Unit 4: Principles of exercise, fitness and health

Course Notes

Unit 4 | Section 4 | Key safety guidelines when working with younger people

Considerations to bear in mind when working with younger people:

- Growth plate fractures.
- Flexibility.
- Cardiorespiratory adaptations.
- Anaerobic exercise.
- Exercise technique.
- Equipment concerns.
- Body temperature and hydration.

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Unit 4 | Section 1 | The effects of exercise on the body

- When exposed to a stimulus, the body adapts by improving itself.
- Exercise is a stimulus which affects the cardiorespiratory and neuromuscular systems.

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Unit 4 | Section 1 | Cardiorespiratory adaptations to endurance training

- Increased size of heart muscle and blood vessels.
- Increased stroke volume and cardiac output.
- Decreased resting heart rate and blood pressure.
- Increased haemoglobin.
- Increased diffusion of respiratory gases in the lungs.
- Increased vital capacity.

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Unit 4 | Section 1 | Other adaptations to endurance training

Important metabolic changes include decreased insulin resistance and improved glucose tolerance, reduced body fat, and increased maximal oxygen uptake.

Muscular adaptations include increased capillarisation and enzymatic function, increased size and number of mitochondria, and improved muscle tone.

Psychological changes include improved self-mastery and dissociation, decreased depression and anxiety and increased social interaction.

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Unit 4 | Section 1 | Short-term and long-term effects of exercise on blood pressure

Long-term effects

- 10 mmHg reduction in systolic and diastolic blood pressure.
- No reduction through strength training.
Short-term effects

- Linear increase in systolic blood pressure.
- Slight decrease in diastolic pressure; in hypertensives diastolic may rise.
- Increase in blood pressure with heavy weight training.

Unit 4 | Section 1 | Exercise and blood pooling

- During exercise, there is increased flow of blood to muscles.
- When exercise stops, blood continues to build up in muscles – ‘blood pooling’.
- Legs are commonly affected (influence of gravity).
- Look out for nausea, dizziness and fainting.

Unit 4 | Section 1 | Effects of exercise on bones and joints

- Short-term effects of exercise includes increased synovial fluid production.
- Long-term changes include stronger ligaments and increased bone density.

Unit 4 | Section 1 | Delayed onset muscle soreness (DOMS)

- Delayed onset muscle soreness (DOMS) is soreness or stiffness in muscles after exercise.
- Occurs 12-72 hours after exercise.
- Brought on by eccentric loading and increases in exercise intensity.

Unit 4 | Section 1 | Short-term and long-term effects of different types of exercise on muscle

When it comes to the low intensities and longer durations of aerobic exercise and muscular endurance training, we often see a change in Type I muscle fibres, including:

- Increased number and size of mitochondria.
- Increased capillarisation.
- Increased number of aerobic enzymes, stored glycogen and triglycerides.

High intensity, short-duration exercise, like strength and hypertrophy training, mainly affects Type II muscle fibres, and includes:

- Decrease in neural inhibition.
- Increase in muscle fibre diameter.
- Increase in glycolytic activity, allowing more work to be done anaerobically.
It's important for fitness instructors to combat postural issues through exercise programmes that include appropriate resistance training and stretching. At a fundamental level this process can be initiated by the inclusion of exercises that use:

- Full range of motion.
- Compound movement patterns.
- Free-standing postures.
- Free weights and cables.
- A balance of pushing and pulling exercises.
- Dynamic and developmental stretches.

Fitness can be defined in many different ways. As a concept it's difficult to provide a definitive definition, because fitness means different things to different people. With this in mind, it may be easier to adopt a more generalised definition and define fitness as ‘the successful adaptation to the stresses of one's lifestyle’, or ‘the ability to carry out everyday tasks with vigour and without excess stress or fatigue’.

There are five main components of fitness:

1. Physical fitness (health-related and skill-related).
2. Mental and emotional fitness.
3. Medical fitness.
4. Nutritional fitness.
5. Social fitness.

As fitness instructors, our main focus will be on physical fitness.

Cardiovascular fitness is the ability of the heart, lungs and muscles to take in, transport and utilise oxygen during exercise. Performing physical activity means the pulse quickens and breathing gets deeper. The cardiovascular system’s efficiency will be improved through regular aerobic training.

