
# Specification

## IAO Level 3 Diploma for The Gym Instructing and Personal Training Practitioner

Qualification Number: 603/6001/X

CIMSPA Endorsed | Professional Standards

Innovate Awarding is an Ofqual regulated awarding organisation with an innovative and dynamic approach. We develop off-the-shelf, customised and fully bespoke qualifications across a growing number of sectors – all on the Regulated Qualifications Framework (RQF).

Our portfolio is always growing, and we currently have qualifications in the following sectors:

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| **Active Leisure** | **Health and Social Care** |
| **Business and Management** | **Hospitality and** |
| **Catering Childcare** | **IT** |
| **Employability** | **Logistics** |
| **Retail** | **Education and Training** |

We currently offer over 120 qualifications and we're continuously developing and diversifying our portfolio. Please visit our website regularly to keep up to date www.innovateawarding.org

This document will be updated if there are any changes, so it is important to make sure you are working from the most up-to-date version, which is available to download from our website.

This specification also provides details on administration, quality assurance policies and the requirements as well as responsibilities that are associated with the delivery of vocational qualifications.

Innovate Awarding is recognised as an awarding organisation by the following qualifications regulators – Ofqual (England) and the Welsh Government (in Wales).

If you have any questions regarding qualifications in general, aspects of specific qualificationsor our quality assurance policies and procedures, visit our website where a lot more information is available.

If you cannot find what you are looking for on our website, please call or email our customer support team:

Telephone: 0117 314 2800
Email: contactus@innovateawarding.org

*"We work with a wide variety of organisations such as employers, training providers, FE colleges and Sector Skills Councils and develop off-the-shelf, customised and bespoke qualifications"*

## Qualification summary

| | |
|---|---|
| **Qualification Accreditation Number(QAN)** | 603/6001/X |
| **Qualification review date** | 30th June 2026 |
| **Guided Learning Hours(GLH)** | Minimum 396 hours |
| **Total Qualification Time(TQT)** | 620 hours |
| **RQF level** | Level 3 |
| **Qualification credit value** | 62 credits |
| **Minimum credits at/above level** | 42 credits |
| **Assessment requirements** | Portfolio of Evidence, Multiple Choice Examination<br><br>The units "A/617/1178 Anatomy and Physiology for Exercise" and "Y/617/1186 Applied Anatomy and Physiology" are assessed by externally assessed Multiple Choice Question (MCQ) examination. Centres will find documentation on how to deliver MCQ examinations on the QuartzWeb portal.<br><br>The MCQ tests consist of 40 questions. The learner must achieve a score of 24/40 to achieve a pass. This equates to 60%. The learner will have 60 minutes to complete the test.<br><br>Remaining units are internally assessed and internally quality assured by Centre staff and externally quality assured by Innovate AwardingExternal Quality Advisors (EQAs). |
| **Aims and objectives ofthe qualification** | The objective of this qualification is to provide learners with the skills and knowledge to engage, facilitate, educate and support clients in thegym environment. This qualification further develops learners' knowledge and skills to pursue a career as a personal trainer.<br><br>Focusing on key areas such as coaching clients towards their healthand fitness goals through the planning and delivery of |

creative and personalised exercise programmes and instruction, nutritional advice and overall lifestyle management.

**Entry guidance**

This qualification is suitable for those who work or wish to work within the active leisure sector. Some experience of gym-based exercises would be beneficial.

**Progression opportunities**

This RQF qualification is designed for individuals aged 16 over who want to complete an industry-recognised qualification and pursue a career within the sector. This qualification outlines the role and scope of a Personal Trainer and the essential knowledge and skills that are needed to meet the requirements of a Practitioner membership with CIMSPA.

Learners who achieve this qualification could progress into employment as a personal trainer either on a self-employed basis or within a gym or leisure organisation.

On completion of this qualification, learners can develop their knowledge and skills further with additional qualifications.

**Professional recognition**

The agreed industry prerequisite to become a Personal Trainer is to have achieved a CIMSPA endorsed educational product that meets the requirements for a Practitioner membership of CIMSPA. This qualification combines the Level 2 Gym Instructor and the Level 3 Personal Trainer standards and so the required prerequisite will be fulfilled upon completing this qualification. On completion of this qualification, learners will also meet the requirements of CIMSPA's professional standard for Safeguarding Adults and Adults at Risk (category 2) applicable to Personal Trainers and Gym Instructors.

**Funding**

For details on eligibility for government funding please refer to the following websites:
http://www.education.gov.uk/section96
https://www.gov.uk/government/organisations/skills-funding-agency

## Innovate Awarding

When you work with Innovate Awarding, you're working with an awarding organisation that sets itself apart – a dynamic company with a collaborative approach to doing business. We'reconsultative and innovative…everything that our customers say they want an awarding organisation to be.

We're easy to work with, committed and passionate about exceeding our customers' expectations. We're not tied down by bureaucracy and red tape and can think outside the boxand respond quickly to our customers' needs.

We have a Performance Pledge that details guaranteed response times. Copies of these canbe found on our website www.innovateawarding.org

## Feedback

Your feedback is very important to us. We're always open to suggestions when it comes to enhancing and improving our services, products and systems. Email us at contactus@innovateawarding.org or call us on 0117 314 2800.

## Complaints

If we do get things wrong, we'll make every effort to resolve your issues quickly and efficiently.If you'd like to raise a formal complaint, then we recommend you read our Complaints Procedure which can be found on our website http://www.innovateawarding.org/ .

## Fees

Our fee's structure is transparent and straightforward. Our fees are published on our website in a clear format with no hidden charges. Unlike other awarding organisations, we do not charge an annual centre fee. Visit our website to compare our fees.

## Enquiries and Appeals

We recognise that sometimes decisions are made that a centre (or learner) may wish to appeal. We have an Enquiries and Appeals Policy and Process on our website that sets out guidelines on grounds for appeal and the process.

## Data Protection

Innovate Awarding takes the protection of data seriously; we have a data protection statementoutlining how we and our centres, comply with the current legislation on data protection. Thisstatement can be found on our website.

## Equality and Diversity

Innovate Awarding is committed to giving everyone who wants to gain one of our qualificationsan equal opportunity of achieving it in line with current UK legislation (Equality Act 2010) and EU directives.

Centres are required, as conditions of approval, to use an equality and diversity policy that works together with ours and that they maintain an effective complaint and appeals process. We expect centres to tell learners how to find and use their own equality and diversity and appeals processes. For information, please visit our website.

## Reasonable Adjustment and Special Consideration

All learners must be treated fairly and equally and be given every opportunity to achieve our/the qualifications. A copy of our policy on Reasonable Adjustments and Special Considerations, and application form, can be found on our website.

## Malpractice and Maladministration

Innovate Awarding has a responsibility to do everything it can to prevent any malpractice or maladministration from occurring, and where it has already occurred, ensuring action is takenproportionate to the gravity and scope of the occurrence.

A copy of our policy and procedure on Malpractice and Maladministration is available on our website.

## Recognition of Prior Learning (RPL)

RPL recognises how the contribution of a learner's previous experience could contribute to a qualification or unit. Innovate Awarding have produced guidance on RPL and this can be foundwithin our Information and Guidance for Centres on our website.

**Please note the above is not a comprehensive guide to running IAO qualifications. Onceapproved centres must adhere to the Centre Agreement and Information and Guidancefor Centres.**

# The Regulated Qualifications Framework (RQF)

## What is the RQF?

The Regulated Qualifications Framework (RQF) is an Ofqual regulated system of cataloguing qualifications. Qualifications on the RQF can be found by their size or level. Qualifications at a given level can differ depending on their content and purpose.

All of Innovate Awarding's qualifications are on the RQF.

## Qualification Level

The level reflects the challenge or difficulty of the qualification. There are eight levels of qualification from 1 to 8, supported by three "Entry" levels.

## Qualification Size

The size of a qualification reflects the estimated total amount of time it would take the average learner to study and be assessed. The size of a qualification is expressed in terms of Total Qualification Time (TQT). The time spent being taught or supervised, rather than studying alone, is the Guided Learning Hours (GLH).

Qualifications can sit at different levels but require similar amounts of study and assessment. Similarly, qualifications at the same level can take different amounts of time to complete.

## Assessment Strategy

This qualification has been developed in line with CIMSPA's Professional Standards (https://www.cimspa.co.uk/standards-home/professional-standards-library) and covers theknowledge, skills and behaviours contained therein to confer occupational competence to the learner upon successful completion.

The qualification comprises both internal and external assessment as outlined in the table below. Internal assessment should be portfolio based and include practical observation records alongside other methods such as (not exhaustive) workbooks, case studies, professional discussions, witness statements and consultation documents.

| Unit title | Level | Assessment |
|---|---|---|
| A/617/1178 Anatomy and Physiology for Exercise | 2 | External: Multiple Choice Question Examination (MCQ) |
| F/617/1179 Maximising the Customer Experience in the Exercise Environment | 2 | Internally assessed |
| T/617/1180 Client Consultation and Lifestyle Management | 2 | Internally assessed |
| A/617/1181 Planning and Delivering Gym-Based Exercise Programmes | 2 | Internally assessed |
| F/617/1182 Cleaning and Maintenance within a Gym Environment | 2 | Internally assessed |
| Y/617/1186 Applied Anatomy and Physiology | 3 | External: Multiple Choice Question Examination (MCQ) |
| D/617/1187 Lifestyle Management and Motivation for Personal Training | 3 | Internally assessed |
| K/617/1189 Consultation, Assessment and Programme Design for Personal Training | 3 | Internally assessed |
| D/617/1190 Planning and Delivering Personal Training Programmes | 3 | Internally assessed |
| M/617/1193 Nutrition for Physical Activity | 3 | Internally assessed |
| T/617/1194 Business Acumen for Personal Trainers | 3 | Internally assessed |
| Y/618/1894 Safeguarding adults and adults at risk in a fitness environment | 3 | Internally assessed |

## Planning and delivery guidance

This section of the assessment strategy contains content and guidance for the delivery of this qualification.

Training providers must take steps to ensure their curriculum plans reflect the coverage of Innovate Awarding's syllabus in full, and that they have implemented strategies to ensure their learners have acquired the knowledge, skills and behaviours across the whole qualification, to the standard described, prior to assessment. Innovate Awarding's External Quality Assurance team will undertake verification activities to ensure that these requirements have been met.

The qualification covers the requirements for both Gym Instructing and Personal Training to support integrated delivery.

For the role of Personal Trainer sufficient time between engaging a client and final assessment needs to be allowed to show improvements in the client's lifestyle, health, and fitness. Learners must provide evidence that they have planned a progressive programme for a client ensuring effective integration of all exercises and physical activities to allow clients to achieve short, medium- and long-term goals. For example, to cover a 12-week period of delivery with evidence of a minimum of six sessions of 30 minutes duration.

Learners should demonstrate their ability to review client progress and make any necessary adaptations to the programme where goals are not being achieved, or new goals are identified.

The role of Gym Instructor requires sufficient time between engaging a client and final assessment needs to be allowed to show improvements in the client's lifestyle, health, and fitness.

There must be evidence that the learner has planned a gym-based programme over a period, for example a six-week programme, by applying the principles and variables of fitness to a range of activities to meet identified client goals and/or to achieve general fitness and health gains. This may be integrated into the delivery and assessment requirements for the Personal Trainer. Providers should ensure that learners are supported to engage participants and plan delivery to cover the full requirements of both roles as outlined within this specification.

Delivery of Y/618/1894 Safeguarding adults and adults at risk in a fitness environment must be face to face although that is not to say that the tutor must be physically present with learners. Technology may be used in the delivery of this unit, but this must be "live" i.e. through live webinars or one to ones led by their tutor.

## Assessment requirements

This section of the assessment strategy explains what must be covered within the learner's final submitted evidence. All elements should be scheduled to occur when the learner has reached the required standard to maximise their chances of a successful outcome and reflect their achievement. All work must be the learner's own and evidence authenticity.

Learners who do not meet the required standard for assessment should be allowed to retake their assessments and provided with feedback and further learning to support subsequent attempts. Further information on retakes for externally assessed is available in Innovate Awarding's Retakes and Resits policy.

## Theory-based elements

Learners must provide evidence that they have the knowledge and understanding specified by the theory-based elements of the specification.

This evidence may be in the form of the following examples:

- Written workbooks
- Digital voice recording (DVR)
- Viva/professional discussion/question and answer
- Exam (MCQ)
- Case studies
- Filmed presentation

The method/s that are selected must be appropriate for the criteria being assessed and meetlearner needs.

Workbooks must include questions that are written in such a way as to make clear to learners and assessors the length and breadth of answer required, based on the wording of the assessment criteria. This may be though the use of verb descriptors (i.e. if the assessment criteria asks for an 'explanation' the question asked must make clear that an explanation is the minimum expected requirement), or by ascribing number of marks to eachquestion.

Viva/professional discussion/question and answer must still produce evidence that can be submitted for IQA and EQA. This evidence may be DVR, filmed or a written transcript. A ticksheet will not be sufficient as evidence that the learner has met the assessment criteria requirements.

It may be possible that some assessment criteria and/or specific units can be assessed by means of a long or short answer test or Multiple-Choice Questions. This approach must be created in conjunction with Innovate Awarding Organisation and approved by them before use. Further guidance is available to centres who wish to

devise these types of assessments internally. Training Providers should note that these will not be permitted as an alternative to Innovate Awarding's external assessments. Mock assessments for these components will be available to help learners prepare.

## Competence-based assessments

Assessment decisions for competence-based elements must be made by an occupationally competent assessor who meets the qualification requirements outlined in the next section of this document. Practical assessment must be conducted where practicably possible in a real- world environment ideally, 'on the job'/at work. This could include; a gym, studio, sports hall, outdoors, client's home or other confined space. Where possible practical observations should be conducted with 'real clients'.

