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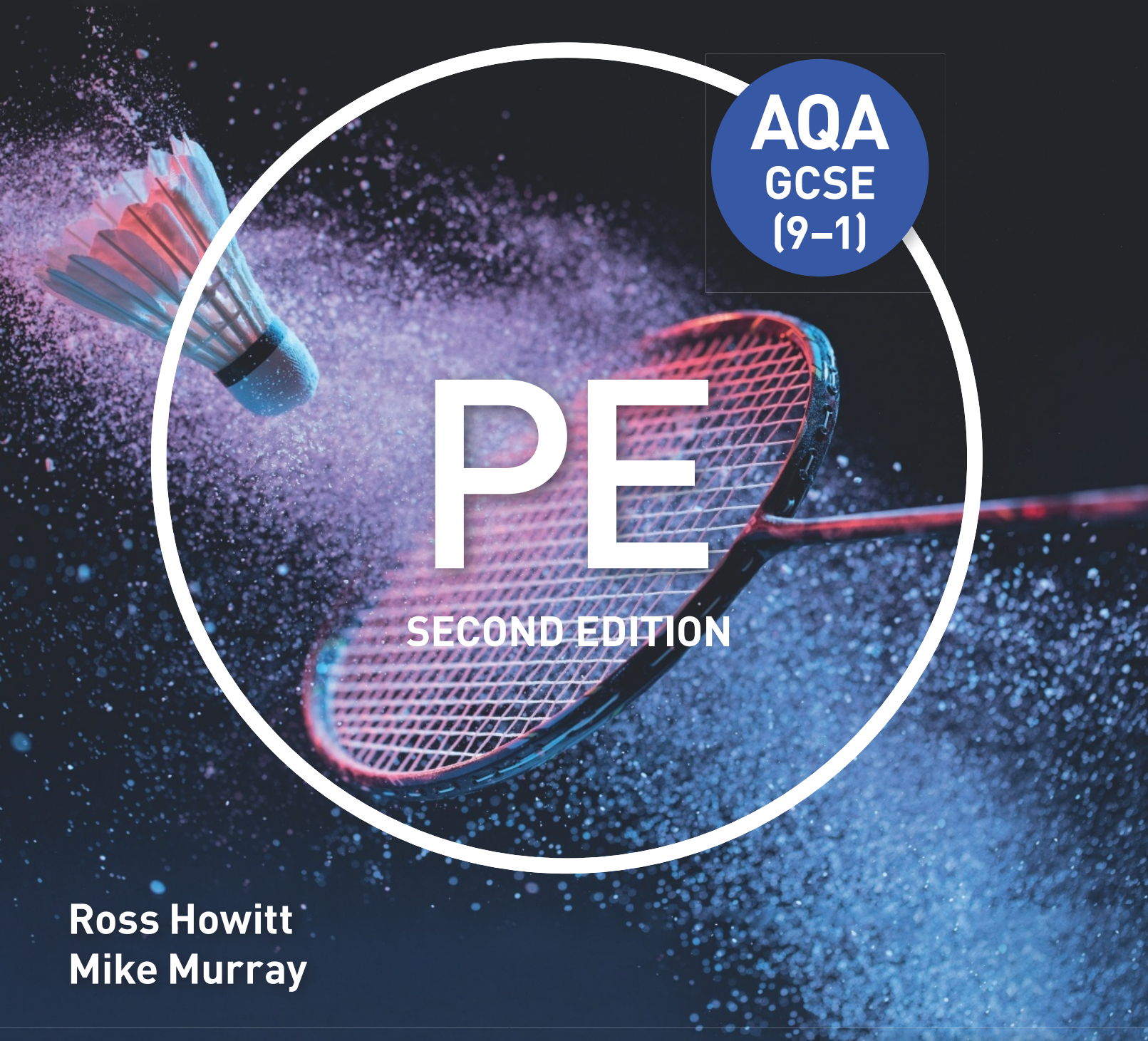

AQA GCSE (9–1)

PE

SECOND EDITION

Ross Howitt
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CONTENTS

Chapter 6 Health and fitness

Chapter objectives

- Linking participation in physical activity, exercise and sport to fitness, health and wellbeing
- How exercise can suit the varying needs of different people
- The consequences of a sedentary lifestyle
- Obesity and how it may affect performance in physical activity and sport
- The most suitable body type (somatotypes) for particular sports (or positions within a sport)
- How energy is gained from food and used
- Reasons for having a balanced diet
- The role of carbohydrates, fat, protein, vitamins and minerals
- Reasons for maintaining water balance

Physical, emotional and social health, fitness and wellbeing

There are several terms and definitions that you need to know in order to fully understand the link between taking part in an activity and what effect it has on health, wellbeing and fitness.

Although the terms 'health' and 'fitness' are also defined in Chapter 3 on physical training, it is perhaps best to confirm these definitions here:

Health (as per the World Health Organization's definition: 1948) – 'A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.'

Be aware that 'ill health' refers to being in a state of poor physical, mental and/or social wellbeing.

Fitness – The ability to meet/cope with the demands of the environment.

By looking at the terms 'health' and 'fitness', you can see that there is a link between the two. As being 'healthy' includes a 'physical component', you would expect that a healthy person has a well-developed or appropriate level of fitness to allow them to cope with the demands of the environment in which they live and work. This relationship is fully explored in Chapter 3, Physical training.

Key terms

Health A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.