Muscular strength can be defined as the maximal amount of force a muscle or group of muscles can generate during one contraction. The development of muscular strength is useful for producing a greater maximal force when required, and for efficient execution of everyday sub-maximal tasks.

Muscular endurance can be defined as the ability of a muscle or group of muscles to contract repeatedly for extended periods of time without fatigue. The vast majority of everyday situations that require an individual to exert force also require muscular endurance.

Flexibility can be defined as the range of movement about a joint or series of joints. It is important that individuals develop and maintain flexibility to ensure an appropriate range of motion and freedom of movement at all joints. Examples of activities and sports that require flexibility include gymnastics, dance, yoga and everyday normal
In health-related fitness, body composition is used to describe the percentages of fat, bone and muscle in human bodies. The body fat percentage is of most interest because it can be very helpful in judging health as well as body weight.

Unit 4 | Section 2 | Skill-related fitness

- **Speed** is about quickness of movement, whether this is the legs of a runner or the arms of the shot putter. It is an integral part of every sport and can be expressed as any one or combination of maximum speed, elastic strength (power) and speed endurance.
- **Power** is the ability to exert maximum muscular contraction instantly in an explosive burst of movement. The two components of power are strength and speed, e.g. jumping or a sprint start.
- **Reaction time** is the ability to respond quickly to a stimulus. ‘Simple reaction time’ is the time taken between a stimulus and movement, and is ‘hardwired’ in the body and cannot be improved. ‘Choice reaction time’ is the time taken between stimulus and action that requires a choice and can be improved by practice and training.
- **Coordination** is the ability to move two or more body parts under control, smoothly and efficiently.
- **Balance** is the ability to control the body’s position, either stationary, e.g. a handstand; or while moving, e.g. a spring board diver during take-off.
- **Agility** is the ability to perform a series of explosive power movements in rapid succession in opposing directions, e.g. zigzag running or cutting movements.

Unit 4 | Section 2 | Factors that affect health- and skill-related fitness

- A person’s fitness is generally greatest during their twenties, but the speed at which the effects of ageing occur can be offset by regular physical activity. Age progressively results in weaker muscles, lighter bones, stiffer joints, slower reflexes and an increase in body fat.
- Males and females tend to be equal in terms of general fitness up to puberty. However, increased levels of testosterone mean that active males grow stronger due to their greater muscle mass. Males are generally larger than females and have larger lungs; therefore they have greater potential for transporting oxygen, which increases CV fitness abilities.
- An individual’s body type will have a significant impact on their ability to perform various physical tasks successfully, e.g. a tall thin person may be more suited to basketball than rugby.
- The body needs certain substances for energy, growth and repair, which are provided by the food eaten. A healthy diet with quality nutrition will help ensure that the body will function at its best.
- Running and training with weights are not the only ways to help fitness levels. Regular non-structured activities can also make significant contributions, such as walking the dog, cycling and gardening.
- A physical impairment may prevent part of the body functioning correctly, but targeted exercise can keep the rest of the body very fit. Many disabled people are first class athletes, which has been
consistently demonstrated in the Paralympics.

- The ability to perform diminishes with tiredness or illness. This could be caused by working too hard with insufficient rest.
- Medical and recreational drugs (alcohol, cigarettes) will both affect an individual’s fitness. Recreational drugs should be avoided when undertaking physical activity, while medical advice should be sought if drugs are being taken for health reasons.
- High levels of stress can lead to illness, causing health problems such as high blood pressure and heart disease.
- The quality of the air taken in will determine the amount of oxygen that can be utilised. Aerobic fitness can be significantly influenced by pollution, weather conditions, and altitude.

Unit 4 | Section 3 | Applying the principles and variables of fitness

Six fundamental principles of programme design:

1. Specificity.
2. Progressive overload.
3. Reversibility.
4. Adaptability.
5. Individuality.
6. Recovery.

Unit 4 | Section 3 | Fundamental principles of fitness – definitions

- Specificity: Any change in the body’s systems will be very specific to the type of training undertaken.
- Progressive overload: Muscles only get stronger when they are required to work harder than normal.
- Reversibility: This principle states that any improvements in fitness can only be maintained by regular exercise.

Unit 4 | Section 3 | Fundamental principles of fitness – definitions

- Adaptability: The body will react in accordance with the type of overload to which it is subjected.
- Individuality: Many clients may have similar general goals, but each is an individual with different physiological abilities.
- Recovery: Scheduled rest periods are a vital part of any exercise programme; this will include rest periods between exercises and also between sessions.

