

# **GCSE Physical Education**

## **‘You Should Know’ Guide**

## 1.1 Healthy Active Lifestyle and How it Could Benefit You

### What is a 'healthy active lifestyle'?

A lifestyle that contributes positively to **physical, mental, and social wellbeing**, and includes regular exercise and physical activity

### What are the benefits of a healthy active lifestyle?

**Physical** - increase fitness; improve performance, for the physical challenge, etc.

**Mental/Psychological** - for the mental challenge, increase confidence, enjoyment, etc.

**Social** - develop teamwork, work with others, make new friends, etc.

### What are the reasons for taking part in physical activity?

**Cooperation** - many sports are played in teams and working in groups helps to improve teamwork and cooperation.

**Competition** - competition can be thought of as psychological as it prepares the mind to compete and helps athletes forget about stress in their lives.

**Physical challenge** - setting a physical task that is challenging but achievable will mean the athlete will be very satisfied when completing the task.

**Aesthetic appreciation** - 'beauty of the game'. It's about appreciating a performance that is beautiful and not just winning. Aesthetic appreciation can be from both a performer's and an observer's point of view.

**Developing friendships** - taking part in exercise or sport at school or at a club means involvement with other people, including other participants, coaches, and officials.

## 1.2 Influences on Your Healthy, Active Lifestyle

### What factors affects involvement in physical activity?

**People** - family, peers (friends), and role models.

**Image** - fashion and media coverage.

**Cultural factors** - disability, age, gender, and race

**Resources** - availability, location, access, and time

**Health and wellbeing** - illness and ongoing health problems

**Socio-economic** - cost and status (social class)

### What initiatives are there to keep people involved in sport?

**Government Initiatives** - Compulsory 2 hours of PE in school every week.

**PE School Sport & Club Links (PESSCL)** - Strategy to increase participation in 5-16 year olds.

**Sport England** - Sport England is committed to creating opportunities for people to 'start, stay, and succeed' in sport.'

### What is the 'Sports Participation Pyramid'?

**Excellence** - this stage is the peak of the pyramid, where individuals reach sporting excellence.

**Performance** - during this stage young people begin to concentrate on sport specific skills and to develop talent in specific sports.

**Participation** - this is the stage where young people begin to participate regularly in a specific sport activity.

**Foundation** - this is the base of the pyramid. At this stage most participants are likely to be learning/experiencing basic sport skills.

### 1.3 Exercise and Fitness as Part of Your Healthy, Active Lifestyle

#### What is the correct definition for 'health'?

**Health** is a state of complete mental, physical, and social wellbeing and not just being free of disease and infirmity.

#### What is the correct definition for 'exercise'?

**Exercise** is a form of physical activity which maintains or improves health and physical fitness.

#### What is the correct definition for 'fitness'?

**Fitness** is the ability to meet the demands of the environment.

#### What is the correct definition for 'performance'?

**Performance** is how well a task is completed.

#### What are the 5 health-related components of exercise?

**Cardiovascular fitness** - the ability to exercise the entire body for long periods of time.

**Muscular strength** - the amount of force a muscle can exert against a resistance.

**Muscular endurance** - the ability to use voluntary muscles many times without getting tired.

**Flexibility** - the range of movement possible at a joint.

**Body composition** - the percentage of body weight that is fat, muscle, and bone.

#### What are the 6 skill-related components of fitness?

**Agility** - the ability to change the position of the body quickly and to control the movement of the whole body.

**Balance** - the ability to retain the centre of mass (gravity) of the body above the base of support with reference to static or dynamic conditions or movement, shape, and orientation.

**Coordination** - the ability to use 2 or more body parts together.

**Power** - the ability to undertake strength performances quickly (power = strength x speed).

**Reaction time** - the time between the presentation of a stimulus and the onset of movement.

**Speed** - how quickly a movement can be performed or a distance can be covered.

## 1.4 Physical Activity as Part of Your Healthy, Active Lifestyle

### What is PARQ?

**Physical Activity Readiness Questionnaire** - before starting an exercise programme you must make sure you are ready to do so. A PAR-Q has questions relating to whether an individual is ready to take part in physical activity.