Fitness The ability to meet/cope with the demands of the environment.

Wellbeing A mix of physical, social and mental factors that gives people a sense of being comfortable, healthy and/or happy.

Health and wellbeing

Health has three distinctive components:

- physical health
- mental health
- social health.

When discussing these three components, it is often useful to group them with the concept of '**wellbeing**'.

Thus we often talk about:

- physical health and wellbeing
- mental health and wellbeing
- social health and wellbeing.

Wellbeing

Very simply, 'wellbeing' involves physical, mental and social elements. It is the dynamic mix of the three parts that gives people a sense of being comfortable, healthy and/or happy. Your wellbeing can refer to how content and/or fulfilled you are in your life socially; for example, are you happy with your social life, friends, etc.?

▲ **Figure 6.1** Health and wellbeing have three components: physical, mental/emotional and social.

Physical health and wellbeing

Physical health and wellbeing refers to the idea that all of the body's systems are working well, so you are free from illness and injury. You therefore have an ability to carry out everyday tasks. Being active and taking part in exercise can therefore directly benefit your physical health and wellbeing. In other words, exercise can have a positive impact on the workings within your body.

Taking part in activity/exercise positively affects physical health and wellbeing as it can:

- improve your heart function
- improve the efficiency of the body systems – cardio-vascular system
- reduce the risk of some illness; for example, diabetes
- help to prevent the onset of obesity
- enable you to carry out everyday tasks without getting tired
- provide a feeling that you can comfortably carry out activities and enjoy them.

Study hint

You need to understand the differences between physical, mental and social wellbeing. The three together contribute to a person's health. You do not, however, have to distinguish between health and wellbeing; for example, the effects of exercise on physical health and wellbeing should be learnt together, rather than the health effects and wellbeing effects separately.

Check your understanding

1 Define the terms 'health', 'fitness' and 'wellbeing'.

Answers are on page 200.

Key term

Physical health and wellbeing
All body systems working well, free from illness and injury. Ability to carry out everyday tasks.

▲ **Figure 6.2** Participating in aerobics at a leisure centre or playing recreational sport provides similar benefits to your physical health and wellbeing, as stated previously. Your body adjusts to the exercise and adapts, allowing the body's systems to work more efficiently (physical health). The feeling of being able to comfortably complete and enjoy exercise provides physical wellbeing.

Mental (emotional) health and wellbeing

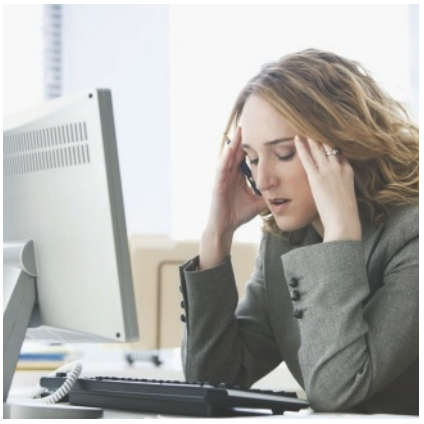
Key term

Mental (emotional) health and wellbeing Defined by the World Health Organization as: 'a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community'.

Mental health has been defined by the World Health Organization as: 'a state of wellbeing in which every individual realises his or her own potential'. An individual with good **mental health and wellbeing** can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. Taking an active part in exercise can positively affect your mental health and wellbeing. Your general state of mind can improve (mental health) and you may 'feel good' about yourself after taking part in a session of suitable exercise (mental wellbeing).

Taking part in activity/exercise positively affects mental health and wellbeing as it can:

- reduce stress/tension levels
- release feel-good hormones in the body, such as serotonin
- enable a person to control their emotions and work productively.



▲ **Figure 6.3** Many people take part in physical activity to 'remove or release stress from everyday life', thus improving their mental health and wellbeing. For example, this may be done by visiting the gym after work or meeting friends for a recreational game of badminton at the local leisure centre.

Social health and wellbeing

So far we have covered two of the three aspects of health and wellbeing. The third, **social health and wellbeing**, refers to the idea that:

- basic human needs are being met (food, shelter and clothing)
- the individual has friendship and support, some value in society and is socially active
- the individual suffers little stress in social circumstances.

Through participating in sport and exercise, individuals get the chance to mix together and socialise. Becoming familiar with people and enjoying friendship allows an individual to feel at ease when being around people and holding conversations. Similarly, organised sport usually takes place in an environment that facilitates some aspects of social health; for example, clothing in the form of a team strip. Social health and wellbeing is deemed to be a vital component of one's health.

Taking part in physical activity/exercise positively affects social health and wellbeing as it can:

- provide opportunities to socialise/make friends
- encourage co-operation skills
- encourage team-working skills
- ensure that essential human needs are met.

Check your understanding

2 Explain how wearing a team strip helps your social health and wellbeing.

Answers are on page 200.

▲ **Figure 6.4** Socialising through sport and exercise is good for social health and wellbeing.

Key term

Social health and wellbeing
Basic human needs are being met (food, shelter and clothing). The individual has friendship and support, some value in society, is socially active and has little stress in social circumstances.

Fitness

As mentioned at the start of the chapter, fitness is the 'ability to meet or cope with the demands of the environment'. Thus, the fitter you are, the more easily you can cope with the demands of your everyday life. These demands may include being productive at work, walking the dog or even running to catch a bus. As you exercise and take part in activities, your body adapts to the demands of the exercise and improves in fitness. This adaptation also lowers the chance of injury occurring. Therefore, as your fitness improves, you are able to meet the demands of the environment more easily without suffering from fatigue (tiredness).

