

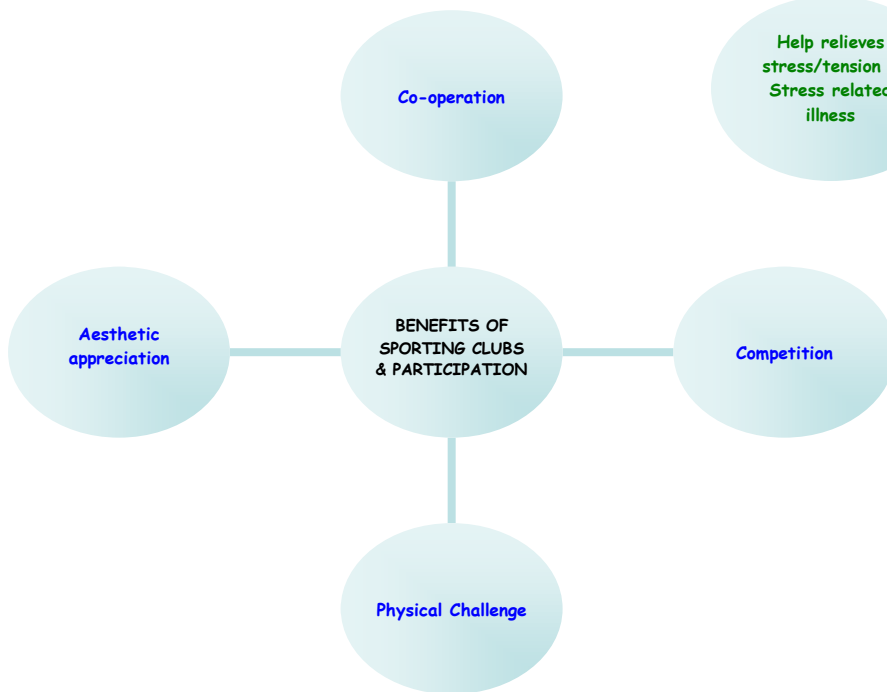
Edexcel GCSE

Physical Education

Revision Workbook

1.1 Healthy, active lifestyles

1.1.1 Reasons for taking part in activity



SOCIAL	MENTAL	PHYSICAL
<ul style="list-style-type: none"> Make new friends Social mixing Meet current friends Develop teamwork + co-operation 	<ul style="list-style-type: none"> Helps relieves stress/tension Help individual feel good Mental challenge (can I do it?) + competition Increase self-esteem + confidence Contribute to life enjoyment Aesthetic appreciation 	<ul style="list-style-type: none"> Helps individual to feel and look good Enhances body shape Contributes to good health and enjoyment of life Physical challenge (can I do it) Competition

1.1.1. Revision Questions

How can sport stimulate cooperation and competition? (2 marks)

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How can sport stimulate the development of friendships and social mixing and physical challenge? (2 marks)

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Explain the term aesthetic appreciation (1 mark)

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Explain the reasons why a retired person may wish to take part in physical activity (2 marks)

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Explain the reasons why a talented 14 year old may wish to take part in physical activity (2 marks)

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The table below states three of the responses made by GCSE PE students when asked about their healthy, active lifestyle choices.

In the table:

- briefly describe how each lifestyle choice could benefit an individual (3)
- classify each identified benefit as social, physical or mental. (3)

Responses made by GCSE PE students about their healthy, active lifestyle choices	Description of how each lifestyle choice could benefit an individual	Classification of each identified benefit as social, physical or mental
Previously I would get the bus to school but now I walk		
Despite the pressure of my examinations I still made sure that I had time to stop revising and play sport for a break		
I've always enjoyed running, and would often go on long runs on my own, but I joined my local athletics club and now run with other runners from the club		

The individuals in **Figure 3** benefit from healthy, active lifestyles.



Figure 3

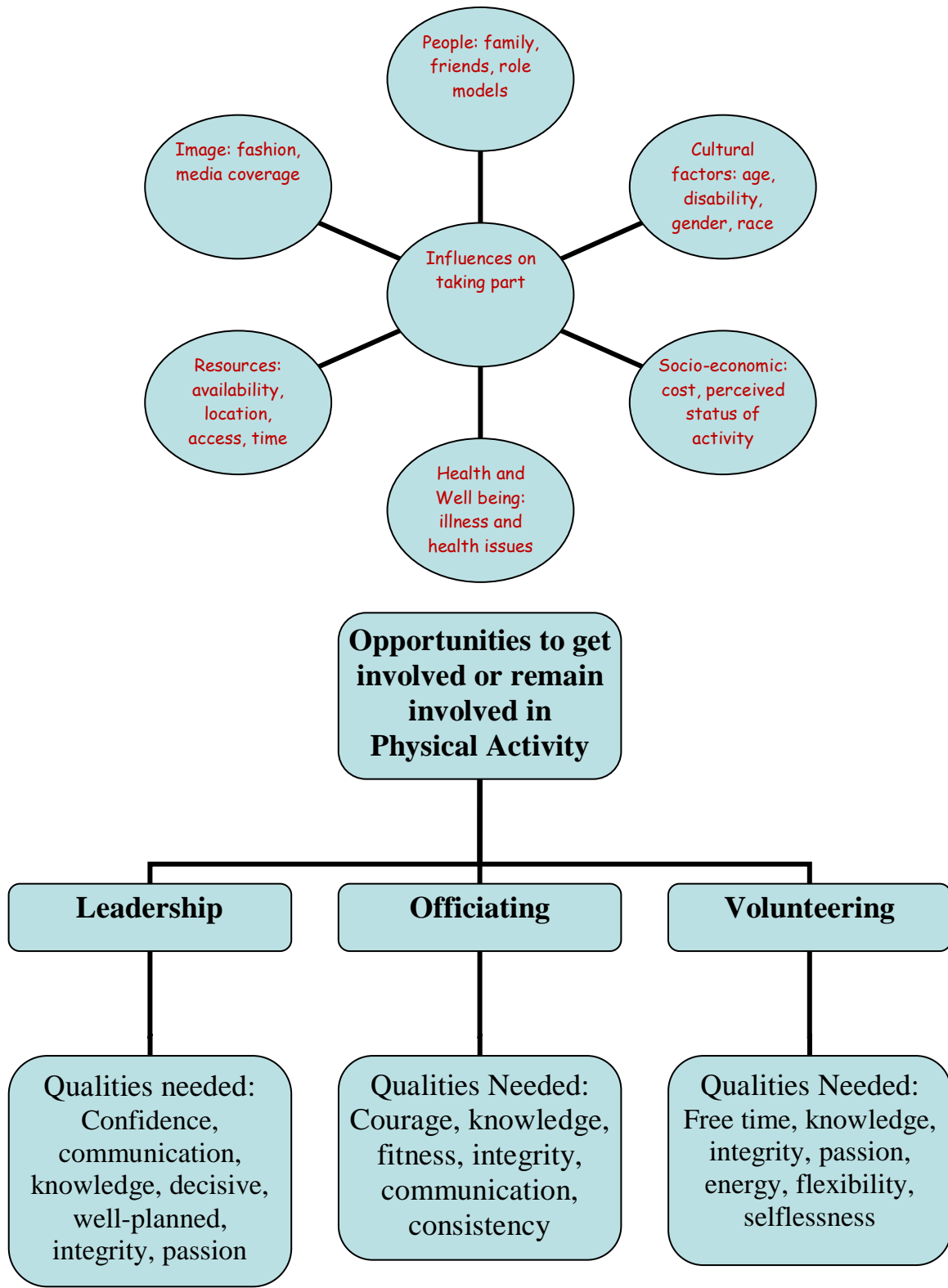
In the table below:

- (a) Identify **three** mental health benefits of regular participation in physical activity. (3)
- (b) State how each of your identified benefits is achieved. (3)

(a) Benefit of regular participation for mental health	(b) How your stated benefit is achieved

This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings on the page.

Influences on your Healthy Active Lifestyle 1.1.2



1.1.2 SPORTS PARTICIPATION PYRAMID



Foundation:

- Base of the pyramid
- Learning basic skills to provide base for personal development and future participation
- E.g. Primary school PE lessons, TOP Play and multi-skills clubs

Participation:

- Begin to participate regularly in a specific activity for enjoyment
- Sports development helps promote this stage with school festivals and school/club links
- Sports clubs are important at this stage to help make the link to the Performance stage

Performance:





- Focus on a specific sport and technique to develop talent in sport
- Quality coaching is important at this stage to develop sporting skills and the talent
- Organised sports coaching weeks e.g. Youth games help promote this stage

Excellence:

- Peak of the pyramid, where individuals reach sporting excellence
- The pyramid narrows here as fewer people take part at this stage
- Sports Governing Bodies are responsible at this stage (county → regional → national)

1.1.2 Initiatives developed to provide opportunities for becoming, remaining involved in physical activity

Being involved in physical activity, whether as a performer, leader or official can have a positive impact on developing a healthy active lifestyle (physically, mentally + socially)

Initiative	Organiser	Details
TOP programme	YST	<ul style="list-style-type: none"> • Chances for those aged 18mths - 18yrs to be involved in physical activity • Could be as performers, leaders, officials and also as volunteers
TOP Link Sports Leaders Award	YST 	<ul style="list-style-type: none"> • Aimed at 14 - 16yr olds • students who want to organise/run sports/dance festivals for partner primary/special school pupils. • Aim: to improve links between primary + secondary schools. • Aim: to recruit, train, deploy and support young sports leaders.
Sports Leaders Award	YST 	<ul style="list-style-type: none"> • Train young people (14 - 16yr olds) as volunteers being leaders or officials for primary children
Start, Stay, Succeed	Sport England (G'ment Sports Council) 	<ul style="list-style-type: none"> • <u>Start</u>: increase participation in sport (increase health of nation) • <u>Stay</u>: retain people in sport through network of clubs, coaches, facilities + competitive opportunities etc. • <u>Succeed</u>: create opportunities for talented performers to achieve success
Active Kids	Sainsbury's 	<ul style="list-style-type: none"> • Voucher programme • Collect vouchers + exchange for sports equip.

1.1.2 Revision Questions

- 3** Initiatives such as the Youth Sport Trust's TOP programme aim to contribute to the development of healthy, active lifestyles.

Briefly explain **two** ways that initiatives such as this can lead to a healthier, more active lifestyle.

1

.....

2

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(Total for Question 3 = 2 marks)

There are many influences on a person to become involved in physical activity. Some have a great impact and are influential enough to sustain long term interest of an individual in sport. Can you explain how cultural influences may affect participation in sport 1? (4 marks)

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How might the following influences affect participation on sport 2? (5 marks)

Mediacoverage.....

Fashion.....

Rolemodels.....

Family.....

Cost.....

***14** Explain how the range of roles available in physical activity should provide sufficient opportunity for all to become or remain involved in sport/physical activity.

In your answer you may consider:

- the range of roles available to become, or remain, involved in physical activity
- the personal qualities needed to fulfil the range of roles available in physical activity
- how the range of roles provides opportunity for all to stay or become involved in physical activity.



1.1.3 - Exercise and fitness as part of your healthy, active lifestyle



KEY DEFINITIONS

- **Health** - State of complete mental, physical and social well-being.
- **Fitness** - The ability to meet demands of the environment
- **Exercise** - Form of physical activity done primarily to improve one's health and physical fitness
- **Performance** - How well a task is completed
- **Healthy, Active lifestyle**- A lifestyle that contributes positively towards social, mental and physical well being and that includes regular physical exercise.

CARDIOVASCULAR FITNESS - The ability to exercise the entire body for long periods of time. Describes the efficiency of the heart, lungs + blood vessels to deliver oxygen to working muscles so physical work can be maintained.