### How can components of fitness be measured?

**Cooper's 12 minute run** - this tests cardiovascular fitness and muscular endurance of the legs.

**Hand grip strength test** - tests muscular strength of the hand.

**Sit and reach flexibility test** - tests the flexibility of the hamstrings.

**Harvard step test** - test measures cardiovascular endurance and muscular endurance.

**Illinois agility run** - tests agility.

**Standing stork test** - tests a person's static balance.

**Sergeant jump test** - tests leg power.

**Standing broad jump** - tests power.

**Ruler drop test** - tests reaction time.

**30 metre sprint** - tests speed.

**Alternate hand wall throw** - test coordination.

### What are the 'principles of training' (SPORRRRI FITT)?

**Specificity** - matching training to the requirements of an activity.

**Progressive Overload** - to gradually increase the amount of effort or overload so that fitness improvements occur, but without injury.

**Rest** - the period of time allocated to recovery.

**Recovery** - the time required for the repair of damage to the body.

**Reversibility** - any adaptation that takes place because of training will be reversed when training stops.

**Individual needs** - matching training to the requirements of the individual.

**FITT (Frequency, Intensity, Time, Type)** - used to increase the amount of work the body does, in order to achieve overload.

### What are SMART goals?

**Specific** - knowing exactly what the goal is.

**Measurable** - knowing when and if the goal has been achieved.

**Achievable** - being able to complete the goal.

**Realistic** - goal may be achievable, but given your time, motivation and other commitments might make the goal unrealistic.

**Time-bound** - having an 'end point' to the goal.

### What are the 6 different methods of training?

**Interval training** - defined periods of work followed by defined periods of rest.

**Continuous training** - steady training for longer amounts of time with no rest.

**Fartlek training** - a combination of fast and slow running with no set distances, unlike interval training.

**Circuit training** - involves a number of exercises, with the stations arranged in a circuit that doesn't work the same muscle groups consecutively.

**Weight training** - involves progressive resistance, in the form of an actual weight lifted or the amount of times the weight is lifted (repetitions).

**Cross training** - is a mixture of all training methods to avoid boredom.

**What is the correct definition for 'aerobic fitness'?**

**'With oxygen'** - if exercise is not too fast and is steady, the heart can supply all the oxygen the muscles need.

**What is the correct definition for 'anaerobic fitness'?**

**'Without oxygen'** - if exercise is done in short, fast bursts, the heart cannot supply blood and oxygen to muscles as fast as the cells use them.

**What is heart rate?**

**Heart rate** is the number of times that the heart beats per minute (bpm).

**What is resting heart rate?**

**Resting heart rate** is the heart at rest. It is normally between 60-80 beats per minute and is best taken first thing in the morning before getting out of bed.

**What is the maximum heart rate (MHR)?**

Maximum heart rate is calculated by subtracting a person's age from 220:

$$220 - (\text{age}) = \text{MHR}$$

**What is meant by the term 'target zone' and how can it be worked out?**

Target zone means working at 60%-80% of maximal capacity. It can be worked out by finding out **60% of MHR (lower threshold)** and **80% of MHR (upper threshold)**.

**What is meant by the term 'recovery rate'?**

**Recovery rate** means how long it takes for a person's heart rate to return to its **resting level** after a training session.

## 1.5 Your Personal Health & Wellbeing

**What are the requirements of a balanced diet?**

**Macro nutrients:**

**Carbohydrates** - are important because they give us energy. Carbohydrates are stored in the muscles and liver as glycogen, which is quickly converted to glucose and used to provide energy.

**Fats** - are important because they provide energy and, together with glycogen, help muscles work.

**Protein** - helps build muscles and repair damage to muscle tissue. Protein is also used to provide energy when working for a long period of time and all the carbohydrate has been used up.

**Micro nutrients:**

**Calcium** - is important when growing up. It is important in the formation of bones and teeth, and helps to make bones strong.

**Iron** - helps the red blood cells carry oxygen and also contributes to the formation of red blood cells.

**Vitamins** - are essential to health and contribute to good vision, good skin, healing, healthy bones and teeth and helping the clotting of blood.

**Water** - holds and transports oxygen. It also transports nutrients, waste and hormones around the body.

**Fibre** - also known as roughage, fibre helps with the functioning of the digestive system and the getting rid of waste products.

**What is carbo-loading?**

Using knowledge of a **balanced diet**, a performer would lower the amount of **carbohydrates** he is taking in. A few days before competition he will eat **very high levels of carbohydrates** so his body's energy stores are more full than normal.

## 1.6 Physical Activity & Your Healthy Mind & Body

**What is meant by the term 'somatotypes'?**

Somatotype refers to the **classification of body type**.

**What is an endomorph?**

An individual with wide hips and narrow shoulders, characterised by **fatness**.

**What is a mesomorph?**

An individual with wide shoulders and narrow hips, characterised by **muscularity**.