Competence based assessments must include:

- Client programme and observation
- Relevant screening and baseline tests

Some competence-based assessment criteria will generate written evidence and may beincluded within the learner's portfolio, for example:

- programme and session plans
- health and fitness testing results
- evaluations

These will be submitted as evidence for assessment and must be available for IQA and EQAas requested.

Other elements of learning will produce practically based evidence and may be includedwithin the learner's portfolio, for example:

- customer service
- professional conduct
- cleaning and maintenance
- client consultation
- session delivery

Practical evidence may take the form of:

- filmed evidence
- DVR
- witness testimony
- confirmation of achievement

## Use of filmed evidence or DVRs

Any filmed evidence requires the learner to introduce themselves on camera at the start of the clip, as well as give the date of recording. Footage must have reasonable sound and picture quality to enable others (assessor, IQA, EQA) to see and hear what is taking place. The footage produced must provide evidence of the achievement of identified assessment criteria and an accompanying reference sheet may need to be provided.

A DVR made by the assessor, or a witness can be submitted as evidence. Their spoken commentary must include the name of the learner and date of recording, be of reasonable sound quality and only reference relevant criteria. Commentary should not be a verbal narrative of everything the learner does if aspects included are not required by assessment criteria (e.g. do not include descriptions of the learner's every move if these elements are not in the specification as required as evidence).

It may be necessary to produce a reference sheet to accompany the DVR for ease of assessing and quality assuring.

## Witness Testimony

Witness testimony must be provided by an appropriately qualified and experienced professional. Evidence of their level of qualification and experience should be available to Innovate Awarding on request. Their written testimony must be personalised to the learner and should include a brief description of what was seen and/or heard that proves the learner met the identified assessment criteria.

The testimony provided by a witness will provide evidence against which the assessor will make their assessment decision. If insufficient evidence is produced by the witness, it may not be possible for the assessor to make a valid and reliable assessment decision.

## Simulation

Simulation may only be used as an assessment method where it is impractical to collect evidence in the workplace within an acceptable time frame, or within exceptional circumstances. These circumstances are restricted to situations where evidence cannot be generated through normal work activity and does not present naturally such as dealing with an emergency situation.

Should simulation be used it must be undertaken in a Realistic Working Environment (RWE). A RWE must "provide an environment that replicates the key characteristics of

the workplace in which the skill to be assessed is normally employed". The conditions of assessment must be the same as those found in the normal working environment, with similar demands, pressures and requirements.

Should simulation be used as an assessment method, the Centre concerned must seek, priorto its use, advice from the external verifier of the relevant awarding organisation regarding thevalidity of the method.

## Holistic assessment

Innovate Awarding encourage centres to take a holistic approach to assessment where possible. A holistic approach to assessment is one that:

- acknowledges that there is some element of repetition and overlap between units
- serves to reduce burden on learners and assessors by 'grouping' like assessment criteria together
- allows for assessment and evidence gathering across units in a 'horizontal' fashionrather than keeping assessment in a per-unit 'vertical' format
- enables a single piece of evidence to be submitted to meet multiple assessment criteria (sometimes from different units) in the one document or assessment method
- is led by the means of assessing, producing and documenting evidence rather thanbeing driven by the content and format of each unit
- may adopt a 'project-based approach' which enables learners to complete a set sequence of events (e.g. carry out client consultation, plan sessions, deliver sessions, show appropriate delivery techniques, review session) in an appropriate order, whilst producing and gathering evidence to be assessed, rather than workingthrough units individually

# Occupational competence requirements

## Tutors, Assessors and Quality Assurance Staff

Required Criteria

All Tutors, Assessors and Quality Assurance Staff must:

- Possess a Fitness or Gym Instructing and/or Personal Training specific qualificationequivalent to the qualification or units being taught / assessed or quality assured
- Have relevant industry experience
- Have knowledge of and a commitment to the Exercise and Fitness Code of EthicalPractice
- Demonstrate active involvement in a process of industry relevant Continued Professional Development during the last two years (this may be discipline/ contextspecific or relevant to tutoring assessing or quality assurance)

## Tutors

Tutors must hold or be working towards a teaching qualification.The following are acceptable:

- Level 3 Award, Level 4 Certificate or Level 5 in Education and Training
- Level 3 Award in Preparing to Teach in the Lifelong Learning Sector (PTTLS)
- Level 4 Award in Preparing to Teach in the Lifelong Learning Sector (PTTLS)
- Level 4 Certificate in Teaching in the Lifelong Learning Sector (CTTLS)
- Level 5 Diploma in Teaching in the Lifelong Learning Sector (DTTLS)Relevant predecessor NQF tutor qualifications

## Assessors

Assessors must hold or be working towards any of the following:

- Level 3 Award in Assessing Vocationally Related Achievement
- Level 3 Award in Assessing Competence in the Work Environment
- Level 3 Certificate in Assessing Vocational Achievement
- A1 (previously D32, D33) or
- Relevant predecessor NQF assessor qualifications

Assessors holding historical qualifications such as unit A1, unit A2, and/or unit D32, and/or unit D33, are required to demonstrate that they meet the same standards of assessment practice as set out in the Learning and Development National Occupational Standard - Standard 9 Assess Learner Achievement. Suggested evidence that demonstrates this requirement may include CPD records, a Personal Development Plan (PDP) and/or records of work completed.

## Internal Quality Assurers

Internal quality assurers must hold or be working towards any of the following:

- Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice
- Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processesand Practice
- V1 (previously D34)
- Relevant predecessor NQF internal quality assurance qualifications

Internal verifiers holding historical qualifications such as unit V1 – Conduct internal quality assurance of the assessment process and/or unit D34, are required to demonstrate that they meet the same standards for monitoring assessment processes and decisions as set out in the Learning and Development National Occupational Standard – Standard 11 Internally monitor and maintain the quality of assessment (Appendix 2). Suggested evidence that demonstrates this requirement may include CPD records, a Personal Development Plan (PDP) and/or records of work completed.

It is recommended that internal quality assurance staff also hold a relevant assessing qualification as detailed above.

## External Quality Assurers

External quality assurers must hold or be working towards any of the following:

- Level 4 Award in the External Quality Assurance of Assessment Processes andPractice
- Level 4 Certificate in Leading the External Quality Assurance of Assessment Processes and Practice
- V2 (previously D35)

External verifiers holding historical qualifications such as unit V2 – Conduct external quality assurance of the assessment process and/or unit D35, are required to demonstrate that they meet the same standards for monitoring assessment processes and decisions as set out in the Learning and Development National Occupational Standard – Standard 12 Externally monitor and maintain the quality of assessment (Appendix 3). Suggested evidence that demonstrates this requirement may include CPD records, a Personal Development Plan (PDP) and/or records of work completed.

It is recommended that external quality assurance staff also hold a relevant assessing and internal quality assurance qualifications as detailed above.

All new assessors and quality assurance staff must be given a clear action plan for achieving the appropriate qualification(s) and should be countersigned by an appropriately qualified individual until the qualification(s) are achieved.

## Desirable Criteria

It is desirable that all Assessors and Quality Assurers should hold professional registration.

## Qualification Structure

Learners must complete all mandatory units to gain the required 62 credits.
The Minimum Guided Learning Hours (GLH) for this qualification is 396 hours.
The Total Qualification Time (TQT) for this qualification is 620 hours.

## Unit Structures - All units are listed below.

## Mandatory units

| Unit ref | Unit title | Level | Credit value | GLH |
|---|---|---|---|---|
| A/617/1178 | Anatomy and Physiology for Exercise | 2 | 6 | 40 |
| F/617/1179 | Maximising the Customer Experience in the Exercise Environment | 2 | 4 | 25 |
| T/617/1180 | Client Consultation and LifestyleManagement | 2 | 4 | 26 |
| A/617/1181 | Planning and Delivering Gym-BasedExercise Programmes | 2 | 5 | 30 |
| F/617/1182 | Cleaning and Maintenance within a Gym Environment | 2 | 1 | 4 |
| Y/617/1186 | Applied Anatomy and Physiology | 3 | 5 | 35 |
| D/617/1187 | Lifestyle Management and Motivationfor Personal Training | 3 | 5 | 29 |
| K/617/1189 | Consultation, Assessment and Programme Design for Personal Training | 3 | 9 | 62 |
| D/617/1190 | Planning and Delivering Personal Training Programmes | 3 | 8 | 44 |
| M/617/1193 | Nutrition for Physical Activity | 3 | 5 | 33 |
| T/617/1194 | Business Acumen for Personal Trainers | 3 | 5 | 29 |
| Y/618/1894 | Safeguarding adults and adults at risk ina fitness environment | 3 | 5 | 33 |

| | |
|---|---|
| **Title:** | **A/617/1178 Anatomy and Physiology for Exercise** |
| **Level:** | **2** |
| **Credit Value:** | **6** |
| **GLH:** | **40** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand the structure and function ofthe cardiorespiratory system | 1.1 Describe the structure and functions of the:<br>• heart<br>• blood vessels<br>• lungs<br>1.2 Describe how blood moves through the four chambers of the heart<br>1.3 Describe the difference between systemic and pulmonary circulation<br>1.4 Outline systolic and diastolic blood pressure<br>1.5 Identify blood pressure classifications<br>1.6 Identify the main muscles involved in breathing<br>1.7 Describe the passage of air through the respiratory tract<br>1.8 Explain the process of gaseous exchange including:<br>• internal respiration<br>• external respiration |
| 2. Understand the structure and function of the skeleton | 2.1 Describe the functions of the skeleton<br>2.2 Identify the bones of the:<br>• axial skeleton<br>• appendicular skeleton<br>2.3 Explain the classification of bones<br>2.4 Describe the structure of a long bone<br>2.5 Explain the stages of bone growth<br>2.6 Describe posture, including:<br>• curves of the spine<br>• neutral spine alignment<br>• potential ranges of motion of thespine<br>• **postural deviations** |

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| 3. Understand the **joints** of the skeleton | 3.1 Explain the classification of joints<br>3.2 Describe the structure of synovial joints<br>3.3 Describe the types of synovial joints and their range of motion<br>3.4 Describe joint movement potential and joint actions<br>3.5 Describe the anatomical planes of movement<br>3.6 Explain the effect of exercise variables on biomechanics and kinesiology |
| 4. Understand the muscular system | 4.1 Describe the characteristics and functions of the three types of muscle tissue<br>4.2 Describe the structure of skeletal muscle<br>4.3 Describe the structure of the different types of connective tissue<br>4.4 Identify anterior and posterior skeletal muscles<br>4.5 Describe the structure and function of the pelvic floor muscles<br>4.6 Describe skeletal muscle fibre types and their characteristics<br>4.7 Describe the different types of muscle actions:<br>• isometric (static)<br>• isotonic (concentric and eccentric)<br>4.8 Identify the joint actions brought about by specific muscle group contractions<br>4.9 Define anatomical terms of location |
| 5. Understand the life-course of the musculoskeletal system | 5.1 Describe the life-course of the musculoskeletal system and the implications for exercise when working with:<br>• young people (13 – 18)<br>• antenatal and postnatal period<br>• older adults (50 plus) |

| | |
|---|---|
| 6. Understand the energy systems and their relation to exercise | 6.1 Describe how carbohydrates, fats and proteins are used in the production of energy and adenosine triphosphate<br>6.2 Describe the by-products of the three energy systems including their significance in muscle fatigue<br>6.3 Explain the use of the three energy systems during aerobic and anaerobic exercise including the effects of:<br>• exercise type, duration and intensity<br>• endurance training on the use of fuel for exercise<br>6.4 Describe:<br>• anabolism<br>• catabolism<br>• excess post-exercise oxygen consumption (EPOC) |
| 7. Understand the nervous system and its relation to exercise | 7.1 Describe the functions of the nervous system<br>7.2 Describe the principles of muscle contraction<br>7.3 Describe the 'all or none law'/motor unit recruitment<br>7.4 Explain how exercise can enhance:<br>• neuromuscular connections<br>• improve motor fitness |
| 8. Understand the digestive system | 8.1 Describe the functions of the alimentary canal<br>8.2 Explain how fats, proteins and carbohydrates are digested and absorbed<br>8.3 Explain the role of dietary fibre in the maintenance of gut function<br>8.4 Explain the role of the liver and pancreas in assisting digestion<br>8.5 Identify typical timescales for the digestive process<br>8.6 Explain the importance of fluid for the digestive process |

## Additional information

### Learning Outcome 1: Understand the structure and function of the cardiorespiratory system

**Structures of the heart to include:**

- Valves
- Atrium
- Ventricles
- Septum

**Functions of the heart to include:**

- Pump oxygenated blood to the heart
- To carry deoxygenated blood away from the heart
- Maintain circulation of blood around the body

**Function of heart structures:**

- Valves – prevent the backflow of blood from the ventricles to the atria
- Atrium / atria – where blood collects when it enters the heart
- Ventricles – pump blood out of the heart to the lungs
- Septum – separates the left and right sides of the heart

**Blood vessels, to include:**

- Veins and venuoles
- Arteries and arterioles
- Capillaries

**Functions of blood vessels:**

- Act as a transport system for the blood
- Veins – transport deoxygenated blood back to the heart
- Arteries – transport oxygenated blood from the heart to muscles and other tissues
- Capillaries –transport blood between arterioles and venuoles

**Structures of the lungs to include:**

- Bronchi / Bronchus
- Bronchioles
- Alveoli

**Functions of the lungs to include:**

- Gaseous exchange
- Deliver oxygen to the blood
- Remove waste products

**Movement of blood through the heart:**

- Oxygenated blood moves from the left atrium to left ventricle
- Deoxygenated blood moves from the right atrium to the right ventricle