Unit 4 | Section 3 | Principles of FITT

- Frequency refers to the number of training sessions per week, month or year. A typical example for a beginner may be to start with a schedule of three sessions a week with a day’s rest in between. Competitive athletes may train up to 12 times a week. The number of exercise sessions per week should reflect current fitness level, time
available and any other commitments like family and goals.

- **Intensity** is an important aspect to be considered when designing an exercise programme. It is normally monitored using percentage of 1RM, RPE or heart rate, but there are additional factors that can influence the intensity, including lever length, speed, gravity, range of movement, time and type.
- The amount of **time** dedicated to the session is largely dependent upon the type of exercise, fitness level and amount of time the client is willing to dedicate to exercise. Cardiovascular training is normally measured in minutes, whereas resistance training is usually measured in reps and sets.
- The **type** of training can be manipulated, as long as the specificity of the adaptation does not move away from the training goal. This can be done, for example, by changing the aerobic exercise from running to cycling or the resistance exercise from a lateral raise to a shoulder press.

### Unit 4 | Section 3 | Levers, gravity, range of movement and speed

- Changing the lever arm can have an impact on exercise intensity and may be used as a progression.
- Use of free weights will increase the effects of gravity.
- Decreasing the weight slightly will allow for movement through a fuller range.
- Increasing the speed of an exercise increases the intensity.

### Unit 4 | Section 3 | Progression and periodisation principles

- Progression refers to gradual overload sufficient to elicit an adaptation.
- Periodisation is the planned progression of training variables over time.
- Initial progress achieved by beginners is often short-lived.

### Unit 4 | Section 3 | Recognising when to regress a training programme

Signs and symptoms of overtraining:

- Sudden poor coordination.
- Inability to concentrate.
- Reduction in performance.
- Irritability/oversensitivity to criticism.
- Disrupted sleep patterns.
- General lethargy.
- Susceptibility to colds/illness.

### Unit 4 | Section 3 | How to regress a training programme

How to regress a training programme: reduce the weight being lifted; reduce the length of the session; reduce the frequency of exercise sessions. Remember, it’s not necessary to regress every aspect of a training programme if overtraining is suspected. It may be sufficient to reduce just a few of the variables.
Unit 4 | Section 4 | Contraindications and guidelines for special populations

- Contraindications exist whenever there is an increased risk of harm in an activity.
- Contraindications are identified during the client screening process.
- Referring medical professionals may give guidance on any action deemed appropriate.
- Special considerations may need to be given to certain population groups.

Unit 4 | Section 4 | Key safety guidelines when working with older people

- 50+ is the current internationally recognised age at which there is significant reduction in the safety margins relating to exercise.
- Pre-exercise screening is essential to ensure exercise professionals meet their duty of care.
- Best-practice guidelines are for 50+ individuals who are asymptomatic, or have little experience of exercise.
- Relaxation of these guidelines for individuals who are frequently physically active and asymptomatic is at the client’s own risk.

Unit 4 | Section 4 | Changes to body systems with age

- Decreased muscular strength: fewer, smaller and weaker fibres.
- Decreased power: fewer fast twitch, smaller, weaker and slower.
- Decreased bone density: thinner, more brittle bones and less ability to withstand fracture.
- Lower aerobic endurance: fewer capillaries, less elastic vessels, and reduced intake, uptake and utilisation of oxygen.
- Reduced balance and coordination: less sensory input and less postural stability, less coordination and lower ability to prevent a trip turning into a fall.
- Reduced flexibility and mobility: stiffer joints, reduced range and ease of movement, and less ability to perform activities of daily living.

Unit 4 | Section 4 | Suggested exercise guidelines for adults aged 50+

- Complete a recommended pre-exercise health screening questionnaire.
- Spend longer warming up than younger clients.
- Build in a longer, and more gradually tapered, cool-down after aerobic training.
- Keep the intensity of all training components to a challenging but health-related level.
- Focus on correct technique.
- Take more time during transitions.
- Avoid extreme ranges of motion.
- Simplify exercise.
Unit 4 | Section 4 | General guidelines for prenatal and postnatal clients

- Start with 15 minutes of continuous aerobic activity, if the client is new to exercise.
- Restrict exercise sessions to no longer than 45 minutes.
- Maintain adequate hydration during exercise.
- Avoid exercising in very hot or humid conditions.
- Consume adequate calories.
- Exercise according to how they feel.