Improvements in fitness will:

- improve your ability to cope with the demands of your environment
- reduce the chances of you suffering injuries
- make it easier for you to complete physical work; for example, some people work on their feet all day or carry out manual labour
- make you feel more content/happy (increased wellbeing).

▲ **Figure 6.5** A person who has to carry out manual tasks as part of their job needs to be of an appropriate fitness level to cope with the demands of their work.

Study hint

Remember that all three of the above components of health and wellbeing (physical, mental and social) work together.

Activity 1

Individually or in small groups, match the term in the table to its correct definition.

▼ **Table 6.1**

Term	Definition
Health	Basic human needs are being met (food, shelter and clothing). The individual has friendship and support, some value in society, is socially active and has little stress in social circumstances
Fitness	All body systems working well, free from illness and injury. Ability to carry out everyday tasks
Social health and wellbeing	A state of complete, physical, mental and social wellbeing and not merely the absence of disease or infirmity
Mental health and wellbeing	The ability to meet/cope with the demands of the environment
Physical health and wellbeing	A 'feel-good' chemical released during exercise
Wellbeing	A state of wellbeing in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community
Serotonin	Involves physical, mental and social wellbeing. It is the dynamic process of the three parts that gives people a sense of being comfortable, healthy and/or happy

Answers are on page 203.

Study hint

Make sure you are able to link participation in physical activity, exercise and sport to the different types of health/wellbeing and fitness; for example, how can taking part in activities improve your social health and wellbeing?

PRACTICE QUESTIONS

1 Explain two named components of wellbeing. (4 marks)

2 Define 'health' and define 'fitness'. (2 marks)

3 Which *one* of the following is an aspect of physical health and wellbeing?

A Can cope with the normal stresses of life ☐

B Individual has friendship and support ☐

C All body systems working well ☐

D High level of self-confidence ☐ (1 mark)

Answers are on page 201.

The consequences of a sedentary lifestyle

'Lifestyle choices' are simply the choices we make about how we live our lives. These could include:

- whether to smoke or not
- whether to drink alcohol or not

- whether to exercise or not
- whether to eat a balanced diet or not
- whether to actively seek an education or not.

Individuals of a suitable level of health are able to actively make choices that directly affect the amount of sport and exercise they take part in. Some people choose to do very little exercise. The lifestyle choice about whether to exercise or not significantly affects the health and fitness of an individual.

Sedentary lifestyle

The term 'sedentary' refers to a person's choice to engage in little, or irregular, physical activity. A 'sedentary adult' tends to make an active choice not to take part in exercise or sport. Such a choice can have far-reaching consequences for a person's health and fitness, as detailed below.

Key term

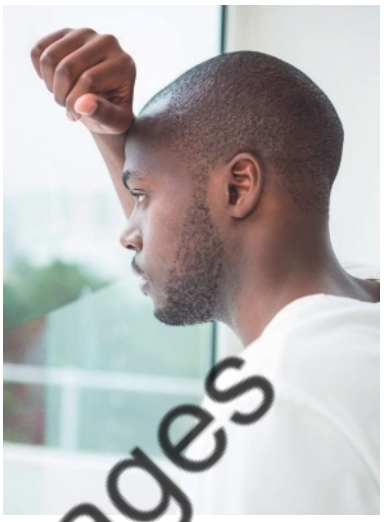
Sedentary lifestyle A person's choice to engage in little, or irregular, physical activity.

▲ **Figure 6.6** Leading a sedentary lifestyle is usually a choice; i.e. you could choose to be more active.

Here are some potential consequences of choosing a sedentary lifestyle:

- gaining weight/becoming obese (physical health and wellbeing)
- heart disease (physical health and wellbeing)
- hypertension (physical health and wellbeing)
- diabetes (physical health and wellbeing)
- poor sleep/insomnia (physical health and wellbeing)
- poor self-esteem/confidence (mental health and wellbeing)
- feeling tired and lethargic (physical/mental health and wellbeing)
- lack of friends/poor communication skills (social health and wellbeing).

The negative effects of a sedentary lifestyle are numerous, yet society still struggles to deal with those people who do not make positive choices in relation to their health and exercise levels. As you have seen previously, a person who follows a sedentary lifestyle may suffer weight gain and become obese.



▲ **Figure 6.7** A person who chooses to follow a sedentary lifestyle may experience an inability to sleep (insomnia) and/or lack of self-esteem.

Check your understanding

3 Describe some of the negative effects of choosing to have a sedentary lifestyle.

Answers are on page 200.

Activity 2

In pairs or small groups, discuss the lifestyle choices you make in relation to the amount of activity you do. Answer the following questions:

- Do you exercise regularly (more than three times a week)?
- What stops or prevents you from making the lifestyle choice to take part in more activity/exercise?
- Do you struggle to sleep or sometimes feel tired for no obvious reason? Could this be because you actually choose not to exercise and therefore often suffer the negative consequences?

PRACTICE QUESTIONS

4 Describe what is meant by the term 'sedentary lifestyle'. (1 mark)

5 Describe three possible negative effects of choosing to have a sedentary lifestyle. (3 marks)

Answers are on page 201.