**Systemic circulation:**

- The transport of blood between the heart and the tissues of the body

**Pulmonary circulation:**

- The transport of blood between the lungs and the heart

**Systolic blood pressure:**

- The pressure within the arteries as the heart contracts

**Diastolic blood pressure:**

- The pressure within the arteries while the heart rests in between contractions

**Blood pressure classifications:**

- Hypotension – 90/60 mmHg
- Normal – 120/80 mmHg
- Prehypertension – 120/85 to 139/89 mmHg
- Hypertension – 140/90 mmHg
- Stage 1 hypertension – 140/90 mmHg
- Stage 2 hypertension – 160/100 mmHg

**Muscles involved in breathing: to include:**

- Diaphragm
- Intercostals – internal and external

**Structures of the respiratory tract to include:**

- Nasal cavity
- Pharynx
- Larynx
- Trachea
- Bronchi
- Bronchioles
- Alveoli

**Gaseous exchange, to include:**

- Internal respiration – exchange of oxygen / carbon dioxide between the blood and tissues

- External respiration – exchange of oxygen / carbon dioxide between the lungs and the blood

## Learning Outcome 2: Understand the structure and function of the skeleton

**Functions of the skeleton, to include:**
- Provide support and structure for the body
- Protection (of vital organs)
- Movement (using levers)
- Blood cell production (white and red)
- Attachment (for muscles and tendons)
- Storage of minerals (calcium and phosphorus)

**Bones of the axial skeleton, to include:**
- Cranium
- Vertebrae
- Ribcage (ribs and sternum)

**Bones of the appendicular skeleton, to include:**
- Upper limbs - humerus, radius, ulna, carpals, metacarpals, phalanges
- Lower limbs - femur, tibia, fibula, tarsals, metatarsals, phalanges
- Hip girdle
- Shoulder girdle

**Classification of bones, to include:**
- Flat
- Irregular
- Long
- Short
- Sesamoid

**Structure of a long bone, to include:**
- Diaphysis (main shaft)
- Epiphysis
- Epiphysial plate (growing area)
- Epiphysial line
- Hyaline cartilage
- Periosteum
- Medullary canal

**Stages of bone growth, to include:**

- Remodelling
- Ossification

and the role of:

- Osteoclasts
- Osteoblasts
- Calcium

**Curves of the spine:**

- Cervical
- Thoracic
- Lumbar
- Sacral

**Potential ranges of movement of the spine:**

- Flexion
- Extension
- Lateral flexion
- Rotation

**Postural deviations:**

- Kyphosis
- Lordosis
- Scoliosis
- The effects of pregnancy, adiposity/obesity, age

## Learning Outcome 3: Understand the joints of the skeleton

**Joints:**

- Fibrous (immovable or fixed)
- Cartilaginous (slightly immovable)
- Synovial (freely movable)

**Structure of synovial joint to include:**

- Articulating bones
- Articular cartilage
- Bursa
- Joint capsule
- Ligaments
- Synovial cavity
- Synovial fluid
- Synovial membrane

**Types of synovial joints to include:**

- Ball and socket
- Condyloid
- Gliding
- Hinge
- Pivot
- Saddle

**Joint movement potential and joint actions to include:**

- Abduction
- Adduction
- Circumduction
- Flexion
- Extension
- Elevation
- Depression
- Dorsiflexion
- Plantar flexion
- Horizontal abduction and adduction
- Horizontal flexion and horizontal extension
- Hyper extension
- Lateral flexion
- Rotation
- Pronation
- Supination
- Protraction
- Retraction

**Anatomical planes of movement:**

- Frontal (coronal)
- Sagittal (median)
- Transverse (horizontal)

**Exercise variables:**

- Leverage
- Single joint (isolation)
- Multi joint (compound)
- Against/across gravity
- Speed
- Weight/load

## Learning Outcome 4: Understand the muscular system

**The characteristics of muscle types to include:**

- Cardiac
  - Involuntary (not under our conscious control, we cannot make them move)
  - only in the heart
  - striated

- Smooth
  - Involuntary
  - In internal organs and blood vessels
  - Not striated

- Skeletal
  - Voluntary (under our conscious control, we can make them move)
  - Attached to the skeleton
  - Striated

**The functions of muscle types to include:**

- Cardiac
  - Constantly keep the heart pumping

- Smooth
  - Constantly contracts to allow body process such as: digestion and blood flow

- Skeletal
  - Movement
  - Posture
  - Joint stability

**The structure of skeletal muscle to include:**

- Endomysium
- Perimysium
- Epimysium
- Fasciculus
- Sarcomere
- Myofibrils

**The connective tissue structures to include:**

- Cartilage
- Ligaments
- Tendons

**Anterior muscles to include:**

- Quadriceps
- Wrist extensors
- Wrist flexors
- Obliques (external and internal)
- Rectus abdominus
- Biceps brachii
- Pectoralis major
- Deltoid (anterior and medial)
- Tibialis anterior

**Posterior muscles to include:**

- Soleus
- Gastrocnemius
- Hamstrings
- Gluteals (maximus and medius)
- Erector spinae
- Triceps brachii
- Posterior deltoid
- Latissimus dorsi
- Trapezius
- Rhomboids

**The structure of pelvic floor (pelvic diaphragm) muscles to include:**

- Pelvic cavity
- Perineum
- Skeletal muscles
- Smooth muscles
- Ligaments

**The function of pelvic floor muscles to include:**

- Support the organs of the abdomen (bladder and bowel)
- Control the flow of urine
- Resist increases to abdominal pressure (intra-pelvic)

**Skeletal muscle fibre types to include:**

- Slow twitch type I / type 1
- Fast twitch or fast glycolytic type IIa / type 2a and type IIx / type 2b

**Characteristics of muscle fibre types to include:**

- **Type I (type 1)**
  - Red in colour
  - Contract slowly
  - Produce low amounts of force
  - Resistant to fatigue
  - High capacity for aerobic respiration
  - Contain many mitochondria and myoglobin

- **Type IIa (type 2a)**
  - Red in colour
  - Contract rapidly
  - Produce high amounts of force
  - Fatigue faster than type 1 fibres
  - Capacity for aerobic and anaerobic respiration
  - Contain mitochondria and myoglobin

- **Type IIb (type 2b / types IIx / type 2x)**
  - White in colour
  - Contract rapidly
  - Produce large amounts of force
  - Fatigue rapidly
  - No capacity for aerobic respiration, anaerobic only,
  - Contain low numbers of mitochondria and myoglobin

**The different types of muscle actions to include:**

- Isometric (static)
  - Length of the muscle does not change
  - Joint angle does not alter

- Isotonic – concentric
  - Length of the muscle decreases
  - Joint angle decreases

- Isotonic – eccentric
  - Length of the muscle returns to normal (increases)
  - Joint angle increases
  -

**Joint actions to include:**

- Shoulder
  - Abduction and horizontal abduction
  - Adduction and horizontal adduction
  - Extension
  - Flexion
  - Rotation
  - Circumduction

- Hip
  - Abduction
  - Adduction
  - Extension
  - Flexion
  - Rotation
  - Circumduction

- Knee
  - Extension
  - Flexion
  - Rotation

- Elbow
  - Extension
  - Flexion
  - Pronation
  - Supination

- Wrist
  - Extension
  - Flexion

- Ankle
  - Dorsiflexion
  - Plantar flexion

- Movement of the trunk
  - Flexion and lateral flexion
  - Extension
  - Rotation

**Specific muscle group contractions should be taught for the above joint actions**

For example:

Elbow flexion – biceps brachii, elbow extension - triceps

**Anatomical terms of location:**

- Superior and inferior
- Anterior and posterior
- Medial and lateral
- Proximal and distal
- Superficial and deep

## Learning Outcome 5: Understand the life-course of the musculoskeletal system

**Musculoskeletal system:**

- Tendon
- Muscle
- Ligament
- Joint
- Bone

To include, but not limited to - the musculoskeletal implications for exercise when working with:

- Young people (13 – 18)
  - damage to bone growth / epiphysial plates
- Antenatal and postnatal period
  - production of relaxin / increased joint flexibility
  - restarting exercise after birth
- Older adults (50 plus)
  - decrease in testosterone causing sarcopenia
  - vulnerability of fractures / reduction of bone density

## Learning Outcome 6: Understand the energy systems and their relation to exercise

**The production of energy and ATP to include: carbohydrates, fats, and proteins**

- Carbohydrates
  - 1 glucose molecule = 34 ATP

- Fats
  - fatty acid chain oxidisation
  - 1 fatty acid chain = approx. 100 ATP

- Proteins
  - amino acids converted into glucose
  - 1 amino acid = 15 – 18 ATP

**The by-products of the three energy systems to include:**

- ATP-PC (alactic) System
  - Anaerobic
  - One PC produces the energy for one molecule of ATP
- Lactate System (lactic acid system)
  - Anaerobic glycolysis
  - Partial breakdown of glucose
  - Produces three molecules of ATP
- Aerobic System
  - Reliant on oxygen
  - Produces 38 molecules of ATP

**The significance of the three energy systems in muscle fatigue to include:**

- ATP-PC (alactic) System
  - No by-products
  - But PC stores are only small, so the amount of energy produced is limited
- Lactate System (lactic acid system)
  - Lactic acid is a by-product which builds up and causes fatigue
- Aerobic System
  - Muscle fatigue is dependent on sources of glucose and oxygen

**The use of the three energy systems during aerobic and anaerobic exercise, to include: the effects of exercise type, duration and intensity and endurance training on the use of fuel for exercise**

- ATP-PC (alactic) System
  - Suits high intensity exercise for short periods up to 10 seconds
  - Anaerobic, immediate energy system

- Lactate System (lactic acid system)
  - Suits higher intensity over longer periods, around 60 – 90 seconds

- Anaerobic, short term energy system

- Aerobic System
  - Suits long continuous and moderate intensity periods
  - Aerobic

**To include descriptions of:**

- Anabolism
  - Larger molecules built from smaller ones

- Catabolism
  - Complex molecules broken down into smaller ones

- EPOC (excess post-exercise oxygen consumption)
  - The increased amount of oxygen the body needs after exercise to return to normal

## Learning Outcome 7: Understand the nervous system and its relation to exercise

**The functions of the nervous system to include:**

- Processing information coming into the body and coordinating responses
- Sending electrical impulses through nerves
- Initiating muscle contractions

**The principles of muscle contraction to include:**

- Sliding filament theory
  - Thick myosin filaments
  - Thin actin filaments
  - Cross bridges
  - Calcium ions
  - Sarcoplasmic reticulum
  - Troponin and Tropomyosin
  - Sarcomere
  - A band, H zone, Z line

**The 'all or none law'/motor unit recruitment:**

- When a motor unit receives a stimulus of sufficient intensity to gain a response, all the muscle fibres within the muscle unit will contract at the same time to the maximum possible extent.

- If the stimulus received by the motor unit is not strong enough to gain a response, none of the fibres within the muscle unit will contract.

**How exercise can enhance neuromuscular connections and improve motor fitness, to include:**

- Neuromuscular connections
  - Enhanced muscle fibre activation and growth

- Improve motor fitness
  - The nervous system learns to recruit the correct number of motor units for a response
  - The ability to recruit existing motor units

## Learning Outcome 8: understand the digestive system

**Structures of the alimentary canal to include:**

- Mouth
- Oesophagus
- Stomach
- Small intestine
- Large intestine
- Rectum
- Anus

**Functions of the alimentary canal to include:**

- Mouth - ingestion
- Oesophagus – carries food and liquid to the stomach
- Stomach – digests food
- Small intestine – break down food and absorb water and nutrients
- Large intestine – compacts waste material into faeces
- Rectum – stores undigested food as faeces
- Anus – opening at the end of the digestive system where faeces exit

**How food groups are digested and absorbed, to include:**

- Fats
  - Broken down into fatty acids, by lipases
  - Absorbed into the blood stream in the small intestine

- Proteins
  - Broken down into amino acids, by pepsin and trypsin
  - Absorbed into the blood stream in the small intestine

- Carbohydrates
  - Broken down into glucose, by maltase and amylase
  - Absorbed into the blood stream in the small intestine

**The role of dietary fibre in the maintenance of gut function to include:**
- Acts as a prebiotic
- Maintains regular bowel movements
- Reduces the risk of some disorders

**The role of the liver and pancreas in assisting digestion to include:**
- Liver
  - Bile production
  - Detoxification
  - Nutrient metabolism

- Pancreas
  - Production of digestive enzymes
  - Regulates hormones

**The typical timescales for the digestive process to include:**
- Food groups
  - Carbohydrates – 1 to 3 hours
  - Fats – 4 to 6 hours
  - Proteins – 3 to 5 hours
  - Fibre – 24 to 48 hours

- Time to process through the structures of the alimentary canal
  - Mouth – 30 – 120 seconds
  - Stomach – 2 to 4 hours
  - Small intestine – 3 to 5 hours
  - Large intestine – 12 to 48 hours
  - Total time for the digestive process - 24 to 72 hours

**The importance of fluid for the digestive process to include:**
- Saliva production
- Stomach function
- Nutrient reabsorption
- Waste elimination

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| **Unit aim (s)** | This unit will give learners the opportunity to show their knowledge and understanding of the structures and functions of key body systems, including how they support exercise and physical activity performance and the effect that training can have on them. |
| **Assessment requirements** | This unit is assessed by externally set Multiple Choice Examination |

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| **Title:** | **F/617/1179 Maximising the Customer Experience in the Exercise Environment** |
| **Level:** | **2** |
| **Credit Value:** | **4** |
| **GLH:** | **25** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand how to assess customer needs in a gym environment | 1.1 Outline demographics of customers who use a local gym facility<br>1.2 Describe how demographics affect the products and services on offer<br>1.3 Outline needs, expectations and aspirations of different customer groups<br>1.4 Describe how social support and inclusion can be built into the fitness facility environment<br>1.5 Describe different methods of obtaining and reporting customer feedback to support membership retention<br>1.6 Explain the feedback cycle and the impact of own role on the customer experience |
| 2. Understand customer service in a gym environment | 2.1 Identify the roles and responsibilities of:<br>• the gym instructor<br>• the client<br>• other professionals<br>2.2 Describe an organisation's:<br>• customer service promise<br>• products and services<br>• range of classes<br>• systems and technologies that enhance the customer experience<br>2.3 Describe the impact of own role on the customer experience<br>2.4 Outline how to promote additional products and services to customers<br>2.5 Outline a typical customer journey in a gym |

