exercise the demand for oxygen and the removal of carbon dioxide increases. This will increase breathing rate and depth and the rate of gas exchange

Because oxygen is needed for the working muscles, vascular shunting occurs

Heart rate is increased as the blood transports the oxygen and carbon dioxide. This increases blood pressure, stroke volume and heart rate

Cardiac output = Stroke Volume x Heart Rate

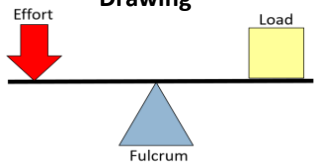
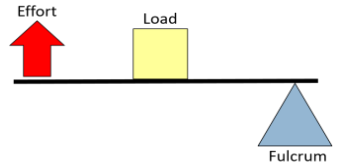
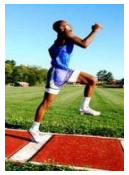
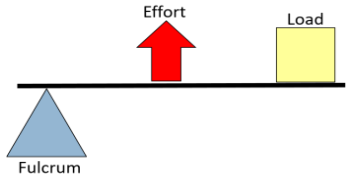
Stroke volume = Amount of blood pumped from the heart in 1 beat

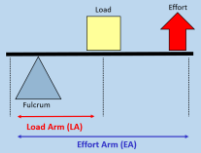
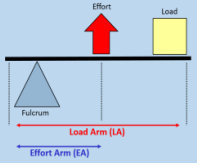
Heart rate = Amount of time the heart beats per minute

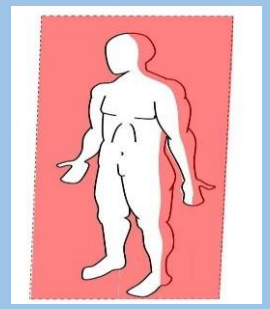
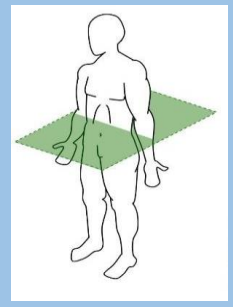
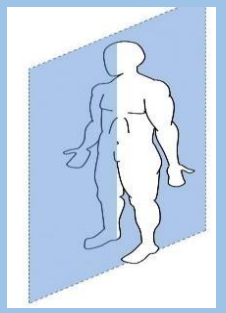
Cardiac output = Amount of blood pumped from the heart in 1 minute

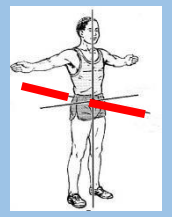
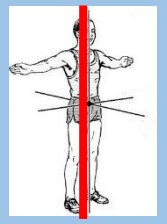
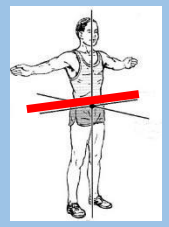
TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 2.1: MOVEMENT ANALYSIS

Fulcrum (F)	Load (L)	Effort (E)
A fixed pivot point 	The weight/resistance to be moved 	The source of energy that will be applied 

Classes of lever	Drawing	Example		
First class lever:			F	1st
Second class lever:			L	2nd
Third class lever:			E	3rd

Mechanical Advantage	Mechanical Disadvantage
This is where a lever's **effort arm** is greater than its **load arm**. Large loads can be moved with limited effort.	This is were a lever's **load arm** is longer than its **effort arm**. Can only move light loads, but can be done at speed.
 	 

Frontal plane	Transverse plane	Sagittal plane
A vertical plane divides the body into **front** and **back.** 	A horizontal plane divides the body into **upper** and **lower** halves. 	A vertical plane divides the body into **right** and **left.** 

Sagittal plane	Vertical plane	Frontal plane
Runs through the body horizontally from the **back** to **front.**  Example: Cartwheel 	Runs through the body vertically from the **top** to **bottom.**  Example: Full twist 	Runs through the body horizontally from **left** to **right.**  Example: Somersault 

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.2.1-5 COMPONENTS OF FITNESS

Health – A state of complete mental, physical and social well-being. fitness.
Fitness - The ability to meet the demands of the environment.
Exercise - A form of physical activity done primarily to improve health and/or fitness. Not competitive sport.
Performance – The action of performing a task/action.