**What is an ectomorph?**

An individual with narrow shoulders and narrow hips, characterised by **thinness**.

**What is 'optimum weight' and what factors affect it?**

Optimum weight refers to a person's **favourable weight** with reference to their lifestyle or a specific sport. Factors affecting optimum weight include:

**Height** - taller people are usually, but not always, heavier than shorter people.

**Gender** - men tend to have more muscle and larger bones.

**Bone structure** - two men of the same height may have completely different bone structures, for instance one may have broader shoulders or thicker wrists.

**Muscle girth** - as with bone structure, people have different muscle girths which will mean they weight different amounts.

**Genetics** - body weight and shape are largely passed on through genes from parents to child.

### **What weight related conditions can affect physical activity?**

**Anorexia** - a prolonged eating disorder due to constant loss of appetite.

**Obese** - a term used to describe people who are very overfat

**Overfat** - having body fat in excess of normal

**Overweight** - having weight in excess of normal (not harmful unless accompanied by overfatness).

**Underweight** - weighing less than is normal, healthy or required.

### **What drugs are seen as performance enhancing?**

**Anabolic steroids** - drugs that mimic the male sex hormone testosterone and promote bone and muscle growth.

**Beta blockers** - drugs that are used to control the heart rate and have a calming and relaxing effect.

**Diuretics** - drugs that elevate the rate of urine production.

**Narcotic analgesics** - drugs that can be used to reduce pain.

**Stimulants** - drugs that have an effect on the central nervous system, such as increased mental and/or physical alertness.

**Peptide hormones** - drugs that cause other hormones to be produced.

### **With regards to risk assessment, what lengths could be taken to prevent injury?**

**Warming up & cooling down** - allows muscles to be prepared before and after activity to aid being able to be physically active. Cooling down disperses lactic acid and prevents soreness and aches.

**Check equipment & facilities** - making sure playing area and playing equipment is in good, usable condition.

**Protective equipment & clothing** - different sports will have different clothing requirements to prevent injury to the player. It is important not to wear any equipment which might harm others also.

**Footwear** - most sports require specialist footwear. This is not only to aid performance but also to provide safety.

### **How can 'balanced competition' be created?**

**Weight categories** - in sports such as boxing, the competitors are matched according to weight as well as ability.

**Mixed or single sex** - in most sports men play against men and women against women. However in racket sports such as tennis and badminton, for example, mixed games are played.

**Age** - children's competitions are grouped by age with some talented athletes perform above their age category.

**Handicap system** - this is used in golf so players of an unequal ability can play in direct competition with one another.

## 1.7 A Health, Active Lifestyle & Your Cardiovascular System

### What is the cardiovascular system?

The cardiovascular system consists of the **heart, blood and the blood vessels**. Its 2 main functions are to **supply** the body with oxygen and nutrients, and to **remove** waste products such as carbon dioxide.

### What is meant by the term 'blood pressure'?

**Blood pressure** is the force exerted by circulating blood on the walls of blood vessels.

### What is meant by the term 'systolic blood pressure'?

**Systolic blood pressure** is the maximum pressure in the arteries when the heart contracts (beats).

### What is meant by the term 'diastolic blood pressure'?

**Diastolic blood pressure** is the pressure of the blood during the relaxation phase of the heart beats (when the heart is at rest).

### What is lactic acid?

**Lactic acid** is a waste product which is produced during exercise and is produced quicker when the intensity of exercise is higher. Lactic acid can lead to aching muscles and eventually cramping.

### What is meant by the term 'cardiac output'?

**Cardiac output** is the amount of blood ejected from the heart in one minute.

### What is meant by the term 'stroke volume'?

**Stroke volume** is the volume of blood pumped out of the heart by each ventricle during one contraction.

### What are the long-term benefits of the cardiovascular system resulting from regular exercise?

**Decreased resting heart rate** – the heart becomes bigger and stronger, meaning it can supply the same amount of blood with fewer beats.

**Quicker heart recovery rate** – the heart can return to its normal rate after exercise quicker than it used to be able to.

**Increased stroke volume** – more blood is pumped by the heart every week, making it more efficient and stronger. This leads to increased cardiac output also.

**Reduced blood pressure** – the heart is more efficient and stronger as a result of exercise, therefore blood pressure is reduced

**Healthier veins & arteries** – blood vessels are more flexible and efficient and so stay clear as well as increasing the number of capillaries in the heart.