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| | environment<br>2.6 Explain the importance of customer retention<br>2.7 Explain how to influence customer retention |
| 3. Understand how to engage and communicate with customers | 3.1 Describe how different communication techniques can be used to engage with customers in a gym environment<br>3.2 Explain how to adapt communication methods to meet individual needs<br>3.3 Explain how to adapt inductions for:<br>• individuals<br>• small groups<br>• larger groups<br>3.4 Explain why it is important to 'walk the gym floor'<br>3.5 Explain ways to build rapport to maximise the customer experience<br>3.6 Explain the importance of being accessible and approachable to clients<br>3.7 Describe 'conflict situations' that may arise and how these can be dealt with |
| 4. Be able to engage and communicate with customers and colleagues | 4.1 Interpret customer data in order to understand different types of customers and their needs<br>4.2 Demonstrate customer engagement by:<br>• delivering an information tour<br>• dealing with customer enquiries<br>• offering an 'end to end' service<br>4.3 Demonstrate the use of customer service skills<br>4.4 Develop a rapport with customers whilst respecting equality and diversity<br>4.5 Comply with current legal and organisational responsibilities |
| 5. Understand professional practice | 5.1 Explain how to present self in line with organisational standards<br>5.2 Explain policies and procedures relevant to own role within the gym facility<br>5.3 Outline the following in relation to own role:<br>• national guidelines<br>• legislation<br>• industry codes of professional conduct<br>5.4 Explain how to keep own knowledge and skills up |

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| | to date using Continuing Professional Development (CPD)<br>5.5 Explain how to work within the boundaries of own professional knowledge and competence |
| 6. Understand the principles of business planning in a gym environment | 6.1 Outline methods of financial planning<br>6.2 Describe:<br>• the importance of digital media<br>• how to produce a digital plan<br>• how to set up a professional social media or digital profile<br>• the impact of social media and digital profiles<br>6.3 Explain how to plan financially, to include a working knowledge of:<br>• profit and loss<br>• tax (income tax, VAT)<br>• national insurance<br>• public and personal liability insurance<br>• music license fees |

**Additional information:**

**Customer service skills:**

- problem solving
- discretion
- influencing
- being professional
- working as part of a team
- using suitable communication methods, language and terminology

**Legal and Organisational responsibilities**:

- Health and safety at work
- Equality and diversity
- Safeguarding
- Data protection
- Hazard identification
- Safe working practices
- Ethics and professional conduct

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| **Unit aim (s)** | This unit will help learners understand the importance of effective customer service as for themselves, the customer and the organisation. They will also have the opportunity to explore legal and organisational responsibilities and how these will influence their own professional conduct. |
| **Assessment requirements specified by asector or regulatory body (if appropriate)** | N/A |

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| **Title:** | **T/617/1180 Client Consultation and Lifestyle Management** |
| **Level:** | **2** |
| **Credit Value:** | **4** |
| **GLH:** | **26** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand the client consultation process in the gym environment | 1.1 Explain why the client consultation is an important part of the customer experience<br>1.2 Outline own role when conducting client consultations<br>1.3 Describe the importance of explaining consultations to clients<br>1.4 Explain the legal and ethical implications of collecting client information, including:<br>• confidentiality<br>• data protection<br>1.5 Describe the process of informed consent |
| 2. Understand health screening, fitness testing and risk stratification | 2.1 Describe different methods for health screening clients prior to undertaking exercise<br>2.2 Explain the importance of verbal screening at the start of sessions and how it is conducted<br>2.3 Explain how to risk stratify clients using recognised risk stratification tools<br>2.4 Explain when to defer a client's exercise:<br>• temporarily based on the results of verbal screening<br>• to other specialist exercise professionals and/or medical professionals<br>2.5 Identify absolute contradictions to exercise<br>2.6 Outline practical assessments that can be used to assess a client's baseline health and fitness<br>2.7 Explain the limitations of health and fitness testing<br>2.8 Identify the factors that indicate that a client is at low, medium or high risk of an adverse event occurring during exercise |

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| 3. Understand lifestyle and health promotion | 3.1 Describe how different factors can affect health and wellbeing<br>3.2 Explain the benefits of physical activity on health and wellbeing<br>3.3 Outline the current UK physical activity guidelines for different ages<br>3.4 State the nationally recognised healthy eating recommendations<br>3.5 Explain how to communicate the benefits of exercise to meet the needs of different clients<br>3.6 Explain the dose-response relationship with respect to exercise and health benefits<br>3.7 Identify sources of evidence-based health and wellbeing advice<br>3.8 Describe how technology can be used to support the customer experience and increase client motivation and activity levels |
| 4. Understand the prevention and management of common health conditions | 4.1 Outline chronic health conditions<br>4.2 Explain how physical activity/exercise can help to prevent and manage chronic health conditions<br>4.3 Explain the role and scope of the gym instructor when offering health and wellbeing advice and guidance<br>4.4 Identify exercise or health professionals that clients can be signposted/referred onto |
| 5. Understand principles of behaviour change and exercise adherence | 5.1 Explain the stages of the trans-theoretical model of behaviour change<br>5.2 Outline the role of intrinsic and extrinsic motivation in exercise adherence<br>5.3 Describe a range of techniques that can motivate clients and/or improve exercise adherence<br>5.4 Explain the importance of re-assessments and reviews to support client's progress and motivation |
| 6. Be able to conduct consultations and assessments | 6.1 Identify a client's health history and health status<br>6.2 Assess a client's readiness to exercise<br>6.3 Demonstrate professionalism and customer service<br>6.4 Create an environment that supports clients to participate in and adhere to exercise<br>6.5 Encourage clients to exercise by using both intrinsic |

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| | and extrinsic motivators<br>6.6 Provide a positive client experience by conducting safe and effective:<br>• consultations<br>• assessments<br>• gym inductions<br>• reviews<br>6.7 Build rapport with clients with varying needs by:<br>• respecting equality and diversity<br>• showing empathy<br>• using language and communication methods<br>• giving positive, motivating, timely and relevant feedback<br>6.8 Take responsibility for dealing with client enquiries<br>6.9 Offer advice and guidance within own scope of practice to promote healthy lifestyle choices<br>6.10 Signpost clients to other services/areas of the facility as appropriate<br>6.11 Model behaviours which promote positive health messages |

## Additional information

**Risk stratification tools:**
- Irwin and Morgan Traffic light system
- Evidence based tools
- Agreed protocols
- Referral
- Care pathways

**Different clients:**
- Young people (13 – 18 years)
- Adults (19 – 64 years)
- Older people (65+ years)

**Technology**:
- Wearable technology
- Pedometers
- Smartphone apps

**Chronic health conditions**:
- Coronary heart disease
- Type-2 diabetes
- Obesity
- Stroke
- Cancer

- Mental health problems
- Musculoskeletal conditions

**Factors:**
- Resting heart rate
- Blood pressure
- Sub-maximal cardio-respiratory fitness
- Muscu
- BMI
- Waist circumference

**Gym inductions:** evidence should show how these have been adapted for individuals and groups (maximum of 5 individuals)

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| **Unit aim (s)** | This unit will support the management of clients 'lifestyles; exploring the process of liaising with clients to establish needs and wants, ways of encouraging a healthier lifestyle and the importance of physical activity to prevent or manage a client's health. |
| **Assessment requirements** | N/A |

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| **Title:** | **A/617/1181 Planning and Delivering Gym-Based Exercise Programmes** |
| **Level:** | **2** |
| **Credit Value:** | **5** |
| **GLH:** | **30** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand components of fitness and programming variables | 1.1 Identify the components of fitness<br>1.2 Outline national and international guidelines for developing components of fitness<br>1.3 Explain the differences between programming exercise for physical fitness and for health benefits<br>1.4 Explain the importance of evidence-based practice<br>1.5 Explain the principles and variables of fitness training |
| 2. Understand gym-based exercise training and techniques | 2.1 Describe a range of gym-based cardiovascular training methods<br>2.2 Describe a range of gym-based resistance training methods<br>2.3 Describe lifting, passing and spotting techniques<br>2.4 Describe a range of gym-based functional training including:<br>• equipment<br>• exercises<br>2.5 Describe a range of gym-based flexibility and range of motion training methods<br>2.6 Explain a range of gym-based exercises, including:<br>• purpose<br>• technique and alignment<br>• demonstration/coaching points<br>• alternatives<br>• safety points<br>2.7 Explain the importance of muscle balance when planning programmes |

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| 3. Be able to plan gym-based exerciseprogrammes | 3.1 Apply knowledge of anatomy and physiology in planning safe and effective gym-based exercise programmes<br>3.2 Ensure individual requirements are reflected in programme planning<br>3.3 Set SMART goals linked to a client's individual needs, wants and motivators<br>3.4 Select gym-based exercises, equipment and methods to develop clients':<br>• muscular fitness (muscular strength and endurance)<br>• cardiovascular fitness<br>• flexibility<br>• functional skills/abilities<br>3.5 Plan how to minimise any risks relevant to the programme<br>3.6 Plan timings and sequences for exercise<br>3.7 Record programme plans in an appropriate format |
| 4. Understand how to deliver gym-basedexercise programmes | 4.1 Describe coaching, teaching and instructing methods used in gym-based exercises<br>4.2 Explain how to adopt appropriate positions to observe clients whilstresponding to their needs<br>4.3 Explain how to monitor the safety and intensity of exercise<br>4.4 Describe the methods of monitoring exercise intensity, including:<br>• benefits<br>• limitations<br>4.5 Explain how to meet individual client needs and abilities by:<br>• adapting<br>• regressing<br>• progressing<br>4.6 Explain the use of corrective strategiesin gym-based exercise<br>4.7 Explain how to review a gym-based exercise programme in consultation with the client<br>4.8 Describe how to carry out a risk assessment in a |

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| | gym environment<br>4.9 Explain how to minimise any risks relevant to the programme<br>4.10 Explain how to ensure equipment is safely:<br>• assembled<br>• dismantled<br>• stored, including the use of storage plans<br>4.11 Identify where to locate manufacturer's guidelines for equipment |
| 5. Be able to deliver gym-based exercise programmes | 5.1 Provide client specific:<br>• instruction points<br>• feedback<br>• encouragement<br>• reinforcement<br>5.2 Demonstrate safe and effective techniques for:<br>• warm up and cool down activities<br>• a range of exercises<br>• using appropriate gym-based equipment<br>5.3 Correct client's exercise technique to ensure safe:<br>• alignment<br>• execution<br>• use of equipment<br>5.4 Adopt appropriate positions to observe and respond to client needs<br>5.5 Monitor the safety and intensity of the exercise<br>5.6 Suggest adaptations, alternatives, progressions and/or regressions that meet client needs<br>5.7 Demonstrate coaching, teaching and/or instructing methods<br>5.8 Demonstrate efficient time management<br>5.9 Ensure clients understand how to continue their programme of gym-based exercise without direct supervision<br>5.10 Ensure client safety at all times by identifying and making safe potential hazards including:<br>• activity areas<br>• equipment<br>• individuals<br>• physical risks<br>5.11 Comply with relevant legal andorganisational procedures |

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| 6. Be able to review gym-based exercise programmes | 6.1 Carry out regular reviews to ascertain how well the programme is meeting the client's:<br>• physiological needs<br>• psychological needs<br>6.2 Review the programme at regular intervals to:<br>• identify areas for development<br>• suggest necessary changes/adaptations to the contentand/or delivery of the session/s<br>• monitor and review progress towards client goals<br>• signpost to other areas of the facility as relevant to the client's needs and interests<br>6.3 Appraise participants' performance in relation to the session<br>6.4 Walk the gym floor, supporting customers effectively<br>6.5 Appraise their own delivery of sessions with reference to best practice |

## Additional information

**Principles and variables:**

- FITT (frequency, intensity, time and type)
- adaptation
- specificity
- progressive overload
- reversibility
- adaptability
- individuality
- recovery time

**Cardiovascular training methods and equipment may include:**

Methods

- Continuous
- Interval
- Fartlek

Equipment

- Upright cycle
- Recumbent cycle
- Treadmill
- Stepper
- Rowing machine
- Elliptical trainer

- Cross trainer

**Resistance training methods may include**:
- Fixed weight machines (e.g. fixed pin, plate loaded, pulleys etc.)
- Free weights (e.g. dumbbells, barbells, benches, squat racks etc.)
- Small equipment e.g. resistance bands, medicine balls etc.)
- Body weight exercises

**Flexibility and range of motion training methods:**
- Static stretching (including developmental)
- Ballistic stretching
- Dynamic stretching
- Proprioceptive neuromuscular techniques

**Gym-based equipment:**
- Cardiovascular machines
- Resistance machines
- Free weights
- Body weight exercises
- Small equipment

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| **Unit aim (s)** | This unit will enable learners to explore how they will plan, monitor and review gym-based sessions for a range of clients. |
| **Assessment requirements** | N/A |