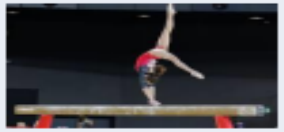
How to remember this?
B – Bob
M - Munches
M - More
F - Fried
C - Chicken

Relationship between these:

- Regular **exercise** increases general **health & fitness**.
- High levels of **fitness** can in turn have a positive impact on **performance**.

How to remember this?
C
R
A
B
S
P

Health Related Components of Fitness

Component	Definition	Sporting Example
Body Composition	The percentage of a body that is fat, muscle, bone and water.	 
Muscular Strength	The amount of the force muscles can generate against a resistance.	
Muscular Endurance	The ability to use voluntary muscles, over long periods of time without getting tired.	
Flexibility	The range of movement at a joint.	
Cardiovascular Fitness (Aerobic Endurance)	The ability of the heart and circulatory system to meet the demands of the body for a long period of time.	

Skill Related Components of Fitness

Component	Definition	Sporting Example
Coordination	The ability to move two or more body parts at the same time.	
Reaction Time	The time taken for a response to occur after a stimulus.	
Agility	The ability to change direction at speed.	
Balance	The ability to keep the body steady when in a static position or when moving.	
Speed	The time taken to cover a set distance/complete a movement.	
Power	The ability to combine speed and strength.	 

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.2.2-4: FITNESS TESTING

Whatever your sport, fitness is key to success. Different sports require different types of fitness and will have completely different training programmes. You can use a single fitness test or a number of fitness tests to measure and assess your current fitness level in a specific area. You can compare your results to other athletes or against the standards for your gender and age groups in national scoring tables.

Cooper 12-Minute Run Test

Tests cardiovascular fitness and estimates VO2 max.

What do I do? – Run for 12 minutes and measure the distance you have covered. Calculate your score against national data.

Re-Test – Use the same course

Harvard Step Test

Tests cardiovascular endurance .

Step on and off the box. Measure recovery heart rate.

The quicker you recover the fitter you are.

Hand Grip Dynomometer Test

Tests muscular strength.

Use the hand grip dynamometer. With your strongest hand, squeeze as tightly as possible

One Minute Press-Up Test

Tests muscular endurance.

See how many full press-ups you can do in 1 minute. Record how many you do.

30 Meter Sprint Test

Tests speed.

Work with a partner. Mark out 30m distance. When your partner signals you to run, run as fast as you can while they record your time.

Sit and Reach Test

Test flexibility of the hamstrings and lower back.

Use a standard sit and reach box. With your feet flat reach as far as you can.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.3.1: PRINCIPLES OF TRAINING

Specificity - training must be **relevant** to the **individual** and their **sport**. This can be achieved by tailoring training specifically for the sport or even the position that the individual plays, the muscle groups that they use the most or the dominant energy system of the athlete. For example, a 100 m sprinter is likely to train very differently to a 10 km racer despite them both being track athletes. The sprinter will focus on speed and power while the distance runner will train for cardiovascular fitness and the ability to work at high intensity aerobically.

Progressive overload - training frequency, intensity, time or type (FITT – see below) must be **increased** over the training period to ensure that the body is pushed beyond its normal rhythm. Increases must be gradual so that the athlete avoids a plateau in performance or, worse, injury.

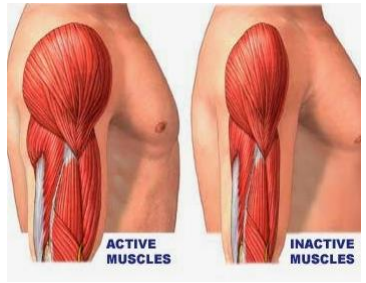
WEIGHTS	×	REPS	×	SETS	=	VOLUME
20LBS	×	10	×	3	=	600LBS
20LBS	×	15 ↑	×	3	=	900LBS ↑
20LBS	×	10	×	4 ↑	=	800LBS ↑
40LBS ↑	×	10	×	3	=	1200LBS ↑

FITT - (Frequency, Intensity, Time, Type) - Frequency is increased by training a greater number of times each week. **Intensity** is increased by lifting a greater resistance, such as with weight training, or by training at a higher percentage of maximum heart rate (maxHR). This can be done either as continuous or interval training. **Time** can be manipulated by training for longer, reducing recovery times or by completing a greater number of sets or repetitions (also known as reps). **Type** of training is manipulated by offering a variety of training types and experiences to the athlete by combining training methods.