Examples

- Playing 90 minutes in football matches
- Playing Cricket matches that could last for 3-5 days
- Running in a marathon

MUSCULAR ENDURANCE - The ability to use voluntary muscles many times (over a long period) without tiring

Examples

- Long distance walking
- Long distance running
- Long distance swimming

FLEXIBILITY - The range of movement possible at a joint

Examples

- Hurdling in athletics
- Gymnastics - performing complex sequences
- Swimming -

HEALTH RELATED COMPONENTS

STRENGTH - the ability to lift a maximum weight in one attempt
Muscular strength - The amount of force a muscle can exert against a resistance

Examples

- **DYNAMIC** - required to start and maintain movement of the body *e.g. cycling or doing loads of press-ups*
- **EXPLOSIVE** - required when a high amount of force has to be applied quickly *e.g. shot putting*
- **STATIC** - required when applying strength to a fixed static object *e.g. pushing in a rugby scrum*

Body Composition is defined as the percentage of body weight which is fat, muscle and bone.

Extra information Our body composition can have a significant bearing on the sports we are most able to play. Taking part in physical activities will change our body composition by decreasing the percentage of fat and increasing the percentage of muscle.

1.1.3 SKILL RELATED FITNESS

SKILL COMPONENTS

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graph TD; SC[SKILL COMPONENTS] --> RT[REACTION TIME]; SC --> P[POWER]; SC --> CO[CO-ORDINATION]; SC --> S[SPEED]; SC --> B[BALANCE]; SC --> A[AGILITY];
```

REACTION TIME – The time it takes to respond to a stimulus (*simple*) or a variety of stimuli (*choice*)

Examples

- **SIMPLE** – responding to a signal *e.g. sprint start to a gun*
- **CHOICE** – responding to a variety of signals *e.g. playing a shot in cricket depending on length of the ball pitched*

POWER – Ability to perform strength performances quickly
(power = strength x speed)

Examples

- Football – Goal keeper taking a goal kick
- Badminton – playing an overhead smash

AGILITY – Ability to change the position of the body quickly and still control the movement of the whole body

Examples

- Football – dribbling past an opponent at speed
- Rugby – Running, avoiding opponents whilst in possession

CO-ORDINATION – Ability to use two or more parts of the body at the same time

Examples

- Pole vaulting
- Basketball – lay up shot
- Tennis – player taking a serve

BALANCE – Ability to keep the body's centre of mass (gravity) above the base of support with reference to still (*static*), changing (*dynamic*) conditions of movement, shape and orientation

Examples

- **STATIC** – holding a position without movement *e.g. a handstand in gymnastics*
- **DYNAMIC** – maintaining a position whilst moving *e.g. cycling or surfing*

SPEED – Fastest rate at which a person can complete a task or cover a distance

Examples

- Running fast – 100m sprint
- Throwing a cricket ball at the stumps to get a run out

1.1.3 Revision Questions



Fitness requirements vary for different activities. The performers in **Figures 3** and **4** need power, muscular endurance, strength and cardiovascular fitness for their activity, but the importance of each component varies depending on the activity.

In the table:

- identify the **two** most important components for each performer (select from: power, muscular endurance, strength and cardiovascular fitness)
- explain how your **first** chosen component for each performer is used in his/her activity.

(4)

(2)

	 <p>Figure 3 Long Distance Runner</p>	 <p>Figure 4 Sprinter</p>
Important component used by performer	Choice 1	Choice 1
Important component used by performer	Choice 2	Choice 2
How first chosen component (Choice 1) for each performer is used in his/her activity		

(Total for Question 4 = 6 marks)

Identify three components of skill-related fitness that would be relevant to **all** the performers in **Figure 1**.

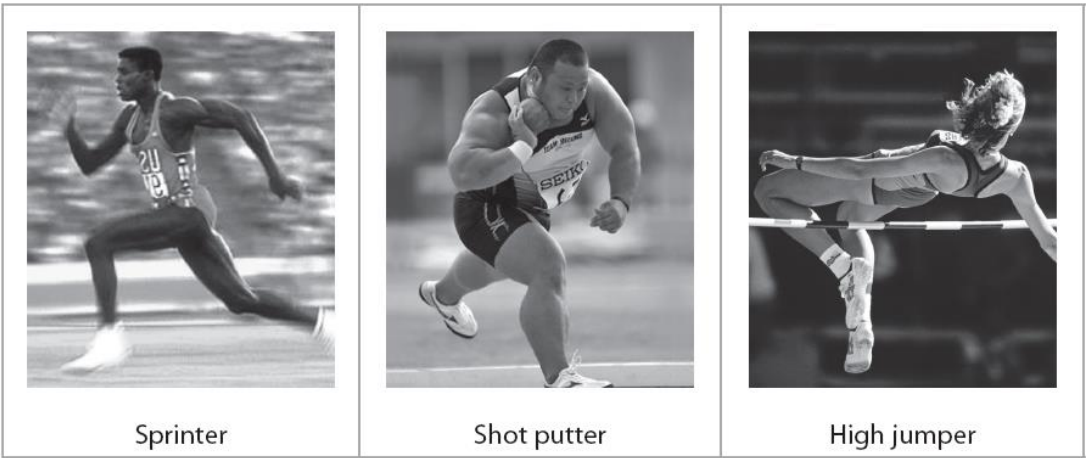


Figure 1

Component 1

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Component 2

.....

Component 3

.....

(Total for Question 3 = 3 marks)

Health-related exercise demands can vary within sporting activities.

For a named activity of your choice, identify a different situation or technique when the stated components, listed below, would be used in this activity.

Name of activity

(a) Muscular strength

(1)

.....

.....

(b) Muscular endurance

(1)

.....

.....

(c) Flexibility

(1)

.....

.....

.....



400m runner

Candidates are not expected to use all the space provided.

1.1.4.

Assessing personal readiness

Use a PARQ (Personal Activity Readiness Questionnaire) to assess you are ready to start an exercise programme.

It will ask you several standard questions including:

- Do you have any medical conditions?
- Are you taking any medication?
- Are you pregnant?

Assessing your fitness levels

Test	Aspect of fitness tested
Cooper's 12 minute run	Cardiovascular fitness
Hand grip test	Muscular strength
Sit and reach test	Flexibility
Harvard step test	Cardiovascular endurance
Illinois agility run	Agility
Standing stork test	Balance
Sergeant Jump	Power
Standing broad jump	Power
Ruler drop test	Reaction time
30 Metre sprint	Speed
3 ball juggle	Co-ordination

BLUE = HRE

GREEN = SRF

Principles of Training:

Good training takes into account all of the principles and their effects on the body.

RIPS R Principles

- **REST AND RECOVERY** - Rest is the period of time set aside for your body to recover. Recovery is the time required for the body to repair damaged caused during competition
- **INDIVIDUAL NEEDS** - Whether training to compete or training for health, everyone has **different personal needs**. People vary in height, size, shape, fitness and preference. Therefore, even though they have the same goals they may not reach them by the same means.
- **PROGRESSIVE OVERLOAD** - Putting greater demands on the body by exercising This will improve fitness as long as the sessions are made more difficult each time by using the FIT principles. The point where exercise is demanding enough to have an effect on the body is called the '**threshold of training**'.
- There 3 ways;
 - **Frequency** - *number of sessions e.g. up to 3 per week*
 - **Intensity** - *increasing distances run, repetitions or weight*
 - **Time** - *length of training sessions*
- **SPECIFICITY** - Understanding the **needs of the game or event**, e.g. a goalkeeper will include reaction work in their training. The pace of training should be consistent to the pace of the game. Also the actions should be the same in training as it is in match situations *e.g. a swimmer needs to spend most of their time in the water.*
- **REVERSIBILITY** - The body will increase in strength, tone and skill with exercise; however it also loses them without it. After injury or illness, an athlete can lose their strength and skill, up to 3x as fast as they gain it - '**If you don't use it, You lose it!**'

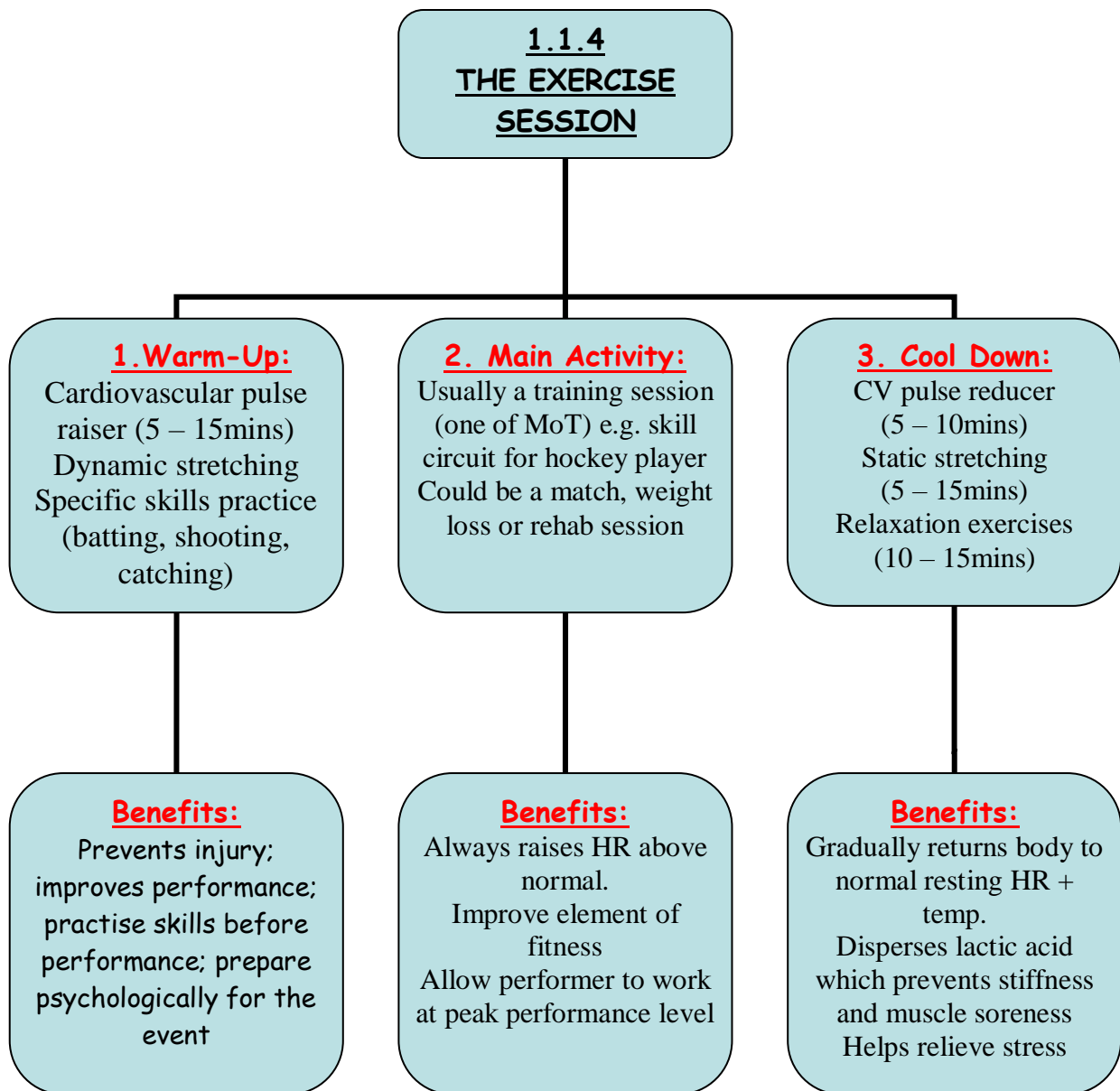
F.I.T.T PRINCIPLES

FREQUENCY - How **often** the exercise is done (be it an individual set or the whole session) - *e.g. Training 3 times a week or 2 per day*. Elite performers train more frequently to achieve results good enough. Remember, the body needs time to recover so training very, very hard, every day can be harmful even to an elite performer.