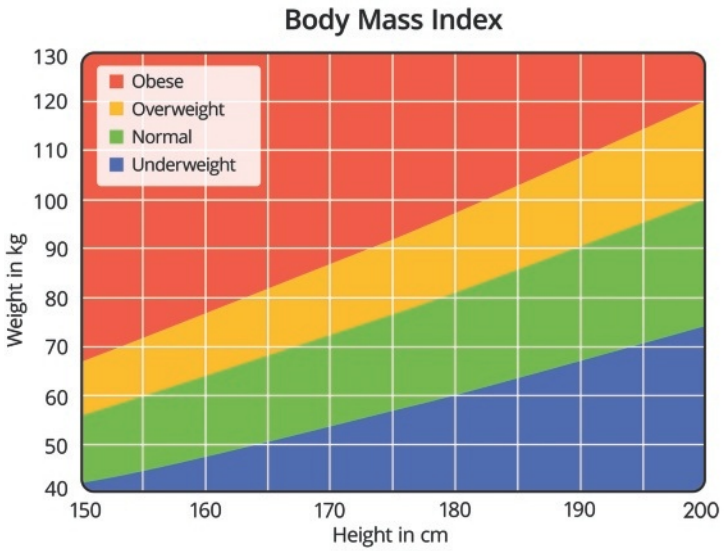
Key term

Obesity A term used to describe people with a large fat content – caused by an imbalance of calories consumed to energy expenditure. BMI of over 30 or 20 per cent or more above ideal weight for height.

Obesity and how it may affect performance in physical activity and sport

'**Obesity**' is a term used to describe people with a high body fat content – usually over 40 per cent body fat. It is caused by an imbalance of calories consumed compared to energy expenditure. Obesity is used to classify people with a body mass index (BMI) of over 30, or 20 per cent or more above ideal weight for height. In simple terms, BMI compares your weight to your height.

Although body mass index is not something you specifically need to know, it is a good measure of whether someone is obese or not. A body mass index chart can show you if you are the correct weight for your height, as shown on the next page.

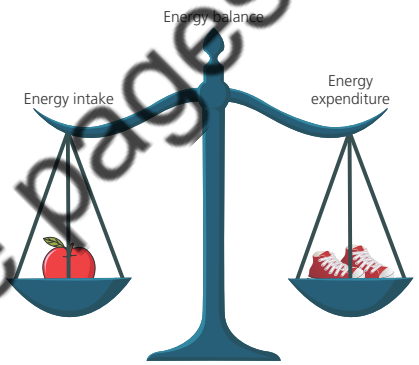


▲ **Figure 6.8** Body mass index chart.

The general classifications for an individual's BMI are:

- a score of less than 20 = underweight
- a score of 20–25 = correct weight
- a score of 25–30 = overweight
- a score of 30+ = obese.

Being significantly overweight can affect sporting performance, but it can also affect all three aspects of health and wellbeing (physical, mental and social).



▲ **Figure 6.9** In simple terms, you will increase in body weight if your energy intake is greater than your energy expenditure.

Obesity and its effects on fitness

It may seem obvious, but carrying a large fat content can affect performance. Although performance in some activities can actually improve due to a large fat content (for example, sumo wrestling), the effect of being obese is generally negative as it can limit different components of a person's fitness.

Obesity can affect fitness by:

- limiting stamina/cardio-vascular endurance – thus making it difficult to perform any activities of a long duration
- limiting flexibility – making it difficult for performers to use a full range of movement at joints when attempting to perform skills
- limiting agility – making it difficult to change direction quickly
- limiting speed/power – making it hard to react quickly enough or to produce force.

Obesity and its effects on health and wellbeing

Just as obesity can negatively affect fitness, it also has far-reaching negative effects on a person's health and wellbeing. Being obese will affect all three components of health and wellbeing (physical, mental and social).

How obesity can cause ill health (physical):

- It contributes to the development of cancer.
- It contributes to heart disease/heart attacks.
- It contributes to an increase in blood pressure.
- It contributes to the development of diabetes.
- It causes cholesterol levels to rise.
- It can lead to injury.
- It can make the individual feel that they cannot comfortably enjoy activities (wellbeing).

How obesity can cause ill health (mental/emotional):

- It can lead to depression.
- It can cause a loss of confidence.
- It can make the individual feel like they can't contribute to society (wellbeing).

How obesity can cause ill health (social):

- It can lead to an inability to socialise.
- It may make the individual feel unable to leave home.
- It may make the individual conscious of how they look and, therefore, uncomfortable in social situations (wellbeing).

Rapid recall

As you can see, the physical effects of obesity are numerous. However, you can remember that the physical effects of obesity are **BAD**:
Blood pressure increases
Attacks of the heart can occur
Diabetes may develop

Check your understanding

4 In pairs, try to remember one negative effect that obesity may have on each of the three aspects of health and wellbeing (physical/mental/social). Then aim to make a list of negative effects.

PRACTICE QUESTIONS

6 Define 'obesity' and explain one negative effect that it could have on mental health and wellbeing. (2 marks)

7 Explain one negative consequence that obesity can have on a person's fitness. (1 mark)

8 Evaluate the effects of a sedentary lifestyle for someone who decides to start taking part in a team game activity. (6 marks)

Answers are on pages 201–2.