Individual needs - all athletes are different. Training must be related to the athlete's age and **gender**, their injury status and fitness level. Any training that fails to be relevant to the individual will fail to motivate the athlete and will prove to be unsuccessful in the long term.

Rest and recovery - physical adaptations occur during the recovery and non-active period of the training cycle. Therefore athletes and trainers must achieve the right amount of rest between sessions, good sleep patterns and the right nutrition, including the use of **protein**, to help repair the damage caused by intense training.

Reversibility - systems **reverse** or de-adapt if training stops or is significantly reduced or injury prevents training from taking place. It is essential to avoid breaks in training and to maintain the **motivation** of the athlete.



Overtraining - if an athlete does not have sufficient rest periods then they are at risk of overtraining. This is when the body does not have time to adapt to the training and as a result the fitness of the athlete declines and they are more at risk of becoming ill or injured.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.3.2: TRAINING THRESHOLD

Training thresholds and calculating working heart rate

Training is effective when it specifically targets the individual athlete. One way of achieving this is by targeting the most relevant training threshold. For many athletes this involves calculating a specific **working heart rate**.

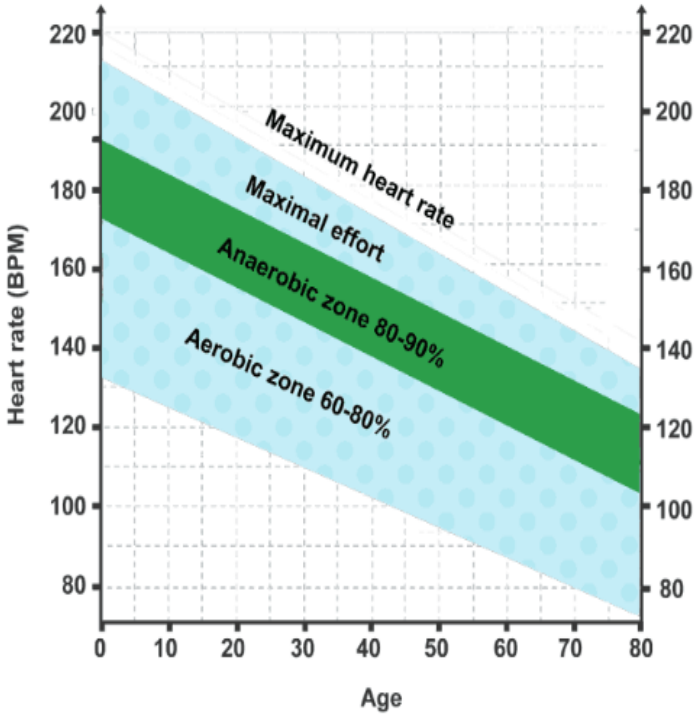
Maximum heart rate = 220 – age

A 20-year-old athlete might want to calculate their maximum heart rate in order to accurately calculate their training threshold:

Maximum heart rate = 220 – 20

Maximum heart rate = 200 beats per minute (BPM)

Once we have calculated the maximum heart rate, we can calculate the training thresholds.



Example 1

A 20-year-old distance runner wants to calculate working intensity within the aerobic zone:

Maximum heart rate = 200

Lower training threshold of the aerobic zone = 60% of maxHR

Lower training threshold = 0.6 × 200

Lower training threshold = 120 BPM

Upper training threshold of the aerobic zone = 80% maxHR

Upper training threshold = 0.8 × 200

Upper training threshold = 160 BPM

Therefore the 20-year-old aerobic athlete needs to target their training between 120 - 160 BPM to make the training effective.