INTENSITY - The **difficulty** of the exercise - could be the amount of weight or the speed you move. Consider cardiovascular fitness, your pulse rate can show you how intensely you're working. Fitness will increase by working in 60-80% target zone of the maximum heart rate, *e.g. Training with heart rate of 120bpm - 160bpm*. Strength training is similar, by calculating 60-80% of their maximum weight they can lift and working to it.

TIME - The **duration** of the Exercise. Keeping your pulse at 60-80% of its maximum for 2minutes is the target. The time begins once the pulse rate hits 60%. The warm up is not included. Also you can vary the duration of each session *e.g. 30mins, 45mins or 60mins*

TYPE - What **kind** of exercise you do - For general fitness then personal preference to suit the individual is usually done *e.g. swimming, cycling or running*, But if its for a specific activity then choice becomes limited as it should reflect the activity. However remember to vary to keep interesting and work all different muscle groups



1.1.4 - METHODS OF TRAINING

Method	Description	Benefit/ element of fitness to be trained
CIRCUIT	Has between 8 - 15 stations in it. Each station has a specific exercise to do.	Can combine muscular strength, endurance, agility, coordination, power,

	<p>A short rest is allowed between each station. Work:rest ratio Repeat whole circuit after approx. 2mins rest</p>	<p>cardiovascular fitness within one session. Can tailor exercises to individuals. Range of exercises makes it interesting. Includes both aerobic + anaerobic. Can have skills focus. Useful for variety of sports, depending on focus.</p>
WEIGHT	<p>Done in a gym using free weights to use progressive resistance. High reps + low weight = muscular endurance Low reps + high weight = muscular strength</p>	<p>Useful for strength events: athletics, speed + jumping events. Increase muscle strength, muscular endurance, increase speed, increase muscle size, rehabilitate after illness.</p>
INTERVAL	<p>Mixing periods of hard exercise and rest periods (these could be walking, jogging or stopping). Set distances or set time to work. Rest time should be at least 30secs. 1 rep = 1 work + 1 rest cycle 1 set = repeating the reps 4, 5 or 6 times for eg.</p>	<p>Similarity to games activities e.g. Rugby and Football Can be done in variety of activities Repeated sprints = anaerobic Reps of pulse at near max and then recover will improve CV Fitness.</p>
CONTINUOUS	<p>Exercising aerobically at a constant rate doing activities like running or cycling, with no rests. Session usually lasts 15 - 20mins.</p>	<p>Cheap. Can be done individually or in a group. Can be done in a wide range of activities swim/cycle/run as well as inside on machines. Useful for endurance events e.g. marathon</p>
FARTLEK	<p>Swedish for 'speed play'. Changing speed, distances + times of exercise in same session. Difference between Fartlek & Interval training is takes place on VARYING TERRAIN, CAN INCLUDE HILLS. Also VARYING Sprint LENGTHS</p>	<p>Suited to most games. Rest periods can be included Can include repetitions e.g. up same hill several times Can take place anywhere safe to do so.</p>
CROSS	<p>Uses a combination of different training methods</p>	<p>Variety of training = prevents boredom. Weather is not a factor - very versatile. Can rest certain muscle groups Can train individually or with different groups of people - adds interest + increases social circles. Useful for variety of sports, depending on MoT chosen but certainly games players will benefit</p>

Using SMART goal setting makes people's aims/goals easier to achieve and they're more likely to stick with them

SPECIFIC - Knowing exactly what the goal is e.g. I want to run 100m further in my Cooper's Run test.

MEASURABLE - will be easy to know when the goal is achieved e.g. improving your Illinois Agility Run score by 1.2 seconds

ACHIEVABLE - running an extra 100m after 6 weeks training is achievable, running a marathon would not be

REALISTIC - goal is ok to achieve in reality not just in theory i.e. you have the right amount of time and resources to achieve the goal

TIME-BOUND - The goal needs to have an end point e.g. your PEP lasted for 6 weeks

1.1.4 TRAINING TERMINOLOGY

Measuring Heart Rate - Radial or carotid pulse or heart rate monitor

Resting Heart Rate - HR at rest! best taken first thing in the morning.

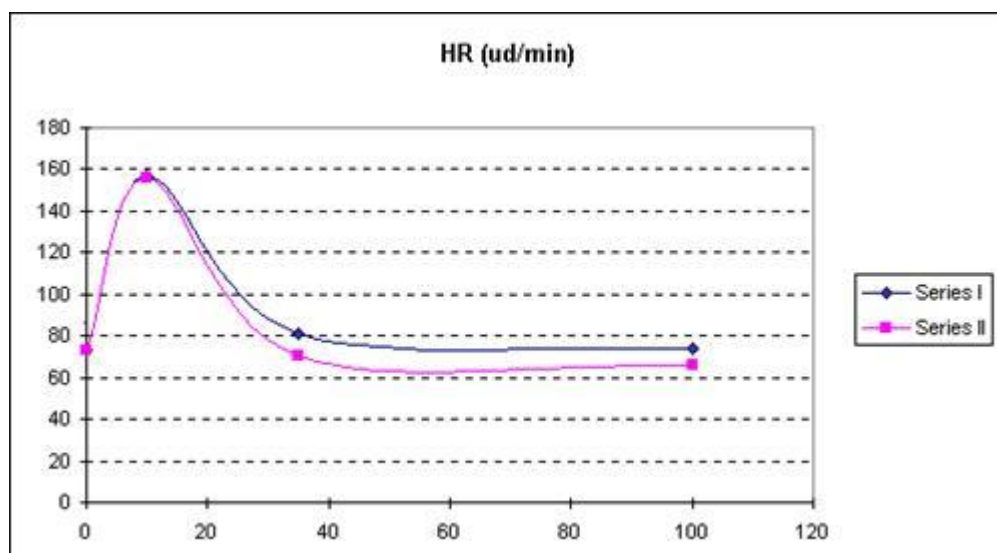
Working Heart Rate - measurement of HR during or immediately after exercise (accurate guide to how hard you work i.e. intensity of the session)

Recovery Rate - time taken to return HR to resting after training

Recovery Rate Graph

The faster your HR returns to its pre-exercise state, the fitter you are

Series I = Recovery rate before 6-week PEP; Series II = Recovery Rate after 6-week PEP.



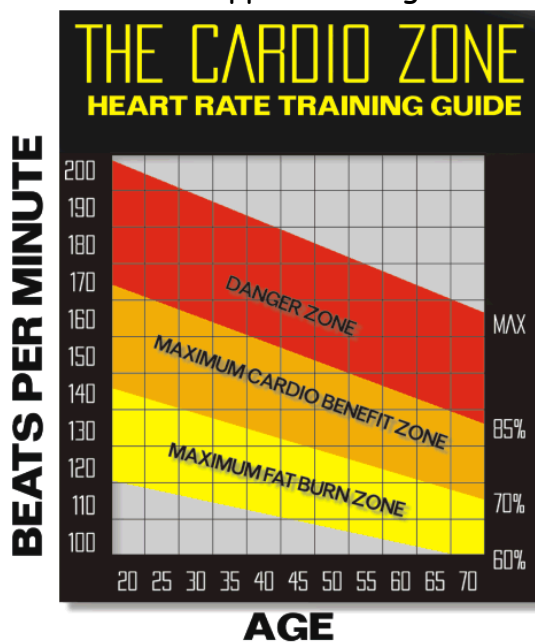
www.life-enthusiast.com

Maximum Heart Rate - $220 - \text{your age}$

Lower Training Threshold - 60% of your maximum heart rate (MHR)

Upper Training Threshold - 80% of your MHR

Target Zone - Working between the lower and upper training thresholds i.e. between 60-80% of your MHR



www.thehealthyteacher.com

1.1.4. Revision Questions

5 As part of his Personal Exercise Programme (PEP) Joe measures his heart rate to check on his fitness levels.

- (a) The heart rate monitors in **Figure 5** show three different heart rate values. Re-order these heart rate values and plot a graph to show Joe's resting, working and recovery heart rate.

(2)



Figure 5

- (b) Explain why you have plotted the values in this order.

I placed this value as working heart rate because

(1)

I placed this value as recovery heart rate because

(1)

(Total for Question 5 = 4 marks)

Imran plays for the school football team. At the start of the season the team undergo a series of fitness tests. In the table below:

- tick the most relevant fitness test for a football player (not goalkeeper) (1)
- explain why this fitness test is relevant to Imran. (1)

	Tick most relevant fitness test for football player	Explanation why this fitness test is relevant to football player
Illinois Agility Run		
Hand grip strength test		
Standing Stork test		

Rob and Imran make sure their training matches the needs of their activity. Which principle of training does this relate to?

(1)

.....

Some training methods can be adapted to suit different activities. In the table below:

- name a training method that Rob and Imran could both use for their activity (1)
- explain how each boy would adapt this training method to suit his own activity. (2)

Training method that can be used by both boys	How training method would be adapted by Rob (Cross-country runner)	How training method would be adapted by Imran (Footballer)

Both activities require the boys to work aerobically and anaerobically. For each of the following statements, state whether the activity is aerobic or anaerobic.

- (i) Rob kept a steady pace for the first mile and a half of the race. (1)

- (ii) At one point near the end of the race Rob had to sprint to prevent the runner behind overtaking him and going into the lead. (1)

- (iii) During the fifth minute of the game Imran had a chance to score a goal, he struck the ball hard and gave his team an early lead. (1)

- (iv) In the second half of the game Imran spent a lot of time slowly jogging back into position. (1)