### **What is cholesterol?**

**Cholesterol** is a fatty substance carried in the blood by lipoproteins. Lipoproteins come in two forms:

**High density lipoprotein (HDL)** - contains more protein than fat as is referred to as 'good cholesterol' because it carries cholesterol away from the arteries to the liver, which removes it from the body.

**Low density Cholesterol (LDL)** -consists mainly of fat and referred to as 'bad cholesterol'. Can lead to build-up of plaque in the blood which can restrict blood flow to the arteries.

### **What are the effects of recreational drugs on the cardiovascular system?**

**Cigarettes (nicotine the drug)** - raises blood pressure because they release adrenaline. Adrenaline constricts the arteries and causes the heart to beat faster.

**Smoking** - lowers HDL (good cholesterol) and increases the tendency for blood to clot, which can lead to serious problems such as heart attacks or strokes.

**Alcohol** - long-term abuse of alcohol can lead to the lowering of blood pressure.

## **1.8 A Healthy Active Lifestyle & Your Respiratory System**

### **What is meant by the term 'oxygen debt'?**

**Oxygen debt** is the extra oxygen consumed during recovery from a period of intense physical activity, compared with the amount of oxygen which would usually have been consumed over the same length of time at rest.

### **What is meant by the term 'tidal volume'?**

**Tidal volume** is the amount of air inspired and expired with each normal breath at rest or during exercise.

### **What is meant by the term 'vital capacity'?**

**Vital capacity** is the most amount of air that can be made to pass into and out of the lungs by the most forceful inhale and exhale.

### **What are the long-term benefits of the respiratory system resulting from regular exercise?**

**Improved lung efficiency** - lungs will deliver oxygen to working muscles better, allowing the body to cope better during exercise.

**Efficient carbon dioxide removal** - body can cope with more carbon dioxide being produced during exercise.

**Increased vital capacity** - whole system becomes more efficient, especially the lungs.

**More alveoli available** - more oxygen can be absorbed by capillaries and more carbon dioxide taken from them.

**More blood vessels** - increase in capillaries around the alveoli means more blood can get into the blood and through the muscles.

### **What effects does smoking have on the alveoli and gaseous exchange?**

Smoking makes the **alveoli less stretchy** and **efficient**. As a result, it becomes more difficult to get **oxygen in** and **carbon dioxide out**. A smoker's **heart** has to **work harder** to get the oxygen their bodies need.

## **1.9 A Healthy, Active Lifestyle & Your Muscular System**

### **What are the main jobs of the muscular system?**

The **muscular system** is the driving force behind **movement**, which happens as a result of muscles contracting and lengthening. Muscles also **define body shape** and maintain **posture**.

### **What are 'voluntary muscles'?**

**Voluntary muscles** bring about **movement**. These are the muscles which can be **consciously controlled**, and can be **trained** to be stronger. These are the muscles used when exercising and playing sport.

### **How do muscles create movement?**

Muscles are attached to the bones of the skeleton by **tendons**. Each muscle is made up of **muscle fibres** and when these **contract**, or pull against the skeleton, movement takes place.

### **What is meant by the term 'antagonistic pairs'?**

Muscles are arranged in **antagonistic pairs**, so when one muscle **contracts** and pulls the other one **relaxes** to allow the joint to work.

### **What are the 11 muscles important to the GCSE examination?**

**Deltoid** - shoulder muscles (**abducts** the upper arm from body)

**Trapezius** - upper back muscle (**rotates** the shoulder blades backwards)

**Latissimus dorsi** - lower back muscle (**rotates** upper arm at the shoulders)

**Pectorals** - front of chest muscles (**adduction** of the arm)

**Abdominals** - stomach muscles (**flexion** and **rotation** of the trunk)

**Biceps** - top of arm muscles (**flexion** of arm at the elbow)

**Triceps** - underneath of arm muscles (**extension** of arm at the elbow)

**Gluteals** - bum muscles (**extension** of the upper leg)

**Quadriceps** - front of leg muscles (**extension** of the leg at the knee)

**Hamstrings** - back of leg muscles (**flexion** of the leg at the knee)

**Gastrocnemius** - calf muscles (**plantar-flexion** of the foot)

### What are 'isometric contractions'?

**Isometric contractions** are muscle contractions which result in **increased tension** but the length of the muscle **stays the same**, for example when pushing against a wall.

### What are 'isotonic contractions'?

**Isotonic contractions** are muscle contractions which result in **limb movement**.

### What are the long-term benefits of the muscular system resulting from regular exercise?

**Muscle hypertrophy** - when using the principle progressive overload, the muscle's fibres become torn causing trauma. The muscle will rebuild itself, making it slightly stronger. This increase in muscle mass is muscle hypertrophy.