Key term

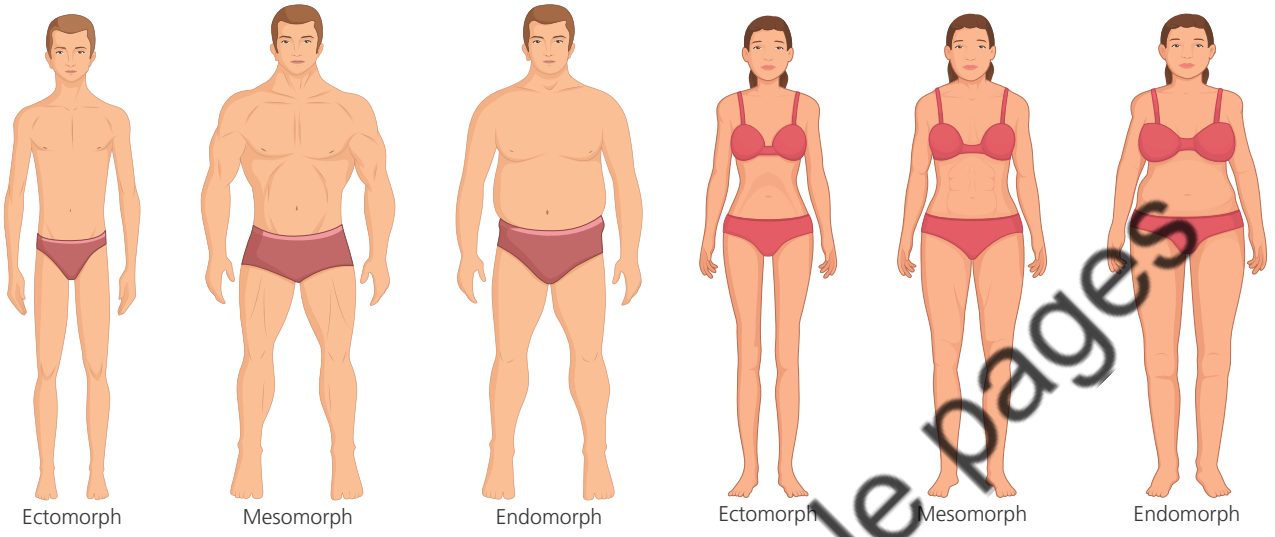
Somatotype A classification of body type – ectomorph, endomorph or mesomorph.

Somatotypes

Using **somatotypes** is a method of classifying body types. Three distinctive somatotypes (body shapes) were proposed by William Herbert Sheldon in the 1940s. The particular types of human body shape/physique were classed into the following somatotypes:

- ectomorph
- endomorph
- mesomorph.

These three somatotypes are extremes; that is, most people do not necessarily display extreme levels of one body type. Many people have characteristics of two or possibly a mixture of all three of these shapes.



▲ **Figure 6.10** Somatotypes in men and women.

Somatotypes for sport

In trying to understand what specific body type is best for an activity, you need to appreciate the characteristics of each somatotype classification and the demands of any given activity. It can be argued that modern-day sport often necessitates a particularly well-developed level of specific fitness with a greater need for strength. Therefore, the link of extreme body shapes to particular sports can be tenuous, as most athletes will display a mixture of characteristics. However, the demands of an activity often lead it to suiting a particular body type.

Ectomorph

An ectomorphic body shape is usually characterised by:

- very thin and lean (usually tall)
- narrow shoulders, hips and chest
- not much fat/muscle
- long arms and legs
- thin face and high forehead.

The thin, lean and tall body shape of an ectomorph is often beneficial for activities where the characteristics of being tall and lean are advantageous. Activities which tend to suit an ectomorphic body shape include:

- high jump
- long jump
- tennis
- endurance activities; for example, marathon.

Study hint

You should be able to identify the most suitable body type for particular sports (or positions within a sport) and provide reasons for your choice. Remember that body types can be mixed, e.g. swimmers are often ecto/mesomorphic (tall and muscular).

Key terms

Ectomorph A somatotype characterised by being tall and thin with narrow shoulders and hips.

A marathon runner may well benefit from having ectomorphic characteristics as they do not carry much weight (fat and/or muscle). However, for an activity like long jump, which requires power and speed, athletes may well have worked on developing some muscular bulk and therefore display an element of being slightly mesomorphic as well. Equally, an endomorph body type may suit the demands of events like shot put or discus, whereby the bulk of the body can be used to create force behind the object being thrown.

Modern sprinters, tennis players and some team-sports performers often display the characteristics of an ecto/mesomorph. Ex-Olympian Usain Bolt is 195 cm (6 ft 5 inches) tall and his long frame characterises elements of an ectomorph. He did, however, work on building up some muscular bulk to provide him with the mesomorphic characteristics he needed for sprinting.

Modern-day tennis players are taller and leaner than ever. The characteristics of an ectomorph are beneficial in that serving has become an ever-increasingly important part of the game and serving from height can provide distinct advantages.

▲ **Figure 6.11** Ectomorph characteristics are frequently found in professional tennis players, such as (clockwise) Andy Murray, Ashleigh Barty, Rafael Nadal and Simona Halep.

Endomorph

An endomorphic body shape is usually characterised by:

- pear-shaped body
- higher content of fat
- fat round middle, thighs and upper arms.

The pear-shaped appearance of an endomorph can be beneficial for some activities that simply require bulk. Front row forwards in rugby are often an endomorphic shape, which benefits them when pushing the opposition in the scrum. Similarly, shot putters often display the characteristics of an endomorph, whereby sheer bulk is used in a powerful release of the shot. This is also the case for an activity like sumo wrestling.