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Janet needs to select a relevant method of training to improve her cardiovascular fitness. Four different methods of training are shown in Figure 7.

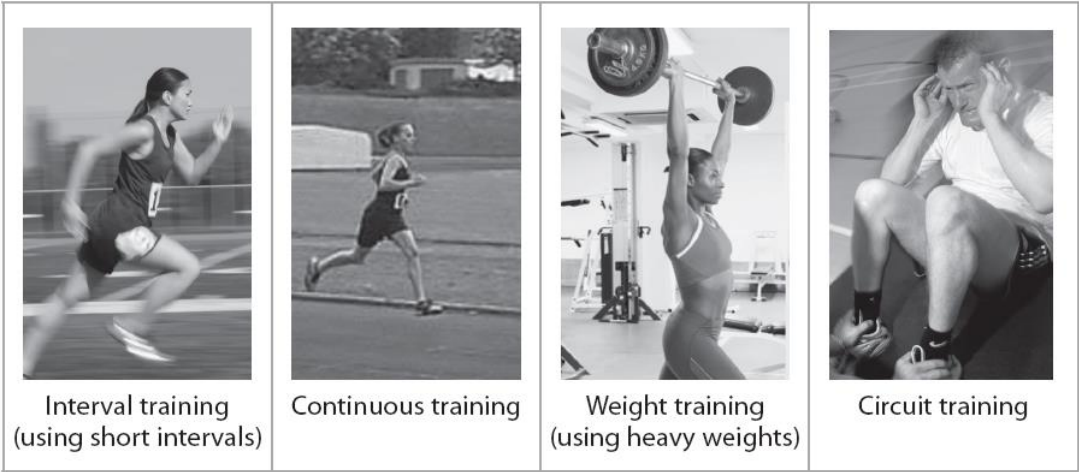


Figure 7

- (g) (i) Identify the **most** relevant and **least** relevant method of training to help Janet improve her cardiovascular fitness from Figure 7.
- (2)

Most relevant	
Least relevant	

- (ii) Identify a sporting activity where the performers would use the training method you identified as **least** relevant to Janet.
- (1)

.....

.....

(Total for Question 11 = 15 marks)



1.1.5 - YOUR PERSONAL HEALTH & WELLBEING



BALANCED DIET - Daily intake of food containing right amounts and types of nutrients

	Element	Function	Foods found in	Aid to Sportsperson
Macro nutrients	Carbohydrates	Ready source of energy Store of energy as Glycogen	Fruit, cakes, beer, sweets, granulated sugar and bread, pasta rice, potatoes.	Ready source of energy when muscles need it. Athletes training hard use carbohydrates quickly so diet should be high in this food type.
	Proteins	Growth and Repair of tissues, enzymes and hormones	Meat, fish, pulses (chick peas, lentils and beans), nuts, eggs and poultry	Builds muscle and repairs tissue within body. Essential after injury to heal quickly. Sportspeople who have large muscles need extra protein.
	Fats	Source of energy (slow release) Can be stored in body	Milk, cheese, butter, oils, chocolate, fatty meats, soya beans and corn.	Increase size and weight of body beneficial to performers with extra bulk e.g. Shot putter. Excess weight can inhibit performance though.
Micro nutrients	Vitamins	Helps general health - vision, skin condition, forming of red blood cells and clotting, good condition of bones and teeth	Fruit - vitamin C Liver, carrots - Vitamin A Whole grain, nuts - Vit B1 Vegetable oil - Vitamin E	General health is important to perform well. When training hard vitamins from B group are used up more so need replenishing.
	Minerals	Calcium helps growth of bones, Iron helps making red blood cells and the way blood is carried by haemoglobin.	Milk and salt water fish (iodine), red meat, liver and green vegetables (iron), cheese and cereal.	Increase oxygen carrying capacity to working muscles. Iodine aids growth, essential for athlete's energy production. Iron helps produce red blood cells so carry more oxygen around body preventing fatigue. Calcium helps blood to clot, aiding recovery and strengthens bones and muscles.
	Fibre	Helps Digestion. There are 2 types. <ul style="list-style-type: none"> Insoluble - adds bulk to food so moves through digestive system Soluble - helps reduce cholesterol, keeping heart healthy 	Leaves, seed cases, cereals and whole grains.	Less Cholesterol in the body makes the heart more efficient By keeping digestive system functioning regularly the body retains less waste
	Water	Two-thirds of the body is water Need to replenish water which is lost in urine, sweat and condensation when we breathe	Fluids and foods	Water allows blood to flow more easily - important when exercising as the body demands more oxygen, nutrients, heat control and waste removal.

1.1.5 Link between diet, exercise, work and rest

DIET - essential part of providing energy needed to work, exercise + also repair tissues. Must consider **Energy balance** (calories in vs calories out)

EXERCISE - can provide fitness necessary to enjoy life + work

WORK - can provide finance, motivation + opportunity

REST - maintains balance between work and exercise ("all work and no play makes jack a dull boy!") + provides chance for tissue repair to occur

1.1.5 Timing of Dietary Intake

Carbo-loading - system used mostly by **marathon runners** to make max use of energy resources.

- Early part of week before event → high protein (muscle repair after high intensity sessions)
- Later in week → high levels of carbohydrates (turn into glycogen stores). Happens 'easily' in the body because of the 'starving' state the body was in during early part of the week
- Immediately after race → take on carbs (isotonic drinks) to restock

BLOOD FLOW DURING EXERCISE - blood shunts to working muscles

- Less blood available to digest food in gut
- Causes cramps/discomfort
- Exercise session should wait until 2-3 hrs after eating

1.1.5 Revision Questions

(a) Diet and rest are two important factors to consider when planning for a healthy, active lifestyle. How may diet and rest influence personal health?

(i) Diet

(1)

(ii) Rest

(1)

(b) Why do you need to consider what you eat if you exercise regularly?

(1)

(Total for Question 6 = 3 marks)

As part of a school’s focus on healthy living, Year 10 students were asked to keep a log of all the food they ate over a one-week period.

Figure 2 is an extract from a student’s log.

	Breakfast	Lunch	Dinner	Snacks	Drinks
Monday	None	Burger and chips	Egg and chips	Chocolate bars x 2	1 litre water 1 litre coke
Tuesday	Cereal	Tuna sandwich from home	Chicken, potatoes, peas	Crisps	1 litre water

Figure 2

(a) Which of the two days, Monday or Tuesday, provided a more balanced diet?

(1)

(b) Explain the requirements of a balanced diet.

(4)

(Total for Question 4 = 5 marks)

Explain the importance of micronutrients in maintaining a healthy, active lifestyle.

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.....

(Total for Question 8 = 2 marks)

1.2 Your Healthy, active body

1.2.1 Physical activity and your healthy mind and body

DEFINITIONS

OVERWEIGHT - having weight excess than normal, harmless unless accompanied with over fatness

OVER FAT - person having more fat than recommended for gender and age

OBESE - term used to describe people who are very over fat

UNDERWEIGHT - weighing less than normal, healthy or required

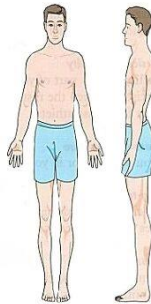
ANOREXIC - describes someone who has anorexia, which is a prolonged eating disorder due to loss of appetite.

WEIGHT'S IMPACT ON PERFORMANCE

- Different weights are desirable for different activities
- Some athletes can be deliberately overweight due to the extra muscle mass they need to be successful in their activity e.g. weight lifters
- Each sport will dictate a different **optimum weight** for success (e.g. basketballer vs shot putter)
- Within each sport, different positions will require different optimum weights (e.g. prop vs kicker in rugby)

ECTOMORPH

- Slightly built, delicate body
- Narrow shoulders and hips
- Lean, fragile
- Excel in long distances
- *E.G. Marathon Runner*



WHAT ARE THE DIFFERENT SOMATOTYPES?

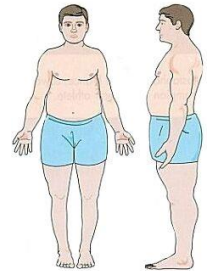
MESOMORPH

- 'Athletic Build'
- Muscular, large trunk
- Broad shoulders, narrow hips
- Strength/sudden burst events
- *E.G. 100m Sprinter*



ENDOMORPH

- Round/ 'pear drop' shape
- Narrow shoulders and broad hips
- Carry weight around waist and on hips and upper thighs
- Power events
- *E.G. Sumo wrestler*



FACTORS AFFECTING OPTIMUM WEIGHT

- **Height:** taller people are usually, though not always, heavier
 - **Gender:** men tend to have more muscle and larger bones
 - **Bone structure:** 'frame size' can vary from person to person
 - **Muscle girth:** muscle girth increases with training so will vary from person to person
 - **Genetics:** body weight and shape are largely passed on through genes
- NB. **Body composition** = % of body weight that is fat, muscle and bone (so all 3 will affect a person's weight)

RISK ASSESSMENT & PREVENTING INJURIES	