**Increase in muscular strength** - muscle hypertrophy will lead to increased muscular strength. This can also lead to an increase in power (strength x speed).

**Increase in muscular endurance** - as with muscular strength, muscles will be able to withstand more and more and they are progressively overloaded, therefore muscular endurance will increase.

### What potential injuries are there to the muscular system?

**Soft tissue injuries to muscles** - these include tears, pulls, and strains. These occur when small muscles fibres are torn from their attachment to the tendon. During exercise, muscle fibres have to contract and relax very quickly, this can cause connective tissue and blood vessels inside them to be torn.

**Muscle atrophy** - When strength training is stopped, a loss of muscle mass and strength can occur, this is called muscle atrophy.

### What is meant by the acronym 'RICE'?

**Rest** - a period of time to allow the injury to recover.

**Ice** - this directs cold to the injured tissue and can relief pain and limit swelling.

**Compression** - helps limit and reduce swelling of the injury.

**Elevation** - reduces swelling by elevating injured part of body above the level of the heart.

## 1.10 Healthy, Active Lifestyle & Your Skeletal System

### What is the skeletal system and what does it do?

The skeletal system includes all the bones in the body. Its three main functions are **movement, support** and **protection**.

### What are the characteristics of the elbow joint?

**Hinge joint** - the elbow joint is a hinge joint and allows the arm to bend (flex) or straighten (extend).

**Biceps and triceps** - the biceps muscles cause flexion in the arm and the triceps muscles cause extension in the arm.

### **What are the characteristics of the knee joint?**

**Hinge joint** - the knee joint is a hinge joint and allows the leg to bend (flex) or straighten (extend).

**Flexion and extension** - the tibia is hinged on the femur so that the leg can bend (flex) or straighten (extend).

### **What are the characteristics of the shoulder joint?**

**Ball and socket joint** - the shoulder is a ball and socket joint. The rounded head of the humerus fits into the shoulder socket shaped like a cup.

**Movement** - the shoulder joint allows flexion, extension, adduction, abduction and rotation.

### **What are the characteristics of the hip joint?**

**Ball and socket joint** - the hip is a ball and socket joint. The round head of the femur fits into the hip socket shaped like a cup.

**Movement** - the hip joint allows flexion, extension, adduction, abduction and rotation.

### **What are the long-term benefits of the skeletal system resulting from regular exercise?**

**Increased bone density** - exercise increases bone density. When bones become heavier, they also become stronger.

**Stronger ligaments & tendons** - ligaments (which attach bone to bone) and tendons (which attach bone to muscle) become thicker and stronger with exercise. This increases joint flexibility and allows more power in movement.

### **What is osteoporosis?**

Bones become **lighter** with age and their **density** and **strength** are **gradually reduced**. Although this occurs naturally, it can be a problem if too much bone is lost, resulting in a **weak skeleton** and bones which can **break easily**. This condition is called **osteoporosis**.

### **What is a fracture?**

A fracture is a **broken** or **cracked bone**. Fractures can occur from a **blow**, or from severe **twisting** or **wrenching** of a joint.

### **What are the different types of fracture?**

**Closed fracture** - as the name implies, the skin over the break is not damaged.

**Compound fracture** - when the broken bone protrudes the skin. These fractures are generally more serious as there is a risk of infection.

**Simple fracture** - takes place in one line, with no displacement of the bone.

**Stress fracture** - referred to as an overuse injury. Most stress fractures happen in weight bearing parts of the body, such as feet.

### **What types of injuries can occur at a joint?**

**Tennis & golfer's elbow** - these are overuse injuries to the tendons at the elbow joint. Main symptom of tennis elbow is pain on the outside of the elbow. Golfer's elbow involves pain on the inside of the elbow.

**Dislocations** - when bone at a joint is forced out of its normal position, often as a result of a hard blow which displaces the bone.

**Sprains** - this is a damaged ligament. Sprains often occur when stretching too far past the normal range of a joint.

**Torn cartilage** - cartilage is a firm elastic substance found at the ends of the bones of a synovial joint.

### **How does diet affect the skeletal system?**

**Calcium** - eating a balanced, calcium rich diet helps the bones to grow and increase in density. The best sources of calcium are milk, cheese and yogurts.

**Vitamin D** - this is essential to the growth and maintenance of healthy bones and helps with the absorption of calcium. Vitamin D is made by the body when the skin is exposed to sunlight.

**Smoking and alcohol** - too much of these substances has a toxic effect on the bones.