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| **Title:** | **F/617/1182 Cleaning and Maintenancewithin a Gym Environment** |
| **Level:** | **2** |
| **Credit Value:** | **1** |
| **GLH:** | **4** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand cleaning and waste management | 1.1 Describe standard operating procedures with regards to routine maintenance and cleaning<br>1.2 Describe the uses of cleaning substances and equipment<br>1.3 Outline Personal Protective Equipment (PPE) that is necessary in the gym environment<br>1.4 Identify different types of waste relevant to a gym environment<br>1.5 Explain how to safely dispose of waste in line with:<br>• organisational procedures<br>• environmental policy/considerations<br>• COSHH |
| 2. Be able to clean and maintain the gym environment | 2.1 Plan and prepare own cleaning activities with reference to a cleaning schedule<br>2.2 Use appropriate cleaning substances and equipment in line with:<br>• safety procedures<br>• cleaning schedules<br>2.3 Communicate with customers and colleagues whilst cleaning to ensure safety |

| **Additional information:** |
|---|
| N/A |

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| **Unit aim (s)** | This unit will give learners the opportunity to show that they understand why it is important to keep the gym environment clean and are able to carry out regular and necessary cleaning activities. |
| **Assessment requirements** | Learning outcome 2: simulation and the use of a real work environment may be used |

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| **Title:** | **Y/617/1186 Applied Anatomy and Physiology** |
| **Level:** | **3** |
| **Credit Value:** | **5** |
| **GLH:** | **35** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand the cardio-respiratory system and its relation to exercise and health | 1.1 Explain the following terms in relation to short and long term exercise and the efficiency of the heart:<br>• cardiac cycle<br>• stroke volume<br>• cardiac output<br>1.2 Explain the effect of disease processes on the structure and function of blood vessels<br>1.3 Describe health risks associated with systolic and diastolic blood pressure classifications<br>1.4 Explain the short and long term effects of cardiorespiratory exercise on:<br>• blood pressure<br>• respiration<br>• venous return<br>• implications of blood pooling |
| 2. Understand the skeletal system and its relation to exercise | 2.1 Explain how bones and bone density are affected by:<br>• the role of osteoblasts and osteoclasts<br>• hormonal contribution<br>• body weight<br>• dietary influences<br>• weight bearing and non-weight bearing exercise<br>• high and low impact exercise<br>2.2 Explain factors that affect the stability of joints<br>2.3 Explain potential risks resulting from unstable and dysfunctional joints<br>2.4 Explain how the structure of joints enables them to act as shock absorbers<br>2.5 Explain the bone modelling and remodelling processes |

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| 3. Understand the muscular system and its relation to exercise | 3.1 Describe the actions of the major muscles of the body<br>3.2 Identify the muscle attachment sites (origins and insertions) for the major muscles of the body<br>3.3 Describe joint actions brought about by contraction of specific muscle groups<br>3.4 Describe the role of contributory muscles as:<br>• agonist<br>• antagonist<br>• synergist<br>• fixators<br>3.5 Describe the significance of anatomical axes and planes of movement to muscle balance and function<br>3.6 Explain the effect of the following exercise variables on biomechanics and kinesiology:<br>• first, second and third class levers<br>• centre of gravity<br>• momentum<br>• force<br>• length-tension relationships<br>• open and closed kinetic chain movements<br>3.7 Explain the following principles of muscle contraction in relation to exercise:<br>• concentric and eccentric (isotonic)<br>• isometric and isokinetic<br>• stretch and reverse stretch reflexes<br>• sliding filament theory<br>• size principle of motor unit recruitment<br>3.8 Explain the short and long-term effects of exercise on muscles including:<br>• delayed onset muscle soreness (DOMS)<br>• muscle fatigue<br>• hypertrophy<br>• metabolic benefits<br>3.9 Describe the response of muscles to:<br>• overuse<br>• underuse<br>• misuse |
| 4. Understand postural and core stability | 4.1 Describe the structure and function of:<br>• 'core' muscles |

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| | • stabilising ligaments of the spine<br>4.2 Explain the classification of core muscles including if they are:<br>• 'local/deep'<br>• 'global/superficial'<br>4.3 Describe the structure and function of intervertebral discs<br>4.4 Explain the effects of abdominal adiposity and poor posture on movement efficiency<br>4.5 Describe abnormal degrees of curvature of the spine and their implications for physical activity<br>4.6 Explain the impact of core stabilisation exercise including the potential for injury and aggravation of problems |
| 5. Understand the nervous system and its relation to exercise | 5.1 Explain the function, in relation to exercise, of:<br>• the central nervous system (CNS)<br>• the Peripheral Nervous System (PNS) including somatic and autonomic systems<br>5.2 Describe nervous control and transmission of a nervous impulse<br>5.3 Explain the process of motor unit recruitment including the:<br>• significance of a motor unit's size<br>• number of muscle fibres<br>5.4 Explain the function of muscle proprioceptors including muscle spindles and Golgi tendon organs<br>5.5 Describe the relevance of proprioceptors to exercise, to include:<br>• the stretch reflex<br>• reciprocal inhibition (inverse stretch reflex)<br>• the 'stretch-shortening cycle' and its application to plyometric training<br>5.6 Explain the neuromuscular adaptations associated with training, to include:<br>• more efficient motor unit recruitment<br>• improved inter-muscular coordination<br>• improved intramuscular coordination |

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| | 5.7 Explain the benefits of improved neuromuscular coordination to exercise performance |
| 6. Understand the endocrine system and its relation to exercise and health | 6.1 Describe the structure of the endocrine system, including both glands and hormones<br>6.2 Explain the main functions of the following hormones:<br>• Human Growth Hormone (HGH)<br>• Thyroxine<br>• Parathyroid hormone<br>• Corticosteroids<br>• Adrenaline and noradrenaline (catecholamines) Insulin<br>• Glucagon<br>• Oestrogen<br>• Testosterone<br>6.3 Explain typical hormonal responses to:<br>• training<br>• overtraining<br>6.4 Describe signs and symptoms of overtraining |
| 7. Understand energy systems and their relation to exercise | 7.1 Explain how the energy systems function independently and interact with one another<br>7.2 Describe ATP re-synthesis<br>7.3 Explain aerobic and anaerobic thresholds and their significance in the planning of training programmes<br>7.4 Explain the effects of different training methods on energy systems |

## Additional information

### Learning Outcome 1: Understand the cardio-respiratory system and its relation to exercise and health

**The following terms in relation to short- and long-term exercise and the efficiency of the heart, to include:**

- Cardiac cycle – the start of a heartbeat through to the beginning of the next, diastole (relaxation) and systole (contraction)

- Stroke volume (SV)
  - Effect of short-term exercise: Increase
  - Effect of long-term exercise: Increase

- Cardiac output (Q)
  - Effect of short-term exercise: Increase
  - Effect of long-term exercise: Increase

- Long term effects of exercise and efficiency of the heart, to include:
  - Enhanced efficiency
  - Decreased resting heart rate (HR)
  - Increased size of the heart / increased cardiac hypertrophy
  - Increase in heart strength

**The effect of disease processes on the structure and function of blood vessels, to include:**

- Arteriosclerosis
  - Hardened artery walls
  - Reduced elasticity of arteries

- Atherosclerosis
  - A specific type of arteriosclerosis
  - Plaque buildup in arteries (caused by deposits of LDL cholesterol and fats)
  - Narrowed artery walls
  - Reduced blood flow
  - Increased risk of heart attack and stroke

- Hypertension (high blood pressure)
  - Blood vessels thicken and stiffen
  - Increased risk of stroke and heart failure

- Diabetes
  - High blood sugar causes damaged blood vessel linings
  - Increased risk of peripheral artery disease

- Inflammatory diseases (including vasculitis)
  - Inflamed blood vessels
  - Increased blood vessel permeability
  - Narrowed or blocked blood vessels
  - Increased risk of damage to tissues and organs

- Venous diseases (including deep vein thrombosis, varicose veins, chronic venous insufficiency)
  - Enlarged veins
  - Twisted veins
  - Formation of blood clots in veins
  - Poor blood return from the limbs
  - Increased risk of swelling and pain

**Blood pressure classifications:**

- Hypotension – lower than 90/60 mmHg
- Normal – 120/80 mmHg
- Prehypertension – 120/85 to 139/89 mmHg
- Hypertension – 140/90 mmHg
- Stage 1 hypertension – 140/90 mmHg
- Stage 2 hypertension – 160/100 mmHg

**Health risks associated with:**

- Hypotension
  - Blurred vision
  - Dizziness
  - Fainting
  - Fatigue
  - Increased risk of the condition 'shock'

- Hypertension
  - Headache
  - Blurred vision
  - Chest pain
  - Increased risk of nerve damage to the eyes, kidney and heart damage
  - Increased risk of stroke and heart failure

**The short and long term effects of cardiorespiratory exercise, to include:**

- Blood pressure
  - Effect of short-term exercise
    - Diastolic – no change

- Systolic – increases
- Increased resting blood pressure

– Effect of long-term exercise
- Diastolic – decreases
- Systolic – decreases
- Decreased resting blood pressure

• Respiration
– Effect of short-term exercise
- Increased breathing rate

– Effect of long-term exercise:
- Decreased breathing rate (improved gaseous exchange)
- Increased number of functioning alveoli
- Increased strength of the respiratory muscles (intercostals and diaphragm)

• Venous return
– Effect of short-term exercise
- Increase in tidal volume (TV or VT)
- Increase in minute ventilation (VE)

– Effect of long-term exercise
- Increased tidal volume (TV or VT)
- Increased minute ventilation (VE)
- Increased vital capacity (VC)

• Implications of blood pooling
– Effect of short-term exercise
- Blood gathers in the lower limbs

– Effect of long-term exercise
- Increased muscle pumping
- Improved circulation
- Increased blood vessel function

## Learning Outcome 2: Understand the skeletal system and its relation to exercise

**How bones and bone density are affected by:**

• **The role of osteoblasts**
– Formation of new bone tissue during bone modelling and remodelling
– Build and replace bone
– Crucial for improving bone density

- **The role of osteoclasts**
  - Absorb bone tissue during the growth and repair process during bone modelling and remodelling
  - Break down and clear away bone tissue
  - Increased osteoblast activity can lead to decreased bone density and increased risk of bone fractures and osteoporosis

**Note - Osteocytes:** cells which maintain the bone matrix, communication with osteoblasts and osteoclasts to regulate bone remodelling

- **Hormonal contribution** (Regulation of bone modelling and remodelling)
  - Parathyroid hormone (PTH)
    - Regulates calcium
    - Stimulates osteoclast activity (leading to increased calcium in the bloodstream)
    - Stimulates osteoblasts and bone formation (leading to decreased calcium in the bloodstream)
  - Calcitonin
    - Controls calcium levels in the blood
    - Calcitonin releases calcium from bones if calcium levels drop in the bloodstream
    - Bone density can reduce if calcium is frequently taken from bones
  - Oestrogen
    - Helps control bone formation and bone breakdown
    - Decreases when women go through menopause
    - Low oestrogen can lead to decreased bone density
  - Testosterone
    - Promotes bone formation and reduces bone breakdown
    - Decreases with age in men
    - Can lead to bone loss and decreased bone density
  - Growth Hormone
    - Helps bones grow during childhood and maintains bone density in adults
    - Low levels can lead to decreased bone density

- **Dietary influences:**
  - Diets high in vitamin C and D and calcium can increase bone density
  - Increased body fat impacts hormone levels which can lead to decreased bone and decreased bone density

- **Weight bearing and non-weight bearing exercise**
  - Weight bearing promotes new bone cell production
  - Weight bearing and resistance exercises enhance bone density and bone strength

- **High and low impact exercise**
  - High impact exercise eg running, promotes osteoblast activity, increasing bone and bone density
  - Low impact exercise eg swimming, can build muscular strength and increase joint stability which maintains bone density

**Factors that affect the stability of joints, to include:**

- Passive structures (tensile strength and laxity of ligaments)
  - Limit excessive motion
    - Bone shape / size
    - Fit of the joint eg ball and socket
    - Ligaments
    - Joint capsules

- Active structures (control and strength of stabilising muscles crossing the joint)
  - Dynamically control joint movement
    - Muscles
    - Tendons

- Neuromuscular Control (motor control of joint movements in response to external forces)
  - Proprioception (awareness of joint position)
    - Motor neurons

**The potential risks resulting from unstable and dysfunctional joints, to include:**

- Lack of biomechanical efficiency
  - Joints are misaligned
  - Excessive movement
  - Increased risk of dislocation and osteoarthritis

- Reduction in transmission of stress
  - Type of joints
    - Fixed joints: no movement, transmit stress directly
    - Hinge joints: movement in one direction, distribute stress along the joint

        - Ball and socket joints: multi-directional movement, manage stress through a wide range of motion
    - Stress transmission
        - Load distribution: across connected bones, reducing localised stress
        - Flexibility and mobility: flexible joints can absorb and dissipate stress, preventing damage
        - Joint structure properties: synovial fluid, cartilage, ligaments, bone influence how stress is transmitted and absorbed
    - Movement patterns
        - Different activities apply different stress levels on joints

- Increased risk of injury
    - Joints can degrade over time
    - Limited movement ability
    - Altered ability to transmit stress effectively
    - Increased risk of dislocation, inflammation, stress fractures and osteoarthritis

- Reduced shock absorption
    - Increased wear and tear on joints
    - Damaged cartilage, ligaments, bursae, menisci, synovial membrane (joint structures)
    - Decreased overall mobility and ability to perform physical activities
    - Increased risk of inflammation, stiffness, sprains, tears and osteoarthritis

- Poor posture
    - Forward head posture (excessively kyphotic thoracic spine)
        - Strain on the neck and upper back
        - Affects cervical joints
    - Rounded shoulders
        - Leads to shoulder joint and rotator cuff discomfort
    - Swayback posture (exaggerated spine curves)
        - Increased pressure on the lower back and hips
    - Decreased flexibility of muscles
    - Decreased range of movement in joints / reduced mobility
    - Increased stress on joints
    - Increased misalignment of joints eg spine, hips, and knees

**The structure of joints and how this enables them to act as shock absorbers, to include:**

- The structure of joints:
    - Shape and range of movement
        - Joints of the spine form curves which absorb shock due to dissipating force