Method of minimising risk	Why it helps
Warm Up	<ul style="list-style-type: none"> • Warming up muscles gradually helps prevent injury - increases blood flow to working muscles to prepared for action, focuses mind on activity
Cool Down	<ul style="list-style-type: none"> • Prevents injury by increasing flexibility for next performance • Disperses lactic acid - prevent soreness and aches and also stiffness which limits movement which can lead to injury
Checking equipment + facilities	<ul style="list-style-type: none"> • Facilities need to be safe and secure • E.g. pitch clean + lines visible • Equipment needs to be in a good condition • E.g. trampoline bed, springs, pads etc all ok.
Protective equipment + clothing	<ul style="list-style-type: none"> • Some sports have protective equipt, built into rules e.g. horse riding and sailing • Clothing must be safe and may vary depending on position • Jewellery should be removed - can get caught or injures others • Footwear - grip better (sprinter), extra protection/support for feet (hockey)
Balanced competition	<ul style="list-style-type: none"> • Weight (boxing), gender (rugby), age (netball), handicap (golf)
Playing to the rules of competition	<ul style="list-style-type: none"> • Help ensure safety and allow game to flow → fair play • E.g. professional fouls
Physical readiness	<ul style="list-style-type: none"> • Physical Activity Readiness Questionnaire (PARQ) completed before exercise commences • Should highlight any problems + help guide person to appropriate sport + how often to take part



DRUGS



ALCOHOL

- Impairs co-ordination, speech + judgement → **dangerous**
- Slows your reactions → **dangerous**
- Makes your **muscles tire quickly**
- Eventually damages heart, liver (cirrhosis), kidneys, brain, muscles + digestive + immune systems
- Increases urination (diuretic) → **dehydration** (thickens the blood)

RECREATIONAL DRUGS 'LEGAL BUT HARMFUL'

SMOKING

- Causes nose, throat + chest irritations
- Makes you short of breath
- Increases risk of developing heart disease, lung cancer, bronchitis and other diseases
- **NICOTINE** = addictive drug within cigarettes
- Negative effect on aerobic fitness → **poor performance**

PERFORMANCE ENHANCING DRUGS (socially unacceptable)		
These drugs are banned by the International Olympic Committee (IOC)		
B.A.D.S.N.A.P	Advantages	Disadvantages
Beta Blockers (Snooker)	<ul style="list-style-type: none"> • Drugs designed to control heart rate • Lower heart rate, steady shaking hands and reduce anxiety • Banned in sports where it may be an advantage - <i>Snooker, shooting</i> 	<ul style="list-style-type: none"> • Can reduce HR to a dangerous level... • Can lead to cardiac arrest!
Alcohol (shooting, archery)	<ul style="list-style-type: none"> • Calms nerves 	<ul style="list-style-type: none"> • Impairs judgments • Reactions affected - delay in reacting cause an accident (skiing)
Diuretics (jockey, boxer)	<ul style="list-style-type: none"> • Elevate rate of urine production • Weight loss - important if competing in a certain weight division • Can mask traces of other drugs in body 	<ul style="list-style-type: none"> • Cause cramp and dehydration • Dehydration → dizziness, headaches, nausea • Long-term dehydration → Kidney problems
Stimulants (boxer)	<ul style="list-style-type: none"> • Effect on Central Nervous System so... • Speeds up reactions and increases aggression • Make you feel less pain 	<ul style="list-style-type: none"> • They're addictive + Feeling less pain can make athlete train too hard • Lead to high blood pressure, increased HR, irregular heart beat • Insomnia, irritability
Narcotic Analgesics (dancer)	<ul style="list-style-type: none"> • Reduce pain - so injuries and fatigue doesn't affect performance • Marijuana (archery) - Calms nerves • Local Anesthetics Reduce pain but maybe allowed for medical purposes • 	<ul style="list-style-type: none"> • Loss of concentration, balance, coordination • Feeling less pain can make athlete train too hard → damage body further • Lead to constipation and low blood pressure • Emotional effects e.g. hallucinations (morphine) •
Anabolic Steroids (shot putter)	<ul style="list-style-type: none"> • Mimic testosterone (male hormone) + promote bone + muscle growth • Increase Muscle size • Allow athletes to train harder 	<ul style="list-style-type: none"> • High blood pressure, heart disease, infertility, cancer, liver disease...death • Women may facial and body hair, and their voices may deepen • Increase risk of muscle injury
Peptide Hormones (marathon runner)	<ul style="list-style-type: none"> • Drugs that cause other hormones to be produced • Increase muscle growth • Increase number of Red Blood Cells... • Assist recovery from training (improves lactic acid removal and decreases O₂ debt quicker) • EPO - allows more oxygen carrying capacity due increase of red blood cells 	<ul style="list-style-type: none"> • Cause strokes and abnormal growth • EPO thickens the blood → harder for blood to pass through capillaries → increase risk of heart attack/stroke

SO WHY ATHLETES CHOOSE TO USE THEM, IN SPITE OF THE RISKS?

- Enhance or improve performance e.g. last chance to get Olympic gold medal
- Encouraged to do so by their coaches or fellow athletes
- Level the playing field
- Financial reward (during relatively short professional career)

1.2.1. Revision Questions

(c) Different measures are put in place to reduce the risk of injury in physical activity.

Give three **different types** of examples to demonstrate how risk of injury is reduced in an activity of your choice.

(3)

Chosen activity

.....

Risk reduced by:

1

.....

Risk reduced by:

2

.....

Risk reduced by:

3

.....

(Total for Question 7 = 6 marks)

.....

Several different categories of performance enhancing drugs are listed in the table below.

Anabolic steroids	Beta blockers	Diuretics
Narcotic analgesics	Stimulants	Peptide hormones/EPO

(a) Using this information, identify the relevant category of drug referred to in each of the following statements.

(i) Long distance runners are more likely to use this class of drug than sprinters.

(1)

(ii) Weight lifters may use this class of drug to mask the pain of a torn muscle.

(1)

(iii) Archers may use this class of drug because of its calming effect to improve their accuracy.

(1)

(iv) Some performers will use this class of drug to mask the use of other types of drugs.

(1)

(b) All of these drugs have potentially harmful side effects. Explain why, despite the risks, some performers will still use them.

(1)

(c) Give an example of a possible harmful side effect of diuretics.

(1)

(Total for Question 8 = 6 marks)

Although not illegal, smoking can have dangerous side effects on the body.

(a) In the table:

- name the **two** body systems that can be seriously damaged by cigarette smoke (2)
- state a health risk associated with smoking for each of these systems. (2)

Body system damaged by smoking	Health risk associated with smoking for this system

(b) Apart from the obvious health risks, why are sports performers advised not to smoke? (1)

.....

.....

(Total for Question 9 = 5 marks)

The performers in Figure 3 have the same body type (somatotype).



Figure 3

(a) Name the body type of the performers in **Figure 3**.

(1)

(b) Describe a characteristic of this body type.

(1)

(c) Give **one** advantage of this body type for:

(i) The pole vaulter