Unit 4 | Section 4 | Exercises to avoid during pregnancy

- Exercising in the supine position after 16 weeks.
- Exercising prone.
- Prolonged motionless standing.
- Heavy, isometric resistance work above the head.
- Resisted leg abduction and adduction.
- Loaded forward flexion.
- Rapid changes of direction.
- Uncontrolled twisting.
- Exercise that carries a risk of falling.

Unit 4 | Section 4 | Reasons for stopping exercise and referral

Pregnant women should immediately stop exercising if they experience:

- Dizziness, faintness or nausea, bleeding or leakage of amniotic fluid.
- Contraction type pain, or unexplained pain in the back, pelvis, buttocks or legs.
- Excessive shortness of breath or chest pain.

Refer to a health professional if presented with any of the following symptoms post birth:

- Stress incontinence or pelvic floor muscle weakness.
- Pain in the pelvic floor area or lower back.
- Abdominal muscle weakness, excessive abdominal doming, or abdominal muscle separation.

Unit 4 | Section 4 | Reasons for stopping exercise and referral

There are a number of hormonal and postural changes that can make pregnant women more vulnerable to injury. Many of these start from early pregnancy and become more significant as pregnancy progresses.

First, women in the child-bearing period are habitually forward flexed, which makes them more susceptible to neck and shoulder pain.

Instructors should also be aware that pregnant clients are vulnerable to injury, nausea, dizziness and fainting, and should therefore have up-to-date first aid skills.
There is a higher risk of certain conditions, like embolism, thrombosis and haemorrhage, during the first weeks after birth. So, women shouldn’t start exercising until they’ve got permission from their healthcare professional.

Physiological and postural changes of pregnancy last for several months after the birth, making women vulnerable to injury. High intensity or impact exercise in pregnancy and post-birth carries the risk of long-term pelvic floor dysfunction.

Sit up, crunch or oblique exercises are not an appropriate choice for the re-education of abdominal muscles post birth.

Unit 4 | Section 4 | Exercise considerations for younger people

- Growth plate fractures make up 15% of all childhood fractures, with the greatest incidence among 14-16 year old boys and 11-13 year old girls. It is extremely important to avoid excessive training, including playing too much of one sport. Too many high impact moves on the spot should also be avoided.
- Caution should be taken when teaching any stretch exercise. Younger children will not have enough motor skills to develop their flexibility with good technique and therefore they risk injury by not understanding stretching to the point of ‘mild tension’. Consequently, it is imperative that stretching should only be encouraged to the point of mild tension.
- Although children are naturally aerobic, it’s important they take regular bouts of rest or slow down to lower intensities during exercise to allow them to cool off adequately. Children have smaller heart chambers and lower heart volumes than adults, resulting in a lower stroke volume than adults at rest and during exercise.
- Children are at risk of dehydration when exercising due to overheating. In the cold they lose heat more quickly due to their relatively large surface area compared to their mass. Instructors should give regular water breaks, provide less intense warm-ups and shorter cool-downs, and provide active rests in between intense bouts of exercise.
- The anaerobic capacity for boys and girls is not fully developed until around 20 years of age. This means that the natural fatigue mechanisms from intense work that adults possess do not exist to the same degree with children; this and the fact that they overheat more than adults is the major risk factor that instructors need to be aware of.
- Since their ‘body awareness’ and coordination are not generally as well developed as that of an adult, children require much closer supervision, especially when undertaking any sort of strength programme. The instructor should therefore begin any programme with non-complex, low resistance exercises which, where possible, duplicate everyday activities.
- The resistance machines in most gyms are designed to be ‘adult sized’ and have weight increments that are generally too large for young people. Free weights are a much better choice because they allow much smaller weight increases and their safe and effective use is not dependent on the size of the exerciser.

Unit 4 | Section 4 | Key safety guidelines when working with disabled people
Many disabled people find they experience barriers to accessing sufficient physical exercise for psychological, physical or social reasons. It is widely recognised that regular and planned physical activity in a safe and supportive environment may not only help disabled clients in the same range of ways as non-disabled clients, but it may also reduce the risk of additional disabling conditions, improve ability to perform activities of daily living, and maintain (or even improve) independence. Unfortunately, studies have shown that the majority of subjects with mobility limitations felt that fitness centres typically do not have the type of equipment or professional staff needed to assist them properly.