- Joint structures:
  - Synovial fluid
    - Lubricates and cushions joints
    - Exercise increases secretion of synovial fluid
  - Cartilage
    - Articular cartilage covers the ends of bones
    - Acts as a cushion between bones
    - Absorbs shock and reduces friction
  - Menisci (in the knee)
    - Crescent-shaped cartilage
    - Distributes weight and absorbs shock
  - Bursa
    - Fluid-filled sacs
    - Reduces friction and absorbs shock
    - Increases joint mobility

**Stages of bone growth, to include:**

- Bone modelling
  - Bone formation or bone resorption occurs on bone surface
  - Bone growth and shaping
  - Occurs in youth

- Bone remodelling
  - A sequence of bone resorption and formation on the same bone surface
  - Renews the skeleton
  - Maintains and repairs bones
  - Occurs throughout life

- Bone modelling and remodelling
  - Formation of bone by osteoblasts and reabsorption of bone by osteoclasts
  - Allow bones to adapt to stress

## Learning Outcome 3: Understand the muscular system and its relation to exercise

**The actions of the major muscles of the body, to include:**

- Shoulder and chest
  - Anterior deltoid, pectoralis major - Flexes the shoulder
  - Posterior deltoid, latissimus dorsi, teres major - Extends the shoulder

- Latissimus dorsi, pectoralis major, teres major, teres minor - Adducts shoulder
- Medial deltoid, supraspinatus - Abducts shoulder
- Pectoralis major, anterior deltoid - Horizontal adduction
- Posterior deltoid, trapezius, rhomboids, latissimus dorsi - Horizontal abduction
- Levator scapulae – stretches along each side of the spine, over the upper back and neck
- Pectoralis minor - in the upper chest
- Serratus anterior – attaches to the ribs and scapula

- Rotator cuff: SITS (including muscle actions)
  - S: supraspinatus
  - I: infraspinatus
  - T: teres minor
  - S: subscapularis

- Spinal flexors (trunk flexors)
  - Rectus abdominus, internal and external obliques - Flexes the spine

- Spinal extensors (trunk extensors)
  - Erector spinae, iliocostalis, longissimus, spinalis, multifidus, quadratus lumborum - Extends the spine

- Spinal lateral flexors (trunk lateral flexion - frontal)
  - Internal obliques, rectus abdominus, erector spinae, quadratus lumborum

- Spinal rotators (trunk rotation - horizontal)
  - External obliques, rectus abdominus, erector spinae

- Hip flexors
  - Iliopsoas, iliacus, psoas major - Flexes the hip

- Hip extensors
  - Gluteus maximus, biceps femoris, semimembranosus, semitendinosus, gluteus medius - Extends the hip

- Hip adductors
  - Magnus, brevis, longus, pectineus, gracilis, sartorius – Adducts the hip

- Hip abductors
  - Gluteus medius, gluteus minimus, piriformis, tensor fascia latae – Abducts the hip

- Abdominals
  - Internal and external obliques - Rotates and laterally flexes the spine
  - Transversus abdominus - Stabilises the core and pelvis and supports internal organ
  - Rectus abdominus - Flexes the spine and stabilises the pelvis

- Rib cage muscles (to enable the mechanism of breathing)
  - Intercostals
  - Diaphragm

- 'Core' muscles (to provide core stability)
  - Rectus abdominus, internal and external obliques, transverse abdominals, erector spinae, quadratus lumborum, multifidus, diaphragm, hip flexors, and pelvic floor muscles - levator ani and coccygeus

- Upper arm
  - Biceps brachii and brachialis - Flexes the elbow and supinates the forearm
  - Triceps brachii - Extends the elbow and assists in shoulder extension

- Upper leg
  - Hamstrings (biceps femoris, semimembranosus, semitendinosus) - Flex the knee and extend the hip
  - Quadriceps (rectus femoris, vastus lateralis, vastus medialis, vastus intermedius) - Extend the knee and assist in hip flexion

- Lower leg
  - Soleus - Plantar flexes the ankle
  - Gastrocnemius - Plantar flexes the ankle and assists in knee flexion
  - Tibialis anterior – Dorsi flexes the ankle

- Wrist
  - Wrist extensors – Extends the wrist
  - Wrist flexors – Flexes the wrist

**The muscle attachment sites (origins and insertions) for the major muscles of the body, to include and not limited to:**

- **Origin**: fixed attachment point of a muscle, usually located close to the body's centre

- **Insertion**: movable attachment point of a muscle, usually located further from the centre of the body

- **Biceps brachii**
  - Origin: Scapula
  - Insertion**:** Radius

- **Triceps brachii**
  - Origin**:** Scapula and humerus
  - Insertion**:** Ulna

- **Quadriceps femoris**
  - Origin**:** Ilium and femur
  - Insertion**:** Tibia (via the patellar tendon)

- **Hamstrings**
  - Origin**:** Ischium and femur
  - Insertion: Tibia and fibula

- **Pectoralis major**
  - Origin: Clavicle, sternum, and ribs
  - Insertion: Humerus

**Joint actions brought about by contraction of specific muscle groups, to include:**

- Flexion (horizontal and lateral flexion)
- Extension
- Abduction and horizontal abduction
- Adduction and horizontal adduction
- Rotation (lateral and medial)
- Plantar flexion
- Dorsi flexion
- Circumduction
- Supination
- Pronation
- Elevation
- Depression
- Protraction
- Retraction
- Inversion
- Eversion

**The role of contributory muscles, to include:**

- Agonist (prime mover)
  - Directly responsible for the movement
  - Contracts and shortens

- Antagonist
  - Facilitates movement
  - Relaxes and lengthens

- Synergist
  - Enhances the efficiency of the agonist
  - Prevents undesired movements

- Fixator
  - Stabilises the bones to allow effective movement to occur
  - Stabilises the origin of the agonist to enable the agonist to contract

**The significance of anatomical axes and planes of movement to muscle balance and function:**

- Anatomical axes of movement:
  - Frontal axis eg performing a jumping jack
  - Sagittal (antero-posterior) axis eg performing a bicep curl
  - Vertical axis eg twisting your trunk to perform a spinal rotation or turning your head to look over your shoulder

- Anatomical planes of movement:
  - Frontal (coronal or lateral) eg adduction and abduction
  - Sagittal (median) eg flexion and extension
  - Transverse (horizontal) eg rotation

- Significance of anatomical axes and planes of movement to muscle balance and function:
  - Performing movements correctly
  - The ability to use the full range of movement at a joint whilst applying load
  - Reducing stress on joints and muscles
  - Reducing the risk of injuries to joints and muscles

**The effect of exercise variables on biomechanics and kinesiology, to include:**

- First class levers
  - The fulcrum or joint is in the middle of the effort and the load
  - The joints in your neck are the fulcrum which allow you to nod your head up and down, the load is the weight of the head

- Second class levers
  - The load is in the middle between the fulcrum or joint and the effort
  - The ball of the foot in the ankle joint is the fulcrum when standing on tip toes, the load is the weight of the body

- Third class levers
  - The effort is in the middle between the fulcrum or joint and the load
  - Performing a bicep curl, the elbow joint is the fulcrum, the load is the weight the hand is holding

- Centre of gravity
  - Depends on the distribution of load along the lever arm
  - It can move depending on changes in load, when loads are added or removed
  - Knowing where the centre of gravity is in relation to the lever arm and load enables balance to be maintained

- Momentum
  - The speed a load is moved
  - Increasing momentum can increase the risk of injury if the muscles and joint are unstable

- Force
  - Force acting on a muscle produces a turning movement
  - Levers amplify force, allowing a smaller force to move a larger load
  - Increasing force increases the lever's ability to lift heavier loads
  - Higher force can allow a shorter lever arm (the lever arm refers to the distance from the fulcrum / joint) to be used to achieve the same lifting effect
  - An increased risk of injury can occur from excessive force used to exceed the lever's limit

- Length-tension relationships
  - The lever's arm length affects the force needed to lift the load
  - Levers where the effort arm is longer than its load arm can move large loads with a smaller amount of effort
  - Second class levers have a lever effort arm which is longer than its load arm
  - First class levers have a lever effort arm which is longer than its load arm, if the fulcrum is close to the load

- Kinetic chain movements – a term used to describe human movements

- Open kinetic chain movements
  - The part furthest away from the body (eg a foot or hand) moves freely and isn't fixed to an object
  - Enables specific muscles to be isolated
  - Allows targeted muscle training eg bench press or bicep curl

- Closed kinetic chain movements
  - The part furthest away from the body (eg a foot or hand) is fixed to an object
  - Improves balance and lowers the risk of injury
  - Promotes stability and is used in rehabilitation eg leg press and squats

**The principles of muscle contraction in relation to exercise, to include:**

- Concentric and eccentric (isotonic)
  - Muscle tension remains constant as the muscle contracts by shortening or lengthening

- Isometric
  - There is no shortening or lengthening of the muscle, muscle length remains static as the muscle contracts

- Isokinetic
  - The speed of muscle shortening remains constant over the entire range of movement
  - Maximum force can be exerted at all angles of the joint

- Stretch reflex
  - The muscle contracts in response to the muscle stretching
  - A rapid and automatic response

- Reverse stretch reflex or Golgi Tendon Reflex
  - When muscle tension increases, sensory receptors called the Golgi tendon organ, send signals via motor neurons to inhibit the movement
  - The muscle relaxes to prevent injury

- Sliding filament theory
  - Muscle fibres are made up of smaller myofibrils
  - Sarcomeres are the smallest unit of skeletal muscle that contract
  - Sarcomeres are along the length of myofibrils
  - Myofibrils contain smaller structures actin and myosin filaments

- Actin and myosin filaments slide in and out between each other to form a muscle contraction

- Size principle of motor unit recruitment
  - A motor unit is a muscle fibre and a single motor neuron
  - Motor units are recruited in an order from smallest to largest
  - Slow motor units are smaller in size, they have the lowest activation threshold, they are recruited first during muscle movement.
  - Large motor units are activated when slow motor units are unable to produce enough force, they contract with more force and fatigue sooner
  - The strength and power exerted by a muscle relies on the number of motor units recruited the rate they contract, and the amount of contractable muscle mass

**The short and long-term effects of exercise on muscles, to include:**

- Short-term effects:
  - Delayed onset muscle soreness (DOMS)
    - Muscles experience pain for 24-48 hours after intense exercise
    - Due to microscopic tears in the muscle fibres
    - Often due to a change in training or performance intensity
  - Muscle fatigue
  - Often experienced in the days after training
  - Physical tiredness

- Long-term effects:
  - Hypertrophy
    - An increase in skeletal muscle mass
  - Metabolic benefits
    - Lower fat mass
    - Improved regulation of glucose
    - Decreased liver fat content

**The response of muscles, to include:**

- Overuse
  - Increased risk of injury
  - Inflammation, joint / muscle stiffness
  - Fatigue
  - Decreased strength, decreased performance

- Underuse
  - Increased risk of injury

- Muscle weakness, fatigue
- Muscle atrophy, decreased muscle strength

- Misuse
  - Increased risk of injury
  - Pain, inflammation
  - Reduced range of movement
  - Muscle weakness, fatigue

## Learning Outcome 4: Understand postural and core stability

**The structure and function of:**

- 'Core' muscles
  - Rectus abdominus, internal and external obliques, transverse abdominals, erector spinae, quadratus lumborum, multifidus, diaphragm, hip flexors, and pelvic floor muscles - levator ani and coccygeus

- Structure of core muscles
  - Skeletal muscles
  - Located around the spine and pelvis

- Function of core muscles
  - Rectus Abdominis: Flexes the spine and stabilises the pelvis
  - Transverse Abdominis: Acts like a corset, provides stability to the spine and pelvis
  - Obliques (Internal and External): Trunk rotation and lateral flexion
  - Erector Spinae: Extends and stabilises the back
  - Multifidus: Stability and posture
  - Pelvic Floor Muscles: Supports the pelvic organs, and core stability and control

- Stabilising ligaments of the spine
- Ligaments in the vertebral column, tendons and muscles, act like a corset to protect the spine from injury
- Ligaments strengthen and stabilise the articulating bones / joints of the spine

**The classification of core muscles, to include:**

- Local or deep
  - Small, deep muscles
    - Transversus abdominis (stabilizes the core), Multifidus (supports the spine), Rotator cuff muscles (stabilize the shoulder)
  - Stabilise joints and support posture

- Maintaining balance and allow functional movements
- Found close to joints, particularly in the spine and pelvis.
- Reduce the risk of injuries by ensuring correct alignment and function

- Global or superficial
  - Large muscle groups
  - Leg, core, back and shoulder muscles
  - Provide body movement and stability
  - Maintaining posture, balance, and functional movement
  - Provide support for the spine and joints during dynamic movements

**The structure and function of intervertebral discs, to include:**

- Structure of intervertebral discs
  - Inner gel-like core - nucleus pulposus, composed of collagen and water
  - Outer layer surrounding the nucleus pulposus - annulus fibrosus, composed of concentric rings of collagen fibres

- Function of intervertebral discs
  - Facilitate movement between vertebrae
  - Act as shock absorbers, allow movement and flexibility
  - Maintain the height of the vertebral column

**The effects of abdominal adiposity and poor posture on movement efficiency, to include:**

- Abdominal adiposity on movement efficiency
  - Increased load on the musculoskeletal system
  - Altered centre of gravity which can affect balance and stability
  - Reduced flexibility decreasing the range of motion in the joints, particularly hips and lower back
  - Increased risk of injury due to altered biomechanics, particularly in weight-bearing joints - knees and ankles

- Poor posture on movement efficiency
  - Muscle imbalance**,** can affect movement patterns and efficiency
  - Reduced lung capacity**,** can affect endurance and performance
  - Increased risk of injury by placing abnormal stress on muscles, joints, and ligaments
  - Increased fatigue