(1)

(ii) The long distance runner.

(1)

For a physical activity of your choice, explain how to reduce a variety of risks associated with that activity in order to maintain physical health.

1.2.2 - THE CARDIOVACULAR SYSTEM DURING EXERCISE

KEY TERMS

- **Heart Rate (HR)** - the amount of beats per minute
- **Stroke Volume (SV)** - the amount of blood pumped by heart in one beat
- **Cardiac Output (CO)** - the amount of blood pumped by the heart per minute

$$CO = SV \times HR$$

WHAT ARE ARTERIES, VEINS & CAPILLARIES?

Arteries:

- Thick, flexible vessel walls
- Has a pulse. No valves
- Work under high pressure
- Transports blood away from heart (**OXYGENATED**)
- Narrow lumen

Veins:

- Thin walls
- Valves present; prevents backflow. No pulse
- Pulsating muscles close to veins prevent backflow- 'skeletal pump'
- Work under low pressure
- Transports blood towards the heart (**DEOXYGENATED**)
- Wide lumen

Capillaries:

- Smallest of all vessels - walls one cell thick
- They are 'semi-permeable' - substances pass through
- At one end - they feed muscles, organs and body tissue with oxygen and nutrients
- At other end - carbon dioxide and waste products pass into veins to be removed
- They bring blood within reach of every cell

The 3 parts of the circulatory system are blood, heart and blood vessels

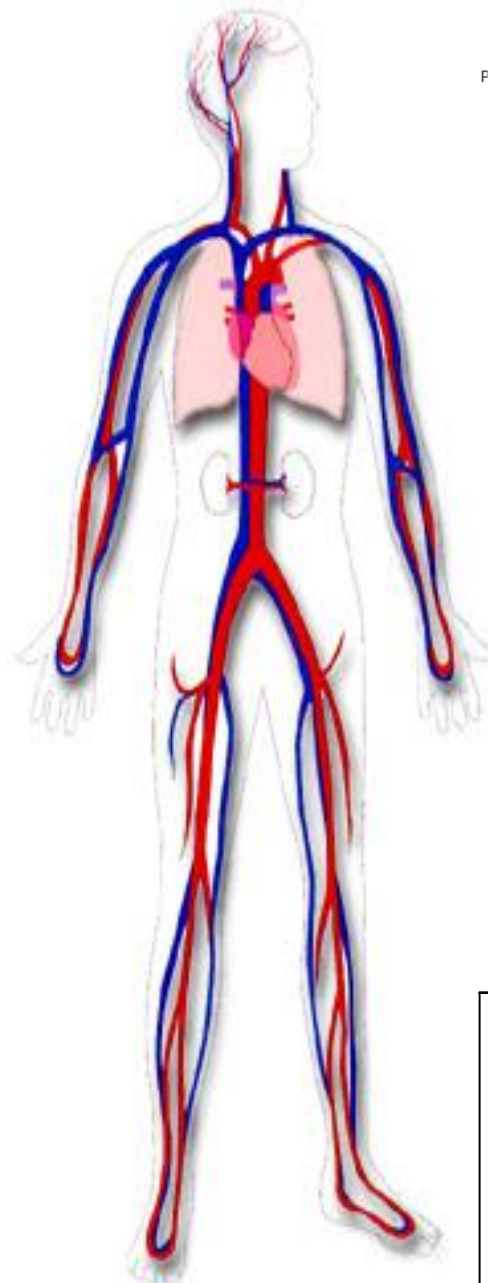
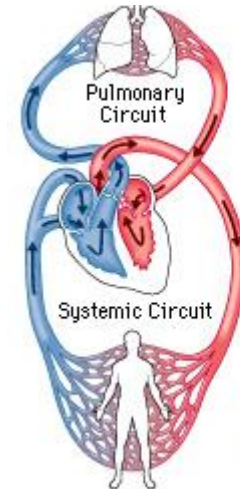
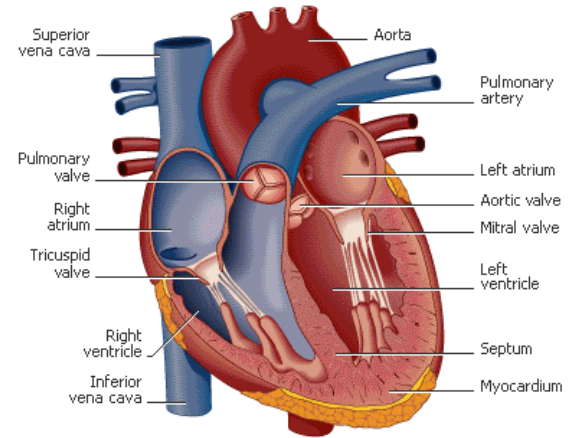


Diagram of the heart
Labels for extra info!



THE FLOW OF BLOOD

(for info + extra understanding!)

De-oxygenated blood returns to the heart through the large veins called venae cavae

Blood enters right atrium and passes through the tricuspid valve into right ventricle

It is then pumped through the semi-lunar valve into pulmonary artery and into lungs where it loses carbon dioxide and picks up fresh oxygen

Oxygenated blood returns to heart from lungs through the pulmonary vein into left atrium

It passes through bicuspid valve and into the left ventricle

It is pumped through semi-lunar valve into aorta and out to rest of body through arteries

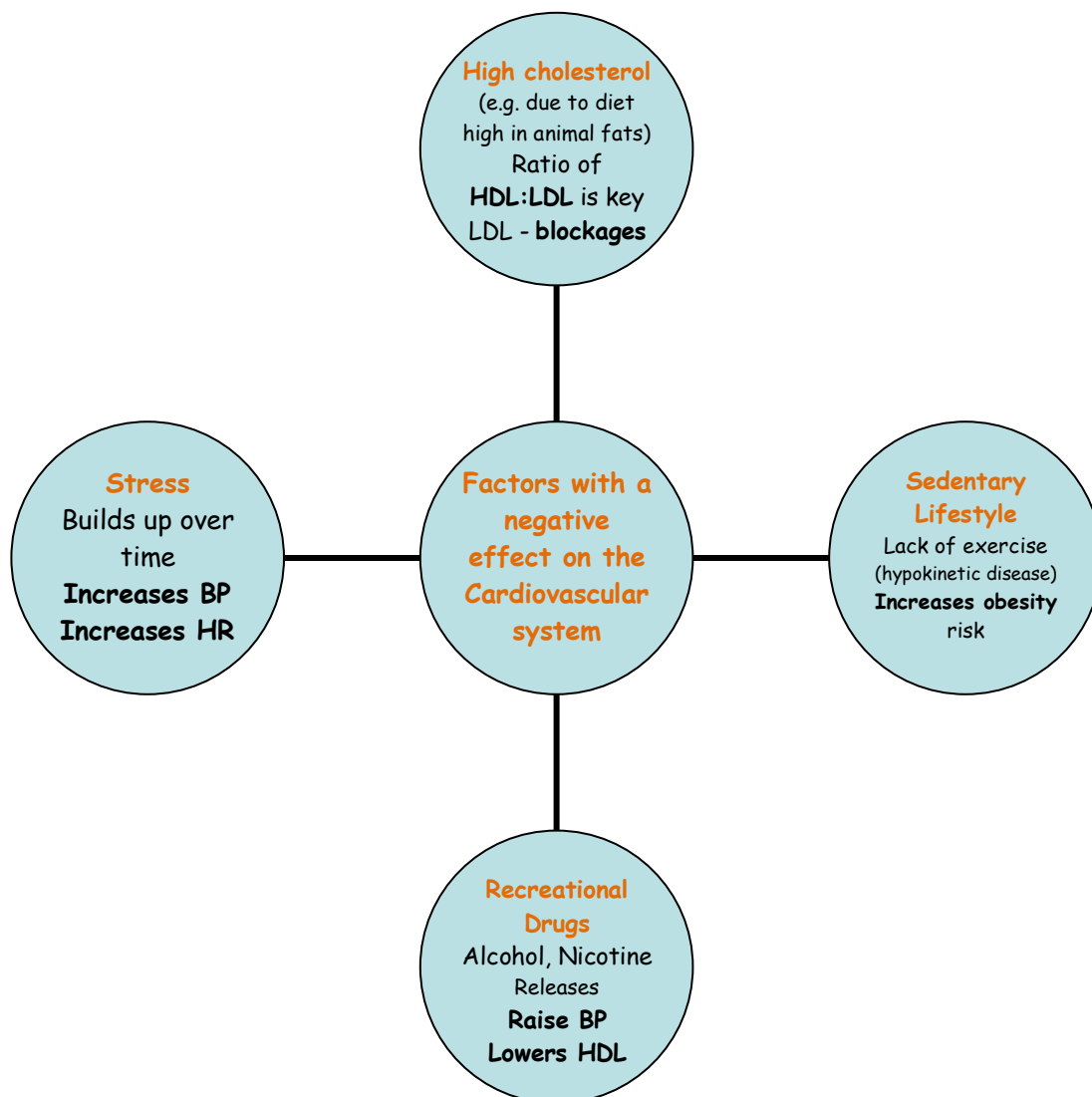
Immediate Effects of Exercise	Effects of Regular Training	Long Term Benefits
<ul style="list-style-type: none"> ✓ Heart Rate increases ✓ Cardiac Output & Stroke Volume increases ✓ Blood Pressure increases ✓ Increase of Blood to working muscles - blood shunting ✓ Vasodilation 	<ul style="list-style-type: none"> ✓ Bigger & Stronger heart ✓ Lower Resting Heart Rate ✓ Increased Cardiac Output & Stroke Volume ✓ Lower systolic + diastolic Blood Pressures 	<ul style="list-style-type: none"> ✓ Helps prevent coronary heart disease ✓ Helps prevent Type 2 diabetes ✓ Helps prevent Cardiovascular Disease ✓ Helps prevent Obesity ✓ Healthy veins &

The Effect of lifestyle on the cardiovascular system

REST

= the period of time allotted for recovery

- Essential to recovery
- Allows body to adapt: heart grow in size + thickness, capillarisation
- E.g. 2 days training + 1 day rest + 3 days training



***15** A healthy, active lifestyle will have an impact on the body systems. Describe some of the effects of participation on the body's cardiovascular and muscular systems.

In your answer you may consider:

- the immediate and short-term effects of participation on each system
- the effects of regular participation and long-term effects on each system.

Diet and rest need to be considered when planning a healthy, active lifestyle.

Describe the impact of diet and rest on the cardiovascular system.

(i) Impact of **diet** on the cardiovascular system.

(3)

.....

.....

.....

.....

.....

(ii) Impact of **rest** on the cardiovascular system.

(2)

.....

.....

.....

.....

(Total for Question 6 = 5 marks)

The following statements are effects of participation in exercise and physical activity on the cardiovascular system. State whether the effect is immediate or long term.

Immediate or long term effect?

Increased heart rate

Increased cardiac output

Increased maximum cardiac output

(Total for Question 7 = 3 marks)

The graph in **Figure 4** shows suggested target heart rate zones depending on age.

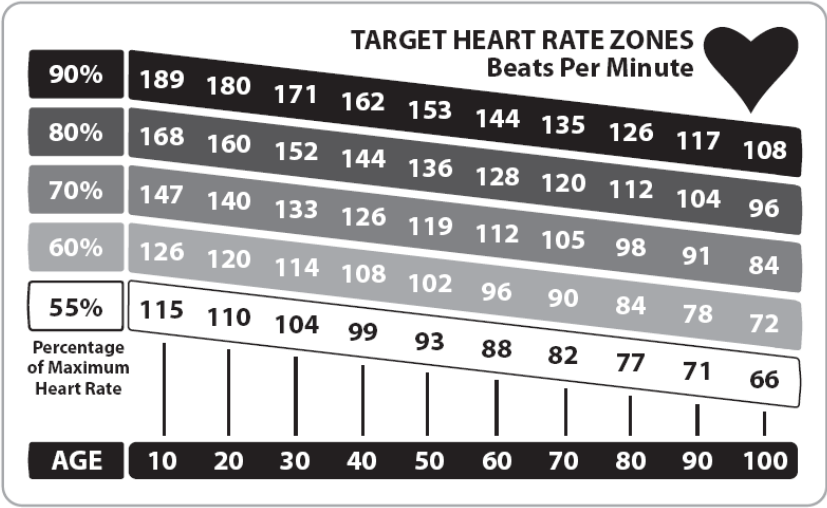


Figure 4

(a) Using **Figure 4**, state the suggested heart rate values that a 40-year-old should work between to ensure they are in the correct target zone to improve their cardiovascular fitness.

(1)

(b) Explain why the suggested target zone for a 20-year-old is different to that suggested for a 40-year-old.

(3)

Our heart rate will vary depending on whether we are physically resting, working or recovering.

Explain why resting heart rate is lower than recovery heart rate.

(3)

(Total for Question 7 = 7 marks)

(a) The equation in the box below is incomplete.

Complete the equation that is used to calculate the amount of blood ejected from the heart per minute.

(1)

..... = **Heart Rate** ×

(b) Blood pressure can be used to help monitor the health of an individual.

(i) A normal blood pressure reading would be 120/80. The 120 represents systolic blood pressure. Name the other blood pressure represented in this reading.

(1)

.....

(ii) Explain the immediate effect of exercise on blood pressure.

(2)

.....

.....

.....

.....

.....

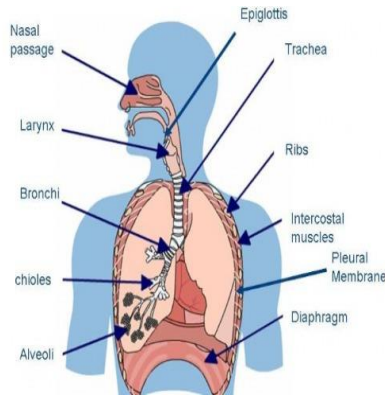
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1.2.3 - THE RESPIRATORY SYSTEM

KEY TERMS

- **Oxygen debt** - Shortfall of oxygen to the body after maximal effort/anaerobic exercise, resulting in deep and shallow breathing e.g. at end of 400m race
- **Vital Capacity** - The maximum amount of air that can be forcibly exhaled after breathing in as much as possible
- **Tidal Volume** - Amount of air breathed in or out at rest

The 3 parts of the respiratory system are the diaphragm, lungs and air passages



MECHANISM OF BREATHING (For info/extra understanding!)

- Lungs are not muscles therefore can't move on their own accord. They are helped by the **diaphragm** and **intercostal muscles** between the ribs.

- down
- Our intercostal muscles contract
- Air pressure is reduced
- Air is sucked through the tubes into lungs
- Our chest expands
- Our intercostal muscles relax
- Our chest becomes smaller
- Pressure increases on the lungs
- Air is forced out

AEROBIC and ANAEROBIC ACTIVITY

AEROBIC - with oxygen

- Lower intensity
- Endurance activities - Marathon

ANAEROBIC - without oxygen

- Higher intensity
- Short distance activities - Sprinting

DAMAGE BY SMOKING/NICOTINE

IMPAIRS GASEOUS EXCHANGE

- × Damages lungs
- × Makes alveoli less stretchy i.e. less efficient
- × More difficult to O_2 in and CO_2 out
- × Hearts have to work harder → athlete feels more tired

THE RESPIRATORY SYSTEM

The function of the respiratory system is;

- To get oxygen into the body
- To remove carbon dioxide out of the body

Oxygen is used by the body to release energy and carbon dioxide is released so it doesn't build up and poison the body

WHAT IS LACTIC ACID?

- Lactic acid is a bi-product of exercise. A build up of this can inhibit performance and cause pain, discomfort and fatigue.
- Lactic acid occurs in the anaerobic system because without the presence of oxygen, pyruvic acid turns to lactic acid.
- Cooling down properly with stretching helps the lactic acid be removed and prevents aching muscles after the exercise.

Immediate Effects of Exercise	Effects of Regular Training