Example 2

A 35-year-old basketball player wants to calculate working intensity within the anaerobic zone:

Maximum heart rate = 185

Lower training threshold of the anaerobic zone = 80% of maxHR

Lower training threshold = 0.8 × 185

Lower training threshold = 148 BPM

Upper training threshold of the anaerobic zone = 90% maxHR

Upper training threshold = 0.9 × 185

Upper training threshold = 167 BPM

Therefore the 35-year-old anaerobic athlete needs to target their training between 148 - 167 BPM to make the training effective.

The numbers and calculations above can be replaced for any type of athlete. Highly trained athletes will tend to train nearer the upper limit of the training threshold to gain maximum benefit.

Case studies - improving athletic performance

Athlete 1

A 25-year-old elite level long jumper training to improve athletic performance, with a specific goal of being selected by TeamGB for the next athletics World Championships.

Specificity - **training** would be focused on explosive strength of the legs by using weights and **plyometric** training. As long jumpers need to be highly flexible, a significant amount of time would be given to increasing flexibility through stretching.

Progressive overload and FITT - training frequency would be approximately 6 times per week. Training intensity would be increased gradually by increasing the weight lifted and then increasing the target heart rate range in interval sessions. Time can be progressively overloaded by decreasing recovery times in weight training and increasing the numbers of repetitions during plyometric training. Training type can be varied by combining weight, plyometric, interval and flexibility training.

Individual difference - this athlete is at optimal training age for strength gains and every effort should be made to cause adaptations in the body. However, there must be enough variety and rest in the training to ensure the athlete does not burn-out or become injured. Training six times a week also requires the athlete to have fun and enjoy the training.

Rest and recovery - the long jumper only has one full rest day each week so training units (sessions) need to be structured to allow for muscle groups to rest and recover. An example of this would be to use a flexibility session the day after a heavy weights and plyometrics day. Likewise the training could be structured so that the athlete works the upper body the day after training the lower body, thus allowing the legs to rest.

Reversibility - the long jumper is training six times per week. Injury and burn-out are avoided by allowing for recovery and providing varied types of training. This should prevent de-adaptation. Injury must be avoided at all costs.

Athlete 2

A 19-year-old road cyclist training to achieve their first professional contract in a European team. The rider is a specialist hill climber.

Specificity - training would be focused on cardiovascular fitness through a process of continuous training with other anaerobic methods used to improve the hill climbing. Training would take place for long periods to prepare the athlete for the full day cycling required by elite road cyclists.

Progressive overload and FITT - training frequency would be approximately six times per week. Training intensity would be increased gradually by increasing the target heart rate range in continuous sessions. Time can be progressively overloaded by increasing the length of sessions and the proportion of the session spent climbing. Training type can be varied by combining continuous, interval and flexibility training.

Individual difference - this athlete is young and every effort must be made to ensure they make fitness gains without causing injury through over-training. Training must be varied to prevent boredom or burn-out.

Rest and recovery - the cyclist only has one full rest day each week so training units (sessions) need to vary in terms of length and intensity. Successive high intensity hill sessions should be avoided. Recovery must be optimised through the use of effective cool downs as well as excellent nutrition between sessions.

Reversibility - the cyclist is training six times per week during in-season training. Attention must be given to ensuring that over-use injuries do not occur by recovering properly from training and by using good nutrition.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.3.3/3.6.1-3 : TRAINING METHODS/WU&CD

Warm up

The illustration shows the three primary components of an effective warm up. All warm ups should last a minimum of ten minutes and typically are much longer.

Pulse raising activity – The pulse raiser will increase deep muscle temperature, loosen joints and increase respiratory and cardiac rates. Stroke volume increases allowing for greater oxygen delivery to the muscles that will work during the performance.

Stretching and mobility exercises – Stretching and mobility exercises increase the range of motion at joints, increase the extensibility of the muscle and helps to reduce the risk of soft tissue injuries such as sprains and strains.

Sport specific activities – Sport specific activities involving drills and practices that develop the core skills of the performance. This causes an increased coordination of antagonistic pairs of muscles, an increased feeling of confidence and increased coordination between players in team sports.

Cool down

The illustration shows the three primary components of an effective cool down. Athletes always cool down following training and performance.