**Abnormal degrees of curvature of the spine and their implications for physical activity, to include:**

- Kyphosis

- Excessive forward rounding of the upper back
- Avoid high-impact activities that may cause pain
- Focus on low-impact, controlled movements
- Strengthen core muscles to improve posture
- Stretching to increase flexibility

- Lordosis
  - Abnormal inward curvature of the lumbar spine
  - Focus on correct form to reduce the risk of injury
  - Strengthen core muscles to improve posture
  - Stretching to increase flexibility

- Scoliosis
  - Side-to-side curve of the spine
  - Avoid high-impact or twisting movements
  - Stretching to increase spinal flexibility
  - Strengthening core muscles to support the spine
  - Focus on low-impact activities eg swimming, walking, and cycling

**The impact of core stabilisation exercise, to include the potential for injury and aggravation of problems:**

- Core stabilisation exercises
- Potential for injury if carried out incorrectly, too frequently, too much load added, progressed too quickly
- Can aggravate existing injuries
- Can prevent or delay healing of existing injuries

## Learning Outcome 5: Understand the nervous system and its relation to exercise

**The function of the CNS and PNS in relation to exercise, to include:**

- The central nervous system (CNS)
  - The brain and the spinal cord
  - Controls and coordinates responses between *receptors* (sensitive to different stimuli) and *effectors (*muscle or gland which produce a response)
  - Via nerves the brain or spinal cord decide whether or not to respond to the stimulus

- The CNS in relation to exercise:
  - Exercise stimulates neurogenesis (formation of new neurons)
  - Improved balance and coordination
  - Improved efficiency in motor control and coordination
  - Enhanced neural pathways, muscle recruitment and performance

- The Peripheral Nervous System (PNS)
  - Connects the brain and spinal cord to the rest of the body
  - Made up of nerves, spinal nerves and cranial nerves
  - Transmits motor and sensory information between the CNS and peripheral body tissues
  - Peripheral nerves carry information towards the CNS are called afferent or sensory neurons, nerves transmitting impulses from the CNS are called efferent or motor neurons

  - Somatic nervous system (SNS)
    - Voluntary, we have conscious control over it
    - Provides sensory and motor innervation to skin, muscles and sensory organs

  - Autonomic nervous system (ANS)
    - Involuntary, we have no conscious control over it
    - Provides sensory and motor innervation to smooth muscle, blood vessels, glands, and internal organs

- The PNS in relation to exercise:
  - Promotes relaxation and recovery
  - Increased blood flow to the digestive organs
  - Promotes deeper and slower breathing.
  - Increased heart rate and energy expenditure during physical activity
  - Enhanced return to pre-exercise homeostasis, lower heart rate and blood pressure
  - Quicker recovery times
  - Improved heart rate variability (HRV)

**Nervous control and transmission of a nervous impulse, to include:**

- Nervous control - the regulation of bodily functions through the nervous system
  - Transmission of a nervous impulse: How signals are sent between neurons
  - Neurons: Basic units of the nervous system, transmit impulses, made up of a cell body, dendrites (receive signals), and an axon (send signals)
  - Nerve impulses, electrical signals, travel along the axon
  - Sensory Impulses: Carry information from sensory receptors to the CNS
  - Motor Impulses: Transmit commands from the CNS to muscles and glands

**The process of motor unit recruitment, to include:**

- Significance of a motor unit's size
  - Motor units are recruited in order of their size, smallest to largest

- Number of muscle fibres
  - Depends on the type of exercise, intensity, and individual fitness levels

**The function of muscle proprioceptors, to include:**

- Proprioception: The body's ability to sense its position and movements

- Muscle spindles (stretch receptors)
  - Specialised sensory receptors within muscles, detect changes in muscle length and the rate of stretch
  - Found between muscle fibres
  - Most important proprioceptors
  - Produce muscle contractions
  - Prevent muscles from over-stretching

- Golgi tendon organ (GTO)
  - Skeletal muscle stretch receptors, proprioceptors
  - Found at the attachment of muscle and tendon fibres
  - Sense muscle tension and force
  - Regulate muscle contraction and tension
  - Prevents damage to muscles and tendons

**The relevance of proprioceptors to exercise, to include:**

- The stretch reflex
  - The muscle contracts in response to the muscle stretching
  - A rapid response stabilises joints and maintains balance during physical activity
  - Reduces the risk of injury by preventing overstretching and potential injuries during dynamic movements
  - Enables explosive movements, by allowing fast muscle contractions
  - Regular training can improve efficiency of the stretch reflex

- Reciprocal inhibition (inverse stretch reflex) or Reverse stretch reflex or Golgi Tendon Reflex
  - When muscle tension increases sensory receptors (Golgi tendon organ) motor neurons send signals via motor neurons to inhibit the movement
  - The muscle relaxes to prevent injury
  - This allows muscle relaxation during exercise
  - Helps to prevent muscle damage by inhibiting excessive contraction

- The 'stretch-shortening cycle' (SSC) and its application to plyometric training
  - Spring-like action of muscles: an eccentric contraction is followed by a concentric contraction

- Plyometrics use the SSC to enhance explosive movements, to increase strength, speed, and agility

**Neuromuscular adaptations associated with training, to include:**

- More efficient motor unit recruitment
  - Increased synchronisation of motor unit firing
  - Improved ability to recruit larger motor units more quickly
  - Enhanced neuromuscular coordination

- Improved inter-muscular coordination
  - Produce force more quickly
  - Sustain power output
  - Execute complex movements

- Improved intramuscular coordination
  - Increased strength and coordination
  - Enhanced skill acquisition
  - Reduced injury risk
  - Greater endurance with less fatigue

The benefits of improved neuromuscular coordination to exercise performance, to include:

- Increased efficiency
- Improved coordination
- Better stability and balance
- Faster reaction time
- More precise muscle recruitment, leading to increased strength and power
- Injury prevention, allows the use of correct form and technique

## Learning Outcome 6: Understand the endocrine system and its relation to exercise and health

**The structure of the endocrine system, including glands and hormones:**

- Structure of the endocrine system
  - Collection of glands throughout the body
  - Secrete hormones

- Glands or endocrine organs
  - Hypothalamus - the main control centre for the endocrine system, located in the brain
  - Pineal gland
  - Thyroid gland

- Parathyroid glands
- Pancreas
  - Adrenal glands
  - Gonads (ovaries and testes)

- Hormones
  - Chemical messengers
  - Travel to specific organs via the bloodstream
  - They carry messages to regulate body functions

**The main functions of the following hormones:**

- Human growth hormone (HGH)
  - Stimulates growth, cell reproduction, and cell regeneration
  - Impacts metabolism
  - Affects how food is used for energy
  - Instructs cells in your bones and cartilage to multiply

- Thyroxine
  - Controls metabolism, heart and muscle function
  - Controls brain development
  - Maintains bones

- Parathyroid hormone
  - Regulates blood calcium and phosphate levels
  - Acts on bones, kidneys and small intestine

- Corticosteroids
  - Reduce inflammation and control overactive immune system responses
  - Assist with hormonal imbalances

- Adrenaline and noradrenaline (catecholamines)
  - Work together to manage stress responses
  - Regulates physiological responses in response to environmental changes

- Adrenaline
  - Increases heart rate and blood pressure
  - Prepares the body for rapid action, fight or flight mechanism
  - Provides energy quickly by simulating the breakdown of glycogen to glucose in the liver
  - Dilates air passages in the lungs to increase oxygen intake
  - Increases blood flow to skeletal muscles and decreases blood flow to non-essential areas

- Noradrenaline
  - Increases blood pressure
  - Increases attention and focus
  - Prepares the body for stress

- Insulin
  - Regulates glucose
  - Facilitates uptake of glucose by cells
  - Promotes storage of excess glucose as glycogen in the liver and muscles
  - Promotes conversion of glucose into fat for long-term energy storage
  - Promotes protein synthesis and muscle growth

- Glucagon
  - Increases blood sugar
  - Promotes conversion of glycogen in the liver into glucose
  - Stimulates the liver to produce glucose from non-carbohydrate sources (gluconeogenesis)
  - Opposes insulin, which lowers blood sugar levels

- Oestrogen
  - Regulates the menstrual cycle
  - Develops female secondary sexual characteristics (breasts, menstrual cycle)
  - Contributes to bone density
  - Protects the cardiovascular system by influencing cholesterol levels and blood vessel function
  - Regulates mood

- Testosterone
  - Development of male characteristics (hair, deep voice, and muscle growth)
  - Regulates libido, mood and energy
  - Maintains bone density and muscle mass

**Typical hormonal responses, to include:**

- Training
  - Undertaking regular exercise to improve physical fitness

- Overtraining
  - Also known as unexplained underperformance syndrome (UUPS) and over training syndrome (OTS)
  - Training without enough recovery time between sessions
  - An unknown cause of decreased performance

**The signs and symptoms of overtraining, to include:**

- Decreased appetite
- Weight loss
- Depression, anxiety, mood swings, irritability
- Increased recurrence of injuries
- Headaches
- Insomnia
- Trouble concentrating
- Irregular heart rate
- Fatigue
- Decreased enjoyment from training / competing
- Low immunity
- Mild muscle / joint soreness
- Reduced ability to train / decreased performance

## Learning Outcome 7: Describe ATP re-synthesis

**Understand energy systems and their relation to exercise**
How energy systems function independently and interact with one another, to include:

- ATP-PC (alactic) system - Anaerobic
  - Suits high intensity exercise for short periods up to 10 seconds
  - Immediate energy system

- ATP-PC and muscle glycogen – Anaerobic
  - Suits high intensity exercise for short periods up to 10 – 45 seconds
  - Short term energy system

- Lactate system (lactic acid system), muscle glycogen - Anaerobic
  - Suits higher intensity over longer periods, around 45 – 120 seconds
  - Short term energy system

- Lactic acid and muscle glycogen – Anaerobic and aerobic
  - Suits medium to high intensity over longer periods, around 120 - 240 seconds
  - Short term energy system

- Muscle glycogen and fatty acids - Aerobic System
  - Suits long continuous and moderate intensity periods 240 seconds – 90 minutes

**ATP re-synthesis, to include:**

- ATP (or adenosine triphosphate) releases energy becoming ADP (or adenosine diphosphate), a phosphate is removed
- ATP is re-synthesised by adding a phosphate to the ADP molecule
  - 1 glucose molecule resynthesises 30-38 ATP
  - 1 fatty acid chain resynthesises approx. 100 ATP
  - 1 amino acid resynthesises 15 – 18 ATP

**Aerobic and anaerobic thresholds and their significance in the planning of training programmes, to include:**

- Aerobic threshold
  - The limit of exercise before energy production becomes dominated by anaerobic glycolysis instead of aerobic oxidation of fatty acids
  - Around 60-70% of maximal heart rate

- Anaerobic threshold
  - The limit of exercise intensity before lactate substantially builds up in your blood from using the anaerobic lactate system to produce energy
  - Around 80-90% of maximal heart rate

- Significance in the planning of training programmes
  - Maximum heart rate = 220 – age
  - Enables the identification of aerobic and anaerobic training zones

**The effects of different training methods on energy systems, to include:**

- CV continuous training
- CV interval training
- CV fartlek training
- HIIT training
- Resistance strength training
- Resistance endurance training

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| **Unit aim (s)** | This unit will enable learners to show that they understand the main body systems, the effect that physical activity and exercise has on them and the ways in which these systems influence our health, fitness and performance. |
| **Assessment requirements** | This unit is assessed by externally set Multiple Choice Examination |

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| **Title:** | **D/617/1187 Lifestyle Management and Motivation for Personal Training** |
| **Level:** | **3** |
| **Credit Value:** | **5** |
| **GLH:** | **29** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand the components of a healthy lifestyle and factors that affect health and wellbeing | 1.1 Explain factors that affect health and wellbeing<br>1.2 Explain how to educate clients on a healthy lifestyle |
| 2. Understand psychological factors influencing behaviour change | 2.1 Describe psychological factors that can influence change<br>2.2 Explain the importance of psychological questionnaires in influencing behaviour change |
| 3. Understand strategies to encourage long-term adherence to positive lifestyle practices | 3.1 Describe different theories and approaches that can motivate positive behaviour change<br>3.2 Outline interventions and strategies to use at each stage of change<br>3.3 Describe how technological advancements can be used to support the client to increase:<br>• physical activity levels<br>• motivation<br>• focus |
| 4. Be able to implement strategies to encourage long term adherence to positive lifestyle practices | 4.1 Use strategies to establish the client's readiness to change their behaviour<br>4.2 Use evidence-based strategies and techniques to create a positive environment |

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| | 4.3 Recognise individual's barriers toexercise<br>4.4 Implement strategies to support clients to overcome barriers to participation<br>4.5 Monitor individual's goals and adapt accordingly<br>4.6 Use strategies to maintain contact and motivate clients between sessions |
| 5. Understand health conditions and medically controlled diseases | 5.1 Describe a range of common healthconditions and medically controlled diseases including the:<br>• features<br>• signs<br>• symptoms<br>5.2 Explain professional role boundaries and scope of practice when:<br>• working with clients with common health conditions<br>• working with clients with medically controlled diseases<br>• offering health and wellbeing advice<br>5.3 Outline how to seek evidence-based health and wellbeing advice |

## Additional information

**Factors**:

- smoking
- alcohol
- nutrition
- physical activity levels and preferences
- weight management
- rest, relaxation and relaxation training
- stress (signs, symptoms, effects and management)
- work patterns/job
- relevant personal circumstances,
- posture

**Psychological factors**:

- self-efficacy
- intrinsic and extrinsic motivation
- social support and peer pressure
- individual client needs and differences: (e.g. experienced, inexperienced,

active and inactive)
- barriers to change: perceived and actual, self-recognition of own barriers
- positive reinforcement