<ul style="list-style-type: none"> ✓ Breathing deepens ✓ Breathing quickens ✓ Oxygen Debt (result from anaerobic exercise) ✓ Increase in tidal volume 	<ul style="list-style-type: none"> ✓ Improved efficiency of lungs → more efficient delivery of O_2 and removal of CO_2 ✓ More alveoli ✓ Improved VO_{2max} ✓ Increased vital capacity ✓ Increased tidal volume ✓ Faster recovery rate

An oxygen debt can occur when working hard during physical activity. Explain the term 'oxygen debt'.

.....

.....

.....

.....

(Total for Question 10 = 3 marks)

Oxygen debt can occur as a result of exercise.

(a) State whether oxygen debt occurs as a result of aerobic or anaerobic respiration.

(1)

.....

.....

(b) When is oxygen debt 'paid back'?

(1)

.....

.....

(c) Give an example of when the following performers would experience oxygen debt in their activity.

(i) A runner in a 1500 metres race.

(1)

.....

.....

(ii) A player in a game of tennis.

(1)

.....

.....

(iii) A boxer in a boxing match.

(1)

.....

.....

As soon as we start to exercise our breathing rate and depth of breathing increases.

(a) Explain **two** reasons why the respiratory system responds in this way when beginning exercise.

(i) Explanation one

(2)

(ii) Explanation two

(2)

(b) Explain how the respiratory system helps the body to recover from oxygen debt after exercise.

(3)



1.2.4 - MUSCLES AND MUSCLE ACTION



HOW ARE MUSCLES CLASSIFIED?

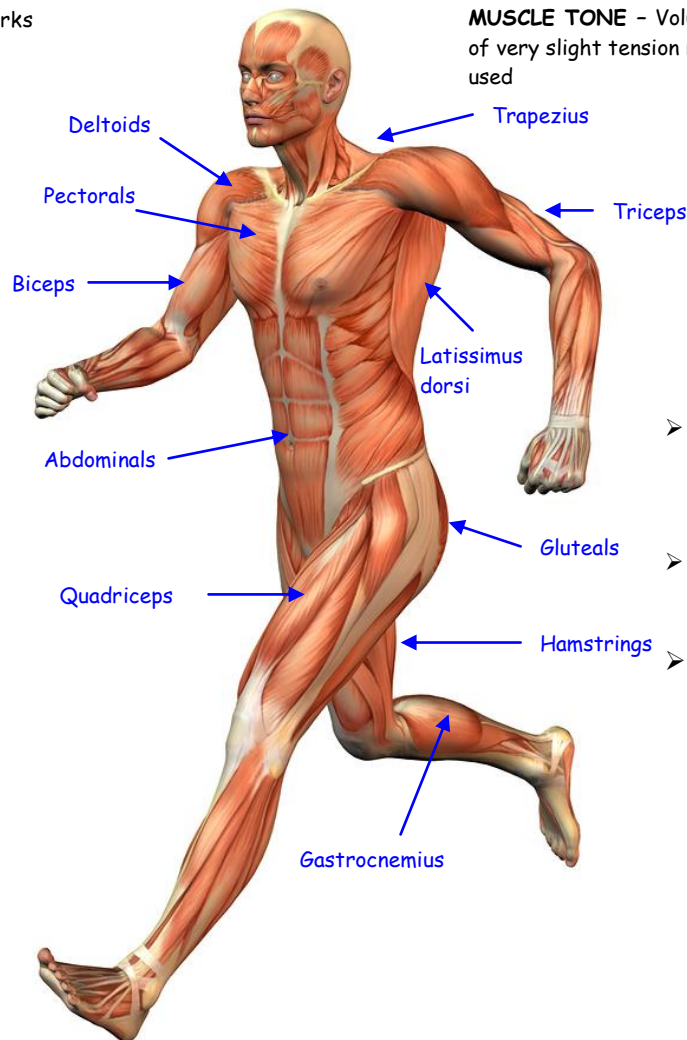
- **Skeletal (Voluntary)** - most common. They attach to the skeleton, give a person's shape - *Biceps/Triceps*
- **Smooth (Involuntary)** - work automatically and are not controlled - found in *intestines, blood vessels and urinary organs*.
- **Cardiac (Involuntary)** - *Heart Muscle* works automatically and beats rhythmically

WHAT IS MUSCLE TONE?

Some muscle fibres contract whilst others relax. These contractions tighten the muscles but aren't strong to cause movement. Different fibres contract at different times to prevent fatigue. This called **Muscle tone** and is very important for good posture.

MUSCLE TONE - Voluntary muscles in a state of very slight tension ready and waiting to be used

Muscle	Movement	E.g.
Deltoid	Moves arms in all directions at shoulder	Tennis serve, cricket bowl
Trapezius	Rotates shoulder backwards	Rowing
Latissimus Dorsi	Rotates arm @ shoulder	Butterfly
Pectorals	Adduct arm @ shoulder	Forehand in tennis
Abdominals	Flex trunk	Pull body down in hurdles
Biceps	Flex arm @ elbow	Chin-up
Triceps	Extend arm @ elbow	Press-up, javelin release
Gluteals	Extend leg @ hips	Pulling back leg before kicking ball
Quadriceps	Extend leg @ knee	Take off on LJ, kick ball
Hamstrings	Flex leg @ knee	Bending on landing from vault
Gastrocnemius	Pointing toes	Front crawl, pushing onto toes in run



ROLE OF MUSCULAR SYSTEM DURING EXERCISE

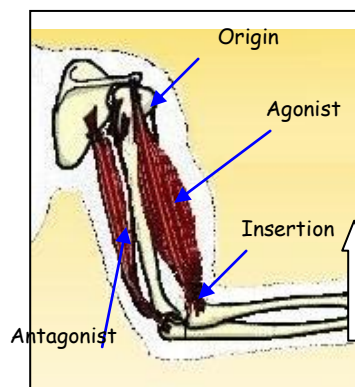
- Muscles are connected to bone to be the driving force behind your movement
- Due to contraction + relaxation (lengthening) of muscles
- Happens voluntarily to bring about movement. These are the ones we can train so they can work harder for longer or to improve their flexibility so performing with them becomes easier and more effective

HOW DO MUSCLES WORK TOGETHER?

Antagonistic Pairs: Muscles working together to provide movement. E.g. Flexion of the arm, **biceps** contracts and **triceps** relax. To extend the arm, the **triceps** contract and the **biceps** relax.

- **Agonist (Prime mover)** - contracting muscle causing movement
- **Antagonist** - relaxing muscle that assists prime mover
- **Origin** - the end of muscle that is attached to a fixed bone
- **Insertion** - point where a tendon attaches muscle to bone where there is movement
- **Flexibility** - a joint's ability to move through its full range
- bone where there is movement

Another example is the hamstrings & quadriceps



1.2.4 - MUSCLES AND MUSCLE ACTION

continued...

TYPES OF CONTRACTION

- **Isotonic Contraction** - In this contraction, the muscle changes length and so something moves. *E.g. Bicep Curl*
- **Isometric Contraction** - In this contraction, the muscle stays the same length and so nothing moves. *E.g. the Wall Sit*
Used less frequently in sports



FAST TWITCH OR SLOW TWITCH?

FAST TWITCH

Used in explosive activities
Contract quickly
Produce powerful action
Limited Oxygen supply
White in colour
e.g. speed events, throwing & jumping

SLOW TWITCH

Used in endurance activities
Contract slowly
Long Lasting
Good oxygen supply
Red in colour
e.g. long distance running, cycling & swimming

Immediate Effects of Exercise	Effects of Regular Training
<ul style="list-style-type: none"> ✓ Requirement for extra fuel (glucose + O₂) ✓ Lactic acid produced if not enough O₂ → ✓ Muscle stiffness/soreness/cramp ✓ Muscle start to fatigue...eventually can no longer perform the movement 	<ul style="list-style-type: none"> ✓ Can cope better with lactic acid - takes longer to build up ✓ Hypertrophy (increased size of muscles) ✓ Increased strength ✓ Increased power (power = strength x speed) ✓ Increased muscle endurance ✓ More toned muscles in appearance ✓ Better posture ✓ Reduce risk of injury

NB. Must cool down after exercise to prevent negative effects of lactic acid build up

POTENTIAL FOR INJURIES

Includes;

- Sprains (muscle)
- Strains (joints)
- Muscle atrophy (muscle wastage due to inactivity)
- Minor injuries - cuts, grazes and bruises



TREATMENT FOR MUSCULAR INJURIES - R.I.C.E

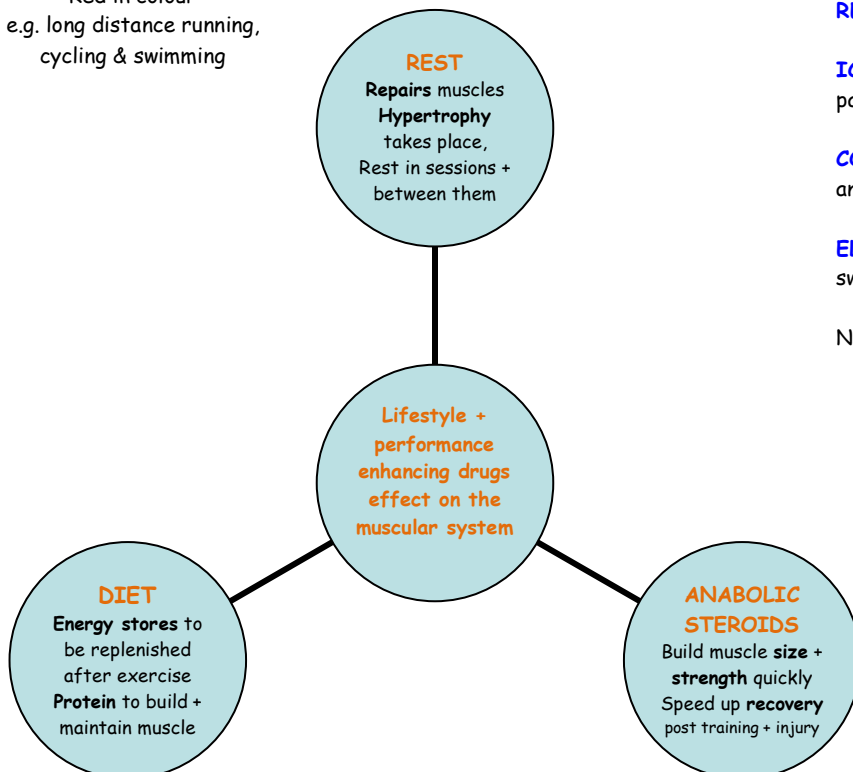
REST - Rest the injured part to prevent further injury

ICE - Apply ice or a cold compress to reduce blood flow, pain and swelling

COMPRESSION - Compress the injury to reduce bleeding and swelling

ELEVATION - Elevate the injured part to reduce bleeding, swelling and throbbing

NB: Cuts/grazes - treat with antiseptic wipe then bandage



1.2.4. Revision Questions

Figure 7 shows two basketball players. One player has flexed his arm at the elbow to control the ball. His opponent has moved his extended arm away from the mid-line of the body to try to intercept the next pass.



Figure 7

(a) Name the muscle that contracts in order to flex the arm at the elbow.

(1)

(b) Name the joint action occurring at the shoulder as the arm moves away from the mid-line of the body.

(1)

***15** A healthy, active lifestyle will have an impact on the body systems. Describe some of the effects of participation on the body's cardiovascular and muscular systems.

In your answer you may consider:

- the immediate and short-term effects of participation on each system
- the effects of regular participation and long-term effects on each system.

Several muscles are listed in the table below.

Abdominals	Triceps	Gastrocnemius	Gluteals
Latissimus dorsi	Pectorals	Quadriceps	Trapezius

Using the muscles in the table, match the correct muscle to the stated action in each of the following statements.

(a) Moves the thigh backward at the hip (hip extension).

(1)

(b) Moves the upper arm back and inwards towards the body.

(1)

(c) Adducts the upper arm at the shoulder.

(1)

(Total for Question 12 = 3 marks)

The following are two training adaptations:

- muscular hypertrophy
- increased bone density

(a) Identify the method of training that is **most likely** to cause muscular hypertrophy.

(1)

(b) Identify an exercise activity that will result in an increase in bone density.

(1)

(Total for Question 13 = 2 marks)