The Inclusive Fitness Initiative provides guidance and support to operators interested in welcoming disabled people into their facilities and to disabled people interested in getting active. This guidance is provided in line with their policies.

Unit 4 | Section 4 | Working with disabled people

- The instructor needs to appreciate that describing components of an exercise prescription for each condition can be difficult because of the various kinds of disability. Some disabilities are classified as progressive and will require careful monitoring over time; others may exhibit asymmetrical weakness, in which case the instructor should aim to improve the affected side.
- Spastic muscles are tight or rigid. Flexibility training is critical because many individuals with physical disabilities will have some degree of spasticity. However, before incorporating any flexibility into a programme, the instructor should seek authorisation from a trained medical authority on how to stretch a spastic muscle without causing injury.
- Muscular dystrophy is an example of a neurological condition. Muscles can become progressively weaker as a result of the decline in CNS function; to help offset this the programme should work on general fitness.
- Damage to sensory nerves occurs with many types of physical disability. This can result in a pressure sore if left untreated. The use of a wheelchair can increase the risk of developing pressure sores and the instructor should also make the client aware that the use of gym equipment may also bring similar risks.

Unit 4 | Section 5 | Safely monitoring exercise intensity

- Monitoring exercise intensity is necessary for the safety and effectiveness of the exercise session.
- It can provide a benchmark against which future sessions can be progressed.

Unit 4 | Section 5 | Heart rate monitoring

- Heart rate is the most common method of monitoring exercise intensity.
- Maximum heart rate is estimated using the equation: 220 – age.
Exercise intensity equivalent to 60%-90% of maximal heart rate is appropriate for most clients.
Beginners should exercise at the lower end of this range.

### Unit 4 | Section 5 | Rate of perceived exertion (RPE)

- RPE method was developed by called Gunnar Borg.
- It’s a scale of how hard an individual feels they are working when they exercise.
- The classic Borg scale rates effort between 6 and 20.

<table>
<thead>
<tr>
<th>Heart rate</th>
<th>RPE</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 90 bpm</td>
<td>&lt; 9</td>
<td>Very light</td>
</tr>
<tr>
<td>100 – 110</td>
<td>10 - 11</td>
<td>Light</td>
</tr>
<tr>
<td>120 – 130</td>
<td>12 - 13</td>
<td>Moderate</td>
</tr>
<tr>
<td>140 – 160</td>
<td>14 - 16</td>
<td>Heavy</td>
</tr>
<tr>
<td>&gt; 160 bpm</td>
<td>&gt;16</td>
<td>Very heavy</td>
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</tbody>
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### Unit 4 | Section 5 | Talk test

- Light activity: Breathing lightly and talking easily.
- Moderate activity: Still talking comfortably, but breathing is a little deeper and quicker.
- Vigorous activity: Breathing deeper and harder, and talking with a little more difficulty.

### Unit 4 | Section 6 | Health benefits of physical activity

Current UK guidelines from the Department of Health state:

- Adults should aim to be active daily, aiming to accumulate at least 150 minutes of moderate intensity activity each week.
- Adults should exercise to improve muscle strength on at least two days a week.
- Adults should minimise time spent being sedentary for extended periods.
- Higher volumes of activity are associated with greater health benefits.

### Unit 4 | Section 6 | Physical activity and disease risk

- Higher levels of regular activity are associated with lower mortality rates for both older and younger adults. Physical activity appears to improve quality of life by enhancing psychological well-being and by improving physical function in persons compromised by poor health.
- Regular physical activity decreases the risk of cardiovascular disease mortality, particularly coronary heart disease mortality.
- Both the National Cancer Institute and Cancer Research UK strongly advocate physical exercise to help reduce the risk of all types of
cancer. Evidence to support this is most consistent for colon cancer, which is reduced by 40–50% among the most active individuals, compared with the least active.

- Physical activity is not associated with joint damage or the development of osteoarthritis. In those with osteoarthritis, exercise training can reduce impairment and improve function.
- Weight-bearing physical activity can reduce the loss of bone mass associated with age.
- Physical activity and strength training are likely to reduce the risk of falling in older adults.
- Inactivity contributes to the development of obesity. Physical activity may favourably affect body fat distribution. Regular activity protects from cardiovascular disease, even in the absence of weight loss.
- Physical activity is recommended by physicians to patients with non-insulin dependent diabetes mellitus because it increases sensitivity to insulin.
- Physical activity appears to relieve symptoms of depression and anxiety and improve mood. Regular physical activity may reduce the risk of developing depression.