Light jog – The light aerobic work allows for the respiratory and cardiac levels to reduce gradually. Core muscle temperature is maintained while capillaries are flushed with oxygenated blood. Lactic acid and other toxins are removed from worked muscles more efficiently.

Stretching – Stretches within the cool down are typically held for 30 seconds. As the muscle stretches blood flow is increased allowing for faster recovery. Muscles are better prepared for the next training session and soreness and pain experienced after training is reduced.

Refuelling – Consuming carbohydrates, proteins and fluids within the first two hours post-exercise allows for optimal recovery. Carbohydrates replace the glycogen burned during training. Proteins help the adaptation process by allowing muscles and other soft tissues to be rebuilt stronger. Fluids such as water and isotonic drinks allow for rehydration.

Continuous training develops cardiovascular fitness

- A minimum of 20 minutes sub-maximal work.
- Target **heart rate** range between 60% - 80% maximum heart rate (maxHR).
- Swimming, running, cycling, walking or a combination of these disciplines.
- Disadvantage - some participants find longer sessions to be boring.

Fartlek (speed play) training develops a range of components and is used by games players

- A continuous form of training.
- Changes in speed, incline and terrain are used to provide changes in exercise intensity.
- **Aerobic** and **anaerobic** work can be done in the quantities that suit the performer.
- Disadvantage - some urban areas have little variety of incline and terrain.

Interval training develops strength, speed and muscular endurance

- Periods of intense work interspersed with timed rest.
- A wide variety of fitness types can be developed.
- Structured in reps and sets.
- Intensity is measured by % maxHR.
- Disadvantage - maximal nature of intervals can be too challenging for some participants.

Weight training develops strength

- An interval form of training.
- Intensity is measured in a percentage of the most weight a person can lift one time and is known as % 1 REP MAX.
- Time is structured in reps and sets with specific timings for recovery between sets.
- Huge range of possible lifts combining machines, free weights and body weight exercises.
- Disadvantage - many performers use poor technique while striving for an even heavier weight.

Plyometric training develops power

- High intensity exercise involving explosive movements.
- The muscle is lengthened and then rapidly shortened to develop the explosive capability of the muscle.
- Suitable for well-trained athletes.
- Very effective for developing power.
- Disadvantage - can cause injury if athlete is not in excellent condition.

Flexibility training develops flexibility

- Essential training for all athletes in all sports and activities.
- Time is measured by the length of hold and the recovery period between holds.
- Intensity is measured as a percentage of range of motion (%ROM).
- Disadvantage - underused by many athletes.

Circuit training

- This develops muscular endurance, strength and/or cardiovascular fitness.
- An interval form of training.
- Stations are set out that train one or more components of fitness.
- The performer moves from one station to the next with exercise periods and rest periods.
- Circuits can be designed so that they are sport-specific.

Exercise classes such as yoga, pilates, body pump and spinning

- Very popular exercise formats.
- Yoga, body pump and pilates are outstanding for developing core strength and whole body conditioning.
- Spinning develops cardiovascular fitness and muscular endurance.
- Group format helps to motivate participants to work harder.
- Disadvantage - can be costly and sometimes carries the unfair reputation of a non-serious training method.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.4.1-3.4.4: LONG TERM EFFECTS OF EXERCISE

Skeletal System:

Adaptations

- Increased bone density
- Stronger ligaments and tendons

Explanation:

- Weight bearing activities lead to stronger bones, stronger bones mean that you are less chance of breaks/fractures. There is also less chance of osteoporosis
- Stronger ligaments and tendons mean that joints are more stable, so less likely to dislocate or an overuse injury of the tendon such as golfer elbow

Muscular System:

Aerobic adaptations

- Hypertrophy of the slow twitch muscle fibres
- Increased myoglobin content
- Increased size of mitochondria

Explanation:

- Slow twitch muscle fibres will get bigger through aerobic exercise, muscular endurance will improve
- An increase in myoglobin means that more oxygen can get to the working muscles for aerobic exercise
- An increase in mitochondria allows us to produce more energy aerobically