1.2.5 - THE SKELETAL SYSTEM



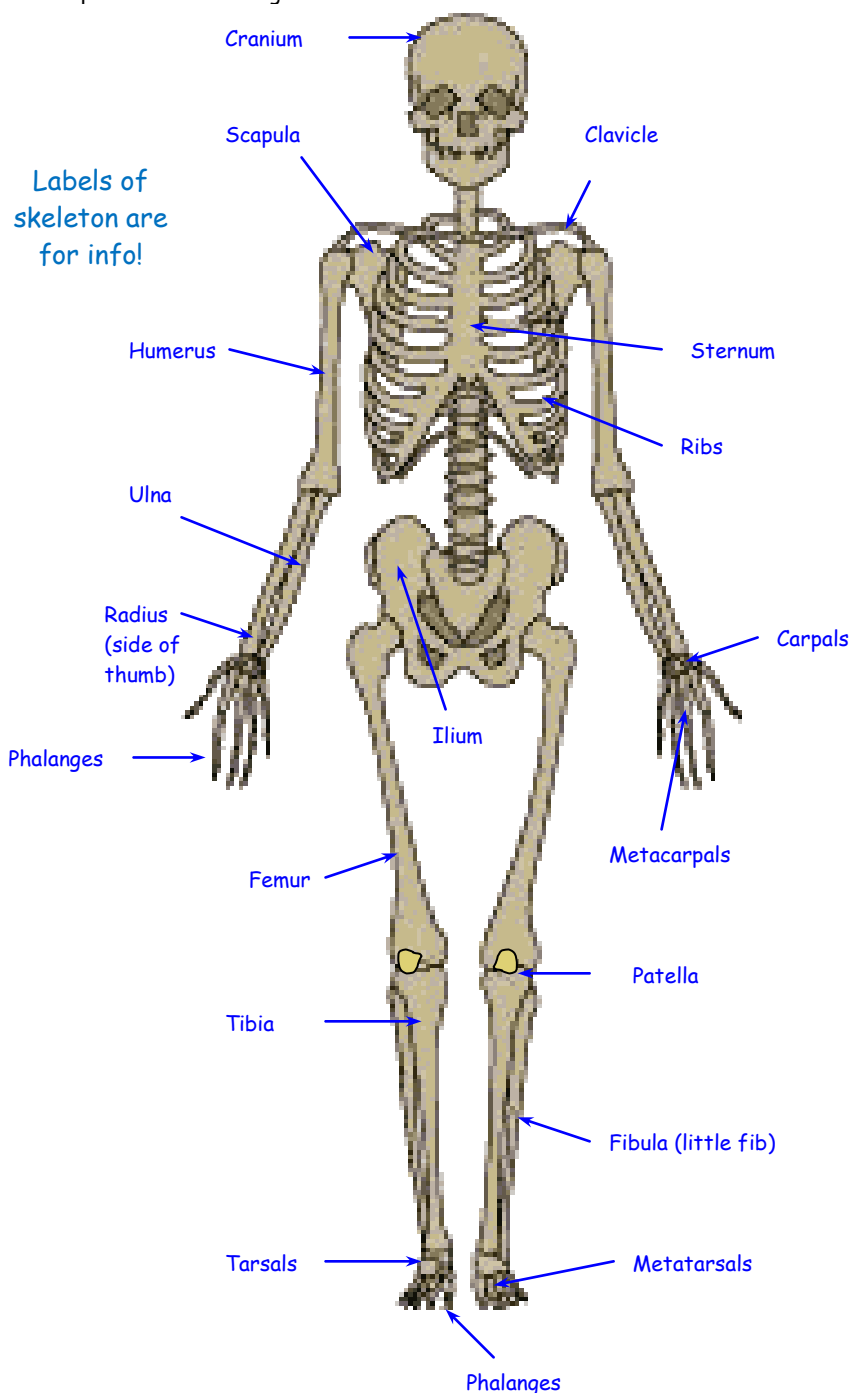
WHAT ARE THE FUNCTIONS OF THE SKELETON?

During movement:

1. **Protection** - Ribs protect heart and lungs, Cranium protects brain, vertebral column protects spinal cord
2. **Support** - firm, rigid and keep us upright
3. **Movement** - Skeleton has 'anchor points' to which muscles attach and act as levers. **Long bones** help create the leverage to apply the force.

At other times:

4. **Shape** - gives framework - basketball player long, thin skeleton - jockeys small, thin skeleton
5. **Blood Production** - red and white blood cells are produced in the long bones.



HOW ARE BONES CLASSIFIED? For info!

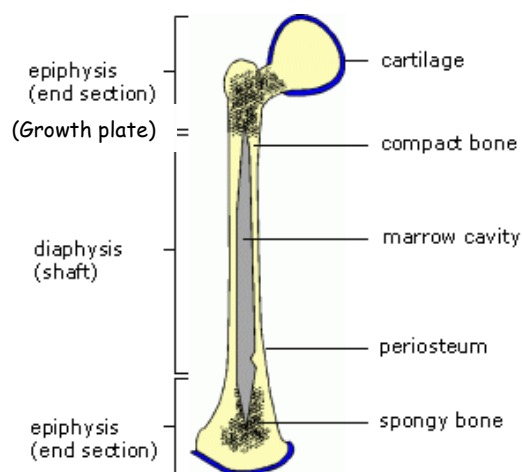
1. **Long bones** - Humerus, Femur
2. **Short bones** - Carpals and Tarsals.
3. **Flat bones** - Cranium, Scapula and Sternum
4. **Irregular bones** - Patella and Vertebrae. (odd shaped bones)

THE DEVELOPMENT OF BONES - For info!

Bones start off as cartilage and then become bone by the process of **Ossification**.

Bones have a tough outer layer called the **Periosteum**. As development continues there are 3 centres of ossification: in the **diaphysis** (middle) and **epiphyses** (end).

Ossification - The development of bone from cartilage. It occurs throughout childhood until adulthood.



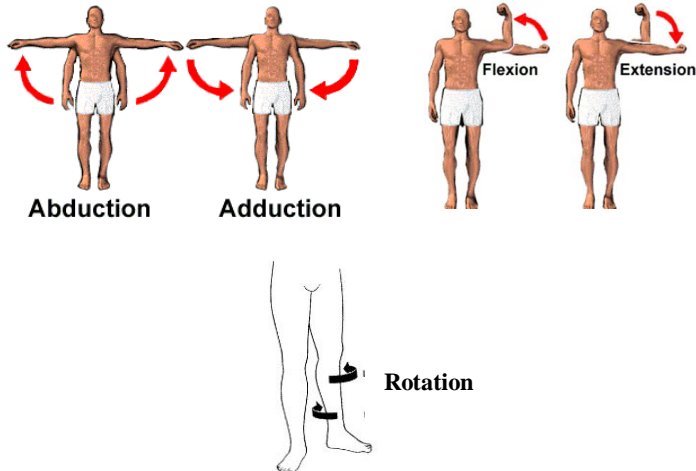
Effects of Regular Training On the Skeletal System

- ✓ Increased **bone density**
- ✓ Thus increased **bone strength**
- ✓ **Ligaments** become **stronger**
- ✓ **Tendons** become **stronger**
- ✓ Increase joint **flexibility**
- ✓ Helps **prevent osteoporosis** (where bone density weakens and bones become weak and thus break easily)
- ✓ **Weight bearing exercises** have positive effect in preventing osteoporosis (e.g. skipping, brisk walking, running, yoga) NB too much while still growing can hinder development

1.2.5 - JOINTS, TENDONS, LIGAMENTS & MOVEMENT

IN WHAT WAYS DO JOINTS MOVE?

1. **Flexion:** decreasing the angle at a joint.
2. **Extension:** increasing the angle at a joint.
3. **Adduction:** movement of a limb towards the body
4. **Abduction:** movement of a limb away from the body.
5. **Rotation:** movement of a limb in a circular or part circular direction.



THE STRUCTURE OF JOINTS

JOINT = place where 2 bones meet
 CARTILAGE = prevents rubbing/friction between bones
 SYNOVIAL FLUID - lubricates joint
 LIGAMENTS - keep joint together
 TENDONS - help create movement by connecting to muscles

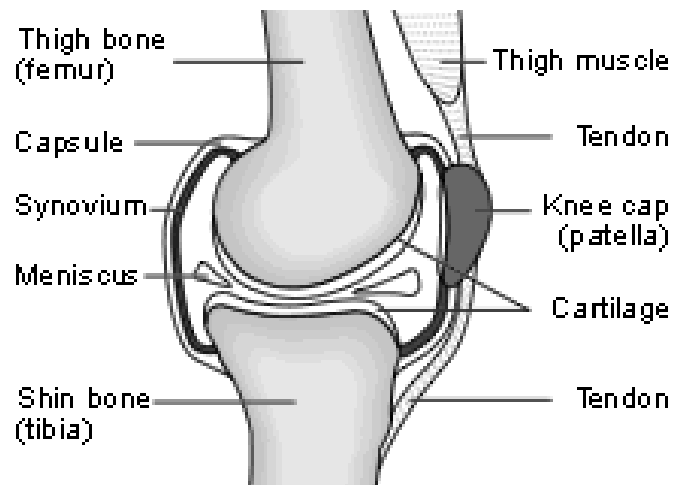
WHAT TYPES OF JOINTS ARE THERE?

1. **Synovial joints** or Freely Moveable - e.g. *Knee/hip*
For info only:
2. Fixed (fibrous) joints - *Skull*
3. Slightly moveable (cartilaginous) joints - *Vertebrae*

SYNOVIAL JOINT

Example - The Knee (HINGE)

Labels are just for info!



WHAT TYPES OF SYNOVIAL JOINTS ARE THERE?

1. **Ball and Socket** - movement in all directions and rotation - Hip, Shoulder (*hurdling*)
2. **Hinge** - movement Flexion and Extension only - Knee or Elbow (*javelin throw, kick ball*)

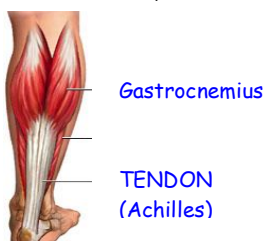
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3. **Pivot** - only rotation at Atlas and Axis at top of the spine
4. **Gliding** - Little bit of movement in all directions tarsals and carpals
5. **Condyloid** - movement forwards and backwards, left to right - in the wrists

WHAT ARE TENDONS, LIGAMENTS & CARTILAGE?

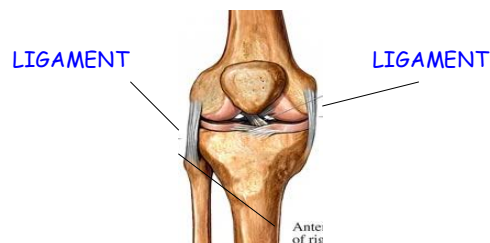
TENDONS

- Attach muscle to bone
- Strong, non-elastic connective tissue
- Joint stability



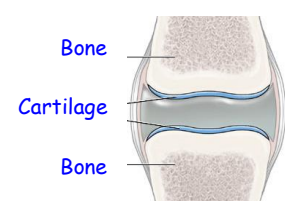
LIGAMENTS

- Attach bone to bone
- Very strong elastic fibres
- Joint stability



CARTILAGE

- Covers joints to allow bones to rub smoothly
- Acts as shock absorber
- Produces synovial fluid



LIGAMENT



SKELETAL SYSTEM INJURIES & IMPORTANCE OF DIET



HARD TISSUE INJURIES

These are injuries to the bone and include;

- Fractures
- Dislocations

FRACTURES - break in the bone. There are two types;

1. **Simple (closed) fracture** - bone stays under the skin
2. **Compound (open) fracture** - Bone breaks through the skin
3. **Greenstick fracture** - like a simple fracture but bone is only partly broken
4. **Stress fracture** - Small cracks in the bone. 'Overuse' injury often caused by running too much in a hard surface

All fractures are serious and need URGENT medical attention

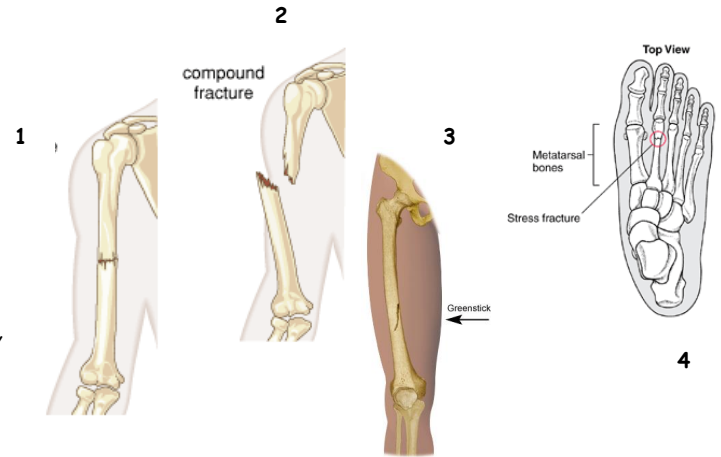
STRESS FRACTURES -. We need to;

- Get immediate rest
- Keep fit doing over activities
- Check running and footwear for problems

DISLOCATIONS - Bone at a joint is forced out of its normal position.

Also could be possible ligament damage around the joint. Could be caused by strong force wrenching the bone e.g. rugby tackle.

All dislocations should be treated as a fracture.



TENNIS + GOLFER'S ELBOW

- Due to overuse of **TENDONS** at elbow

TENNIS ELBOW RECOGNITION

- Pain on outside of elbow
- Using wrong-sized grip of racket

GOLFER'S ELBOW RECOGNITION

- Pain on inside of elbow

SPRAINS

- Sprain = damaged ligament e.g. twisted ankle

CAUSES

- Tearing of ligaments holding bones of joint together
- E.g. Joint was inverted (turned inwards), falling awkwardly, colliding with another player.

TORN CARTILAGE

- Tearing connective elastic substance joining muscle to bone

RECOGNITION

- E.g. knee: pain on inside of knee
- Athlete falls to the ground
- Joint is likely to be bent

BONE & JOINT INJURIES

RECOGNITION

- Recent blow or fall
- Snapping sound
- Difficulty moving limb
- Pain worse when moving
- Deformity - limb unusual shape
- Swelling, bruising
- Signs of shock

ACTION

- Keep him/her still & comfortable
- Support injured part
- Bandage injured part to their body/limb
- Reassure him/her
- Send for medical help

TREATMENT FOR INJURIES

REST

- Stop playing/training

ICE

- Limits swelling
- Allows healing to take place faster
- Provides pain relief

COMPRESSION

- Restricts swelling

ELEVATION

- Raising injury - reduces swelling

DIET & THE SKELETAL SYSTEM

Effect of Calcium

- Helps bones grow
- Increases their density
- E.g. milk, cheese, yogurt (choose low-fat!)

Effect of Vitamin D

- Helps with absorption of calcium
- Essential to growth + maintenance of healthy bones
- Made when skin is exposed to sunlight

1.2.5. Revision Questions

- (a) Identify **two** different types of injury the player in **Figure 6** could sustain as a result of the ball striking his face.



Figure 6

Injury 1

(1)

Injury 2

(1)

-
- (b) Some injuries are described as soft tissue injuries. What would be the appropriate treatment for these types of injury?

(1)

The skeletal system plays an important role in allowing for a healthy, active lifestyle. Figure 5 shows the skeletal system of two basketball players.



Figure 5

In the table below:

- identify **three** functions of the skeletal system in use during physical activity (3)
- give **one** example of how each function is used during a game of basketball. (3)

Function of the skeletal system during physical activity	Example of use during a basketball game

(Total for Question 10 = 6 marks)

Complete the following statements about hinge joints.

(a) The range of movement possible at a hinge joint is

(1)

..... to

(b) (i) The is an example of a hinge joint in the body.

(1)

(ii) Give a specific sporting action where this range of movement is used at this joint.

(1)

.....
.....

(Total for Question 14 = 3 marks)