▲ **Figure 6.12** Retired rugby prop Adam Jones used his endomorph characteristics on the field of play.

Mesomorph

A mesomorphic body shape is usually characterised by:

- a wedge or rectangular shape in men, an hourglass shape in women
- higher muscle content
- broad shoulders and thin waist.

The muscular nature of a mesomorph is excellent for producing power and strength. They are not necessarily overburdened with muscle (that is, can hardly move due to having so much muscle) but tend to have distinctive muscle definition in the chest and shoulders, creating a wedge-like body shape. Such a shape is beneficial in sprinting, whereby the force generated at the shoulders can allow the arms to 'pump' (allowing the legs to move faster). Equally, a weight-lifter will have high upper-body muscle bulk to provide the force to lift and hold a very heavy weight. Many rugby players (league and union) display mesomorphic characteristics, allowing them to generate force when making contact with their opponents.

Activity 3

In small groups, learn to appreciate the importance of the muscular upper body of a sprinter (mesomorph). Jog slowly on the spot. Start to pump your arms with power whilst trying to keep your legs jogging slowly. You should realise that the faster and more powerfully the arms work, the faster and more powerfully the legs work.

Key terms

Endomorph A somatotype characterised by a pear-shaped body with high fat content, wide hips and narrow shoulders.

Mesomorph A somatotype characterised by muscular appearance with wide shoulders and narrow hips.

Rapid recall

A simple way to remember the body types is by using the following:

- **M**esomorphic body shapes have a high **m**uscle **m**ass.
- Endomorph (end-**o**-morph) – you can accentuate the 'o' to suggest the body shape is like an 'O', or you can remember Homer Simpson, who regularly says 'Doh' and has an endomorphic body shape.
- Ectomorph (Ec-to) – referring to your neck to toe being a long distance; that is, it's a long (thin) distance from your 'Ec' (neck) to your 'to' (toe).

Check your understanding

5 Describe the three somatotypes.

Answers are on page 200.

PRACTICE QUESTIONS

9 Explain, with reference to a sporting activity of your choice, why an ectomorph body type may be beneficial. (3 marks)

10 Sprinters often have wide muscular shoulders and a low fat content. What body type is this?

A Mesomorph ☐
B Ectomorph ☐
C Endomorph ☑

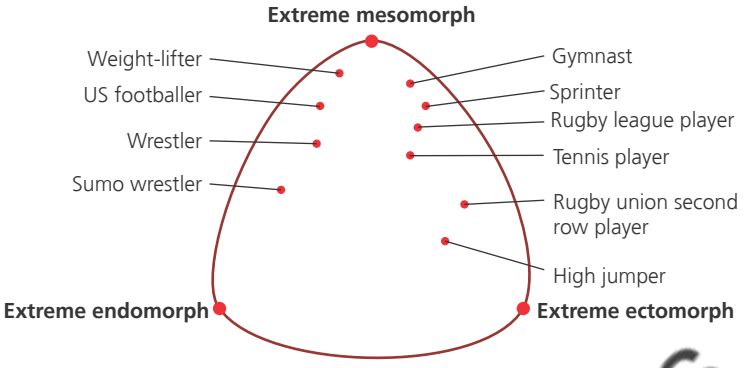
(1 mark)

11 Justify why an ectomorph body type may be suited to long-distance running. (2 marks)

Answers are on page 202.

Study hint

Make sure you know how many calories the average adult male and female need per day.



▲ **Figure 6.13** A representation of which somatotype tends to suit certain sports.

Activity 4

1 What body type would you say you were? Therefore, what sporting activities does your body shape stereotypically suit? Do you actually play/perform in these activities? Compare with classmates.

2 For the following sporting activities, suggest the stereotypical body shape that would suit that activity.

▼ **Table 6.2**

Activity	Body type required
Hammer throw	
Pole vault	
400 m sprint	
Marathon	

Answers to question 2 are on page 203.

Energy use, diet, nutrition and hydration

Kilocalories or calories (energy from food) are important for providing energy to carry out everyday activities and allow the body to function normally. Our bodies require energy for everything we do – for growth, repair, development and movement, especially when performing activities like running, swimming and walking.

Energy is measured in calories or kilocalories (kcal). These calories are obtained from the food and drink we consume. Therefore, the more calories we consume through our food, the more energy we have to use. If we do not use the calories, they get stored in the body, causing weight gain.

Average calorie requirements

The average adult male requires 2500 kcal/day and the average adult female requires 2000 kcal/day. However, these figures are dependent upon several factors:

- age of the individual (after age 25, the calorie needs of individuals start to fall)
- gender (as you can see, men usually need more calories)
- height of the individual (taller people tend to require more calories)
- energy expenditure (in other words, how much exercise the individual does – the more exercise, the more calories are required)
- basal metabolic rate (BMR). This is basically how fast energy is being used. It can vary from individual to individual.

It may seem obvious, but the calorie intake required to provide energy for a day will vary depending on what you are doing that day. Some top-class athletes need to eat much more than the average suggested intake in order to cope with the demands of their training schedule.

▲ **Figure 6.14** Olympic swimming legend Michael Phelps was rumoured to consume as many as 12 000 calories a day during his gruelling training schedule in preparation for the Olympics.