Anaerobic adaptations

- Hypertrophy of the fast twitch Muscle fibres
- Increased strength
- Increased tolerance to lactic acid

Explanation:

- Fast twitch muscle fibre will get bigger allowing more strength and power for anaerobic activities
- An increase in strength allows us to produce more force in anaerobic activities
- An increased tolerance to lactic acid allows muscles to carry on working at a high intensity without getting tired

Respiratory System:

Adaptations

- Increased number of alveoli
- Increased strength of intercostal muscles
- Increased strength of the diaphragm
- Increased tidal volume & vital capacity

Explanation

- More alveoli mean that more oxygen and carbon dioxide can be exchanged
- An increase in the diaphragm and intercostal muscles allow the lungs to fully inflate
- An increase in tidal volume and vital capacity allows more oxygen to be taken into the lungs and more carbon dioxide can be removed
- All the adaptations to the respiratory system allow more oxygen to be delivered to the working muscles and for more carbon dioxide to be removed

Cardiovascular System:

Adaptations

- Increased elasticity of the muscular wall of veins and arteries
- Reduced resting blood pressure
- Increase size and strength of the heart (cardiac hypertrophy)
- Increase in resting stroke volume
- Lower resting heart rate
- Increase in maximum cardiac output
- Increased capillarisation
- Increased number of red blood cells
- Faster recovery rate

Explanation

- An increase in the elasticity of veins and arteries reduces your resting blood pressures and have less chance of developing coronary heart disease
- Cardiac hypertrophy of the heart allows more blood to be ejected from the heart in one beat (stoke volume). Because it can pump more blood, resting heart is reduced
- When exercising the heart can pump more blood around the body per minute. This allows more oxygen to be transported to the working muscles and for the removal of carbon dioxide
- More capillaries allow more oxygen to get into the blood/working muscles and the removal of co2
- An increase in red blood cells allows the blood to carry more oxygen to the working muscles
- Because the heart is bigger and more efficient, we can recover quicker after exercise

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.5.1-4: PARQ/INJURIES

PAR-Q questionnaire

Many health clubs, gyms and other physical activity providers use a questionnaire **methodology** to ensure that participants are of good physical health to start a programme of exercise. The Physical Activity Readiness Questionnaire (PAR-Q) is a common method of uncovering health and lifestyle issues prior to an exercise programme starting. The questionnaire is short and easy to administer and reveals any family history of illness. If the PAR-Q reveals an issue it is advisable for the participant to seek a doctor's advice through a process called the GP referral.

Physical Activity Readiness Questionnaire (Par-Q)

Name _____ SS# _____

Contact Phone _____ Occupation _____

Date of Birth _____ Which Preventive Health activities do you plan to participate in? _____

For most people physical activity should not pose any problem or hazard. The Par-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or those who should have medical advice concerning the type of activity most suitable for them.

Common sense is your best guide in answering these questions. Please read them carefully and check **YES** or **NO** if it applies to you. If a question is answered with **YES**, **please use the available space to explain your answer and give additional details.**

1. Has a doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor? ☐YES ☐NO
2. Do you feel pain in your chest when you do physical activity? ☐YES ☐NO
3. In the past month, have you had chest pain when you were not doing physical activity? ☐YES ☐NO
4. Do you lose your balance because of dizziness or do you ever lose consciousness? ☐YES ☐NO
5. Do you have a bone or joint problem that could be made worse by a change in your physical activity? ☐YES ☐NO
6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition? ☐YES ☐NO
7. Do you know of any other reason why you should not do physical activity? ☐YES ☐NO
8. Do you currently participate in any regular activity program designed to improve or maintain your physical fitness? ☐YES ☐NO
   If yes, what activity program do you participate in?_____
   _____

Injury prevention – to prevent injury performers and coaches should recognise and identify risks and reduce them.

Using the right principles of training to over overuse injuries	Understand and following the rules of the sport during play	Using appropriate protective clothing	Checking the equipment to make sure it is in good condition and age appropriate	Following a full warm up and cool down	Checking the facilities	Ensuring competition is balanced

R – Rest

Immobilise the injured part

I – Ice

Apply an ice pack or other cold object direct to the affected area

C – Compression

Ensure that the ice pack or compress is firmly pressed against the affected area

E – Elevation

Raise the injured limb above the level of the heart

Injuries

Soft tissue injuries

Strain – Pulled or overstretched muscle.