**Unit 4 | Section 7 | The importance of healthy eating**

Modern day health complications and diseases that have a root cause or risk factor associated with food and diet:

- Metabolic disease, such as obesity and diabetes.
- Cardiovascular diseases, such as hypertension, heart disease and high cholesterol.
- Respiratory diseases, such as asthma.
- Some cancers.
- Some types of arthritis.
- Infertility.
- Eczema.

**Unit 4 | Section 7 | Role boundaries when offering nutritional advice**

- This qualification will allow instructors to offer generalised advice on the components of a healthy diet for normal healthy individuals.
- More serious diseases will require referral to an appropriately qualified and registered dietician or nutritional therapist.

**Unit 4 | Section 7 | Carbohydrates**

- Five nutrient groups: carbohydrate, protein, fat, vitamins, minerals.
- Three categories of carbohydrate: sugar, starches and fibre.
- Role of carbohydrate: provides the body with energy.

**Unit 4 | Section 7 | Proteins**

- Proteins are made from building blocks called amino acids.
Two important sources are animal and plant protein. Some amino acids can be made by the body. Proteins fulfil many functions including transport of substances in the blood, tissue growth and repair. Protein is particularly important to aid recovery after heavy and intensive training.

Unit 4 | Section 7 | Fats

Dietary fats occur in three basic categories, each of which is important to the body in order to maintain health and performance: saturated, monounsaturated and polyunsaturated.

- Saturated fat is mostly found in animal sources but is also present in some plant sources. They are important for the body’s cells and the nervous system, and good sources include meat, eggs, dairy products and coconut oil.
- Monounsaturated fat is found in animal and plant sources, and helps to protect from heart disease. Good sources include meat, olive oil, peanut oil and avocados.
- Polyunsaturated fat is found in fish and plant sources, and is important for cells and proper brain function.

Fats are an important component of cell membranes, help the body to use fat soluble vitamins, provide insulation, protect internal organs, and are a useful source of energy.

Unit 4 | Section 7 | Vitamins and minerals

- Vitamins are formed by plants and can be obtained in the diet by eating the appropriate plants.
- Minerals occur naturally in the soil and are drawn into plants.
- Colour and variety are important factors when making food choices.
- Vitamins and minerals are vital for normal growth, repair and daily functioning of the body.

Unit 4 | Section 7 | Hydration

- Water is essential for optimal health and performance.
- Water is found both inside and outside the body’s cells.
- Amount required depends on temperature, humidity, physical activity, and respiration rate.
- Functions of water include formation and maintenance of blood plasma and effective passage of substances in and out of cells.

Unit 4 | Section 7 | UK national food guidelines

The Eatwell Plate is supported by eight specific healthy eating tips stated by the Foods Standards Agency.

1. Base your meals on starchy foods.
2. Eat lots of fruit and vegetables (five portions per day).
3. Eat more fish (two portions per week; one oily).
4. Cut down on saturated fat and sugar.
5. Try to eat less salt, no more than 6g per day.
6. Get active and try to be a healthy weight.
7. Drink plenty of water (six-eight glasses per day).
8. Don't skip breakfast.

Unit 4 | Section 7 | UK national food model targets

The national food model also provides the following targets:

- Adult males should be consuming 2550 calories per day.
- Adult females should be consuming 1950 calories per day.

The total amount of calories should be divided across each of the macronutrients to achieve the following ratios:

- A minimum of 50% calories from carbohydrates.
- A maximum of 35% calories from fats.
- A minimum 55g of protein per day (9-15% of total calories).

Unit 4 | Section 7 | Recommended portion sizes

Macronutrients contain the following calories:

- **Carbohydrates**: 4 calories per gram.
- **Proteins**: 4 calories per gram.
- **Fats**: 9 calories per gram.
- **Alcohol** (not a nutrient): 7 calories per gram.

Unit 4 | Section 7 | Weight management and energy balance

- Weight management: actions to achieve or maintain an acceptably healthy level of body fat.
- When energy intake exceeds energy output, body fat and body weight increase.