✔ Check your understanding

6 What is the suggested calorie intake per day for an average adult male and adult female?

Answers are on page 200.

It is interesting to note that an individual uses approximately 1 calorie per minute when sleeping, 3–4 when walking and 8–10 when jogging fast.

Nutrition – reasons for having a balanced diet

The food and drink you consume contain calories but are also made up of varying constituents. A **balanced diet** is eating the right amount of calories to deal with the energy that will be needed (suitable intake to match energy expenditure/exercise). However, it is also eating different food types to provide suitable nutrients, **vitamins** and **minerals**. Minerals are inorganic substances which assist the body with many of its functions; for example, calcium for bone formation. Vitamins are organic substances that are required for many essential processes in the body; for example, Vitamin A for structure and function of the skin.

Key terms

Balanced diet Eating the right amount (for energy expended)/ the right amount of calories/ eating according to how much you exercise/eating different food types to provide suitable nutrients, vitamins and minerals.

Vitamins Organic substances that are required for many essential processes in the body.

Minerals Inorganic substances that assist the body with many of its functions.

▲ **Figure 6.15** An English breakfast, Cornish pasty for lunch and fish and chips for an evening meal. These are popular British meals but would they constitute a 'balanced diet', providing the body with the nutrients, vitamins and minerals it needs?

Aiming for a balanced diet

Unfortunately, there is no one food that contains all the nutrients the body needs. Some foods have particular properties which benefit the body:

- High-fibre cereals and whole grains provide fibre, which prevents constipation and can help reduce blood cholesterol (fatty deposits).
- Milk, cheese and other dairy products provide calcium (a mineral), which is good for nerve and muscle function as well as teeth and bone growth and repair.
- Foodstuffs rich in iron (a mineral) like liver help the immune system and assist in the production of red blood cells, which carry oxygen.
- Vitamin A (for skin function and growth) is found in dairy products like cheese.
- Oily fish, eggs and butter provide vitamin D to help strengthen bones.
- Vitamin C is found in citrus fruit, broccoli and liver and aids the immune system, skin elasticity and blood vessel function.
- Various types of vitamin B are found in whole grains, nuts, eggs and fish and assist with the functions of the body.

A truly 'balanced' diet contains lots of different types of food and would normally involve an individual consuming a mixture of carbohydrate, protein and fat from a variety of sources. The ideal mix of different foods should also include green vegetables and fruit to provide the suitable nutrients, vitamins and minerals required. As a rough guide, you should aim for five portions of fruit and vegetables per day. When measuring vegetables, a 'fist-sized' portion is often regarded as one portion. The ideal mix of foods is sometimes referred to as the 'seven classes of food': carbohydrate, fat, protein, fibre, vitamins, minerals and water.

Activity 5

Discuss last night's evening meal with a partner. Did either of you consume all seven of the classes of food? Did you manage to consume five portions of fruit and vegetables yesterday? In France, the government recommends ten portions of fruit and vegetables a day!

▲ **Figure 6.16** A mix of fruit and vegetables provides the body with vitamins and minerals.

So why should you strive to have a balanced diet?

- Unused energy is stored as fat, which could cause obesity (particularly saturated fat found in deep-fried food).
- Suitable amounts of energy should be consumed to be made available for the exercise and activity carried out.
- The human body needs nutrients for energy, growth and hydration (see 'Water' on page 152).

PRACTICE QUESTIONS

12 An adult man averages a daily intake of 3500 kcal per day. Is this too much or too little based on recommended guidelines? Justify your answer. (2 marks)

13 If an adult female is in training for an event, why might she eat and drink more calories than the recommended daily intake? (2 marks)

Answers are on page 202.

Check your understanding

7 What are the seven classes of food? What is a truly 'balanced' diet?

Answers are on page 200.

▲ **Figure 6.17** Pasta is a food source rich in complex carbohydrate – providing energy.

Carbohydrates, fat, protein, vitamins and minerals

As you have discovered already, a balanced diet contains seven elements: carbohydrate, fat, protein, fibre, vitamins, minerals and water. With specific reference to carbohydrates, fat and protein, the recommended percentages that your diet should contain are:

- 55–60 per cent carbohydrate
- 25–30 per cent fat, and
- 15–20 per cent protein.

Study hint

Make sure you know the percentage recommendations for carbohydrate, fat and protein.

Carbohydrates

Carbohydrates are the main and preferred energy source for all types of exercise, of all intensities. The body requires a supply of glucose as an energy fuel and carbohydrate acts as the main source of glucose. Thus, for an athlete requiring energy, carbohydrate is a very important part of their diet. There are many types of carbohydrate (simple and complex) that can be consumed. Bread, pasta and potatoes provide valuable sources of starch, which is a complex carbohydrate.

Key terms

Carbohydrate Food source that acts as the body's preferred energy source.

Fat Food source that provides energy at low intensities.

Fat

Fat is also an energy source and helps to carry vitamins in the body; for example, vitamin A. It provides more energy than carbohydrates – in fact, more than double the amount that carbohydrate provides. The key, however, is that fat can only be used as an energy source at low intensity; for example, walking, light jogging and so on. Although fat is a concentrated energy source, it does come in two forms – saturated fat (usually animal fat) and unsaturated fat (usually vegetable fat/oils).

Study hint

Don't forget that fat can provide more energy than carbohydrate BUT only when you are working at a low intensity.