Sprain - Twisted or wrenched ligament.

Treatment for strain and sprain = **RICE** (Rest, Ice, Compression, Elevation)

R – **rest** the injured part.

I - Apply **ice** to reduce the swelling for a maximum of 10 minutes.

C – **Compress** the injured area using a bandage.

E – **Elevate** the injured part to decrease the blood supply.

Golfers Elbow/Tennis Elbow – overuse injury caused by inflamed tendons that attach muscles to the elbow joint. Symptoms also include soreness and pain.

Abrasions – minor injuries to the surface of the skin. *i.e. a graze.* Symptoms are a hot/burning sensation, redness and occasionally some light bleeding. Treatment – clean and cover with a low adhesive dressing.

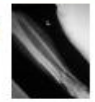
Torn Cartilage – This can occur when a joint is twisted excessively. This is commonly caused when players change direction quickly. Treatment – ice and surgery

Concussion – An injury to the brain caused by a knock to the head. Common in contact sports. If an athlete is concussed, they may:

- Become unconscious.
- Feel sick, dizzy or drowsy.
- Get confused, stare & suffer memory loss.

Dislocation - a sudden impact on a joint can cause the bones that meet to become disconnected.

Fracture – a broken bone.



Open/compound/complex fracture – bone through the skin

Closed/simple fracture – bone remains in the skin.

Greenstick fracture – bone bends (younger children)

Stress fracture - repeated or prolonged forces against the bone

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.5.5: PERFORMANCE ENHANCING DRUGS

What are drugs?

- Drugs are 'substances that change chemical reactions in the body.'
- Depending on the drug, the effect it has on the body can very different!

Why athletes take drugs?

- Encouraged by their coach/fellow athletes
- Reward of success (financial/titles)
- Lifespan of career is short
- Thought that everyone is doing it

Name of Drug	Effect on performance?	Sporting Example	Side Effects
Anabolic steroids 	Helps athletes to train harder and build muscle mass	Bodybuilders – Bodybuilders are judged on their muscle mass. More muscle = improved performance	• Increase risk of heart attacks • High blood pressure • Liver disease • Increase risk of muscle injury • Infertility in women • Death
Beta blockers 	Reduce heart rate (HR)	Archery / Snooker / Darts – these athletes need to concentrate hard on performing a specific fine skill, so a lower HR aids performance	• Nausea and diarrhoea • Tiredness • Depression • Insomnia and nightmares
Diuretics 	Remove fluid from the body and can aid weight loss	Boxing / Jockeys – Need to make weight to fight or race	Dehydration Dizziness Long term – Kidney problems
Narcotic analgesics 	Mask pain caused by injury or fatigue which can make the injury worse	Footballers – may take these to hide the pain of a dead leg to continue playing for the next game	Loss of concentration Loss of balance Loss of co-ordination Emotional effects – Hallucinations (Morphine)

Name of Drug	Effects on performance	Sporting Example	Side Effects
Peptide hormones (erythropoietin or EPO) 	Increases red blood cells = more energy	Cyclist – Need to cycle for long periods of time so more energy = improved performance	• Increase blood viscosity – long term heart issues
Growth Hormone (GH)  	Builds muscle	Wrestler – needs lots of muscle to be able to throw/wrestle their opponents	• Fewer side effects
Stimulants 	Makes athletes more alert and masks fatigue (extreme tiredness caused by physical activity) and increases aggression.	Ice Hockey – Contact sport so being alert and aggressive is important to avoid/make tackles and stay safe!	• Insomnia • Irritability • Irregular heart rate • Increased heart rate • High blood pressure • Addiction
Blood Doping 	Involves injecting blood that has been removed from the body a few days earlier, enabling the blood to carry more oxygen = improves endurance so athletes can train for longer!	Marathon Runner – Need to perform for long periods of time, so an improvement in endurance = improved performance	• Increase blood viscosity • Long term heart issues • Risk of infection