Although many people perceive fat as a bad or unhealthy part of a diet, you do in fact need to consume 25–30 per cent fat within your normal diet. However, a high fat intake (particularly saturated fat) is strongly linked to many health risks. These include:

- high cholesterol
- heart disease
- narrowing of arteries due to fat deposits.

▲ **Figure 6.18** Saturated fat tends to be derived from animal sources and can cause health risks.

▲ **Figure 6.19** Eggs and dairy products are rich in protein.

Key term

Protein Food source which is predominantly for growth and repair of body tissues.

Protein

Protein is used predominantly for growth and repair of body tissues. It also has a small part to play in providing energy. The main sources of protein within the diet are meat, eggs, fish, dairy products, nuts and cereals. For some athletes, particularly those who lift weights and do strength/power activities, a diet rich in protein is beneficial to help them with the development and repair of muscle tissue.

Activity 6

Take note of your daily intake of food. Using the wrappers and packaging, try to keep track of the amount of carbohydrate, fat and protein you consume. Does your intake conform to the recommended levels? You could also try to design a suitable daily intake containing the recommended percentages of carbohydrate, fat and protein.

Vitamins and minerals

Vitamin and mineral intake comes from foodstuffs such as fruit and vegetables. Vitamins and minerals are needed for maintaining the efficient working of body systems and general health.

Vitamins are organic substances that are required for many essential processes in the body; for example, vitamin A for structure and function of the skin. Minerals are inorganic substances which assist the body with many of its functions; for example, calcium for bone formation.

Water

Water consumption is often neglected by many people, but it is a vital component of a healthy diet. As water makes up more than half of the human body, it is necessary to maintain **hydration** levels (water balance) as it assists in how the body functions generally. It helps with reactions and lubrication and also plays a big part in maintaining correct body temperature. It is also important to note that the amount of water you should drink a day depends on several factors:

- the environment you are in – for example, you would need more water in a desert
- the temperature – the hotter it is, the more you sweat and therefore you need more water
- the amount of exercise/activity you are doing – exercising means that you need to replace water (**rehydration**).

It is vital that water consumption prevents **dehydration**. This is when there is an excessive loss of body water, interrupting the functioning of the body.

It is important to remain hydrated as it prevents the effects of dehydration. Dehydration in the body has many harmful effects:

- The blood thickens (increased viscosity), which slows blood flow.
- The heart rate increases, which means that the heart has to work harder. This can cause an irregular heart rate (rhythm).
- The body temperature is likely to increase, meaning that the body may overheat.
- Reaction time increases. In other words, it gets slower and general reactions are poorer. This, of course, means that decisions made may be negatively affected.
- An individual may suffer muscle fatigue and/or muscle cramps.

Study hint

Make sure you are aware of why hydration is necessary.

Study hint

Although this section provides examples of vitamins and minerals, you are not required to know about the role of specific vitamins and minerals.

Key terms

Hydration Having enough water (water balance) to enable normal functioning of the body.

Rehydration Consuming water to restore hydration.

Dehydration Excessive loss of body water, interrupting the functioning of the body.

▲ **Figure 6.20** The recommended daily intake of water is approximately eight large glasses a day to maintain hydration levels.

Rapid recall

Remember the dangers of dehydration as **THRST** (no 'I'):
TH – **TH**ickens (blood)
RS – **R**eactions **S**low
T – **T**emperature increases

PRACTICE QUESTIONS

14 Fat makes up 40 per cent of an adult's diet in a day. Suggest whether this conforms to the recommended daily intake. Justify your answer. (2 marks)

15 Explain three different negative consequences of becoming dehydrated. (3 marks)

16 Explain the main roles of carbohydrate, fat and protein. (3 marks)

17 Evaluate the importance of eating carbohydrates, fats and protein to a team sports performer. (6 marks)

18 Evaluate the importance of hydration to a discus thrower and a long-distance road cyclist. (9 marks)

Answers are on pages 202–3.

Activity 7

1 In the table below, match the correct term with the correct definition.

▼ **Table 6.3**

Term	Definition
Dehydration	Consuming water to restore hydration.
Hydration	Excessive loss of body water, interrupting the function of the body.
Rehydration	Having enough water (water balance) to enable normal functioning of the body.

2 Take note of the amount of water you consume in a 24-hour period. Does it conform to the recommended daily intake of eight large glasses? Compare your results with classmates.

Answers to question 1 are on page 203.

Check your understanding

8 What are the recommended percentages for carbohydrate, fat and protein within your daily diet?
9 What is the role of vitamins and minerals within the diet?
10 What do the terms 'hydration', 'dehydration' and 'rehydration' mean?

Answers are on page 200.

Summary

- Exercise can be used to suit the varying needs of different people.
- Exercise can affect physical, mental and social health and wellbeing.
- A sedentary lifestyle is a choice and has many negative effects.
- Obesity is a consequence of a sedentary lifestyle and can affect all aspects of health and performance.
- There are stereotypical and suitable body types (somatotypes) for particular sports (or positions within a sport).
- Energy is gained from food. If more energy is taken in than used, there will be weight gain (and vice versa).
- A balanced diet contains the seven classes of food: carbohydrate, fat, protein, fibre, vitamins, minerals and water.
- The following have specific roles: carbohydrates (energy), fat (energy), protein (growth and repair), vitamins and minerals (efficient functions).
- Water balance prevents dehydration and the resultant consequences; for example, thicker blood.

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