**Positive behaviour change:**
- arousal theories
- motivational interviewing techniques
- trans-theoretical model (stages of change)

**Interventions and strategies:**
- decisional balance sheet/cost benefit analysis
- fitness testing
- strategies to overcome barriers
- SMART goal setting
- behavioural modification techniques
- planning for relapse/contingency planning
- rewards
- focusing and self-monitoring
- support systems and reinforcement strategies

**Technological advancements:**
- wearable technology
- pedometers
- mobile phone applications

**Health conditions:**
- obesity
- osteoporosis
- mental health problems (stress/depression/anxiety)
- lower back pain
- hypertension
- angina
- coronary heart disease (CHD)
- stroke
- pre-diabetes and diabetes
- prevalent forms of arthritis
- cancer
- asthma
- chronic obstructive pulmonary disease (COPD)
- chronic fatigue
- eating disorders (anorexia nervosa and bulimia nervosa)

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| **Evidence based health and wellbeing advice**:<br>• Where to signpost clients<br>• Recommended physical activity guidelines<br>• Health benefits of physical activity<br>• Researching of unfamiliar medical conditions |

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| **Unit aim (s)** | This unit will give learners the opportunity to explore the factors that influence a healthy lifestyle, to consider the ways in which clients may be persuaded to adopt and maintain a healthier and more active lifestyle and the relationship between lifestyle and health. |
| **Assessment requirements** | N/A |

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| **Title:** | **K/617/1189 Consultation, Assessment and Programme Design for Personal Training** |
| **Level:** | **3** |
| **Credit Value:** | **9** |
| **GLH:** | **62** |

| Learning Outcomes<br>The earner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand how to obtain client information to inform programme planning | 1.1 Explain the benefits of a professional membership for personal trainers<br>1.2 Describe industry codes of professional and ethical conduct related to own role<br>1.3 Explain guidelines for physical contact with clients<br>1.4 Explain how to conduct a professional one to one consultation with clients<br>1.5 Explain the importance of obtaining client's consent<br>1.6 Explain factors that influence the selection of client consultation methods<br>1.7 Explain how to use a range of health and fitness assessments, considering their suitability for the client<br>1.8 Explain factors that would influence the selection of client fitness assessment activities<br>1.9 Describe the principles of postural assessment<br>1.10 Describe how to use regular assessments to monitor client progression towards goal achievement |
| 2. Be able to conduct client consultations to collect and analyse information | 2.1 Interact professionally with clients and other relevant individuals<br>2.2 Obtain informed consent<br>2.3 Collect the information required to design, tailor and deliver an effective exercise programme<br>2.4 Risk-stratify clients using recognised risk stratification tools<br>2.5 Seek information from, or signpost clients, to other specialists or medical professionals where relevant<br>2.6 Support the client to recognise and develop their intrinsic and extrinsic motivation to exercise |

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| 3. Be able to conduct health and fitness assessments appropriate to individual clients | 3.1 Plan an assessment appropriate to the:<br>• individual client<br>• assessment conditions<br>• equipment<br>• time available<br>3.2 Prior to commencing any physical assessments, advise the client of the:<br>• purpose of the assessment<br>• correct procedures<br>• protocols<br>• risks<br>3.3 Carry out a client's pre-exercise health and fitness assessment using evidence-based protocols<br>3.4 Interpret results using accepted criteria and 'norm' ranges where appropriate<br>3.5 Develop a profile of the client to assist in the design of a safe and effective programme tailored to their specific needs<br>3.6 Inform clients of analysis outcomes<br>3.7 Agree actions and goals using appropriate language<br>3.8 Undertake regular re-assessments to monitor client progress and goal achievement<br>3.9 Use appropriate products and IT to support and manage effective personal training |
| 4. Understand key principles and guidelines for programming exercise for a range of clients | 4.1 Describe the key principles of designing short, medium and long-term exercise programmes<br>4.2 Explain how to tailor exercise programmes for a range of clients<br>4.3 State current international guidelines for developing the different components of fitness<br>4.4 Describe a range of protocols and tools for monitoring exercise intensity<br>4.5 Identify effective repetition and resistance ranges to develop:<br>• strength<br>• power<br>• endurance<br>• muscle hypertrophy<br>4.6 Identify heart rate training zone models for |

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| | developing aerobic and anaerobic capacity<br>4.7 Explain the purpose and principles of progressive programming and periodisation |
| 5. Understand how to manipulate training variables to meet different programming goals | 5.1 Explain the principles and variables of fitness training<br>5.2 Explain how to manipulate the FITT principles to tailor exercise programmes<br>5.3 Explain how to manipulate the principles of training to tailor exercise programmes to support goal achievement<br>5.4 Describe the typical signs and symptoms of overtraining |
| 6. Understand how to deliver different modes of exercise in different environments | 6.1 Explain how to design and deliver programmes for environments that are not specifically designed for exercise/physical activity including:<br>• outdoors<br>• home-based<br>6.2 Identify a range of resources and exercise modes suitable for training clients in different environments |
| 7. Understand how to design small group training sessions | 7.1 Explain how to adapt the design and delivery of sessions for use with small groups<br>7.2 Describe how to balance the needs of the individual and the group<br>7.3 Explain how to ensure the safety of all clients at all times |
| 8. Understand a range of fitness training techniques and methods | 8.1 Describe cardiovascular training techniques and methods<br>8.2 Describe resistance training techniques and methods<br>8.3 Describe functional skill training methods and techniques<br>8.4 Describe flexibility training techniques and methods to facilitate increased range of motion<br>8.5 Identify the suitability of training techniques and methods for different clients, including:<br>• sedentary clients<br>• experienced clients<br>• high-level performers |
| **Additional information** | |
| **Range of clients**: | |

- sedentary (untrained)
- experienced (trained)
- high-level performer (well-trained)
- recovering from injury
- over-trained
- sport-specific performer
- clients with low-risk health conditions

**Current International Guidelines:**

- ACSM

**Principles and variables of fitness training**:

- FITT principles (frequency, intensity, time and type)
- adaptation
- modification and progression for each component of FITT
- implications of specificity
- progressive overload
- reversibility
- adaptability
- individuality
- recovery time

**Training variables**:

- choice of exercises
- sequence of exercise
- resistance and repetitions
- number of sets
- rest between sets (short-term recovery)
- speed of movement
- type of muscle contraction
- duration of session
- volume of training
- split routines
- rest between sessions (long-term recovery and the importance of adequate rest periods between training loads)

**Evidence-based protocols**:

- PAR-Q
- PAR-Q+
- health commitment statement

- organisation/employer devised methods

**Risk stratification tools**:
- Irwin and Morgan
- ACSM
- national/locally agreed protocols
- referral/care pathways

**Assessments**:
- Height, weight and BMI
- Resting heart rate
- Blood pressure
- Cardiorespiratory fitness (cooper run, YMCA step test, CV machine pre-programmed tests, etc.)
- Muscular strength (1RM, grip strength, etc.)
- Muscular endurance (press ups, sit ups, abdominal curl, etc.)
- Flexibility (sit and reach, visual assessments, etc.)
- Body composition (bioelectrical impedance, skinfold callipers)
- Basic postural analysis

**Cardiovascular training techniques and methods may include:**
- Interval training
- Fartlek
- Continuous

**Resistance training techniques and methods may include**:
- super-sets
- tri-sets
- giant sets
- pre/post exhaust
- pyramid systems
- drop sets
- German volume training
- negatives/eccentric training
- circuit resistance training

**Flexibility training techniques and methods may include**:
- mobilisation of joints
- static stretching
- dynamic stretching

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| • proprioceptive neuromuscular facilitation<br><br>**Functional skill training methods and techniques:**<br>• A range of functional equipment<br>• movement patterns<br>• muscle actions<br>• components of fitness required for daily living |

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| **Unit aim (s)** | This unit allows the learner to show that they understand the factors and processes involved in consulting with clients and are able to use collected information to design fitness programmes that are appropriate to the clients' needs and wants. |
| **Assessment requirements** | N/A |

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|---|---|
| **Title:** | **D/617/1190 Planning and Delivering Personal Training Programmes** |
| **Level:** | **3** |
| **Credit Value:** | **8** |
| **GLH:** | **44** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Be able to plan sessions and programmesfor a range of clients | 1.1 Apply exercise science, methods and techniques to programme design<br>1.2 Plan session and programme content to achieve client's short, medium and long-term goals<br>1.3 Set SMART goals linked to a client's individual needs, wants and motivators<br>1.4 Plan appropriate timings, sequences and intensity of exercises<br>1.5 Prepare equipment and resources as required<br>1.6 Plan warm-up and cool down activities appropriate to the session and individual client<br>1.7 Plan sessions for different environments:<br>• gym<br>• studio/sports hall<br>• outdoors<br>• client's home or other confinedspace<br>1.8 Plan sessions for both individuals and small groups |
| 2. Understand how to observe and adapt exercise technique | 2.1 Explain communication techniques that can be used when instructing clients including verbal and non-verbal<br>2.2 Explain how to observe and monitorclients during sessions<br>2.3 Describe teaching strategies that canbe used to correct and enhance client performance, including:<br>• one-to-one sessions<br>• small group training<br>2.4 Describe methods of maintaining clients' motivation<br>2.5 Explain why it is necessary to modify, adapt, regress or progress exercise programmes |

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| | 2.6 Explain why it is important to monitor individual performance during small group training |
| 3. Be able to demonstrate professional conduct when delivering personal training sessions | 3.1 Introduce self, build rapport and help clients feel at ease in the exercise environment<br>3.2 Explain to clients:<br>• planned objectives of the session<br>• exercises involved including their physical and technical demand<br>• how objectives and exercisessupport their goals<br>3.3 Assess clients' readiness and motivation to take part in the planned exercises<br>3.4 Agree with clients any changes to the planned exercises or physical activities that:<br>• meet their goals and preferences<br>• enable them to maintain progress<br>3.5 Record changes to client's plans<br>3.6 Work within boundaries of own role<br>3.7 Maintain a professional duty of care toensure client safety and wellbeing<br>3.8 Comply with legal responsibilities |
| 4. Be able to instruct and adapt personal training sessions to meet the needs of different clients | 4.1 Deliver personal training sessions to individuals and small groups<br>4.2 Meet client needs by delivering a range of:<br>• cardiovascular training techniques and methods<br>• resistance training techniques and methods<br>• flexibility training techniques and methods<br>4.3 Deliver a range of functional and skill training techniques and methods to meet client needs, including:<br>• functional equipment<br>• appropriate movement patterns<br>4.4 Use motivational techniques to support the client<br>4.5 Provide a warm up and cool down appropriate to the client(s), the planned exercise and the environment<br>4.6 Adapt verbal and non-verbal communication methods to make sureclients understand what is required<br>4.7 Throughout the session, provide the client with specific:<br>• instruction<br>• feedback |

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| | • encouragement<br>• positive reinforcement<br>4.8 Observe, monitor and analyse the client's performance throughout the session<br>4.9 Correct the client's technique at appropriate points to ensure safe and effective alignment, execution and useof equipment<br>4.10 Progress or regress exercises according to client's performance<br>4.11 Offer modifications, adaptations or alternative exercises when required |
| 5. Be able to review sessions and programmes | 5.1 Evaluate sessions and programmes<br>5.2 Review client goals based on outcomes and revise sessions and programme accordingly<br>5.3 Amend future session plans and own performance based on evaluation andfeedback from the client<br>5.4 Give feedback to clients based on review |

## Additional information

**Exercise science, methods and techniques:**

- the musculoskeletal system
- Kinesiology and balanced muscular development
- the cardiorespiratory system
- the energy systems
- physiological responses to exercise
- measuring exercise intensity/response
- exercise safety and contraindications

**Cardiovascular training techniques and methods may include:**

- Interval training
- Fartlek
- Continuous

**Resistance training techniques and methods may include:**

- super-sets
- tri-sets
- giant sets
- pre/post exhaust
- pyramid systems
- drop sets

- German volume training
- negatives/eccentric training
- circuit resistance training

**Flexibility training techniques and methods may include:**

- mobilisation of joints
- static stretching
- dynamic stretching
- proprioceptive neuromuscular facilitation

**Legal responsibilities:**

- health and safety at work
- equality and diversity
- safeguarding
- data protection
- hazard identification
- safe working practices
- ethics and professional conduct

**Evaluate sessions and programmes:**

- session/programme aims
- SMART goals
- session content
- participant performance
- own performance (preparation, delivery)
- health and safety

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| **Unit aim (s)** | This unit will give learners to opportunity toshow that they understand fitness training methods and techniques and that they candeliver relevant and appropriate fitness session in a professional manner. |
| **Assessment requirements** | N/A |

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|---|---|
| **Title:** | **M/617/1193 Nutrition for Physical Activity** |
| **Level:** | **3** |
| **Credit Value:** | **5** |
| **GLH:** | **33** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand the principles of nutrition | 1.1 Explain the functions of:<br>• macronutrients<br>• micronutrients<br>• hydration<br>1.2 Describe the main nutrient groups and their food sources<br>1.3 Explain the impact of nutrition on health |
| 2. Understand key nutritional strategies and guidelines | 2.1 Describe the principles and key features of current government healthy eating guidelines<br>2.2 Distinguish between credible and non-credible sources of nutritional information and guidance to advise clients<br>2.3 Explain how current government health eating advice can be used to support clients with:<br>• weight management<br>• hypertrophy<br>• sports performance<br>2.4 Explain how to educate clients to make good food choices |
| 3. Understand how to use **nutritional assessment tools** | 3.1 Describe tools that can be used to collect client's nutritional information<br>3.2 Explain how to analyse information so that clients' needs and nutritional goals can be identified |
| | 3.3 Explain how to estimate resting metabolic rate and energy requirements to support the achievement of client goals<br>3.4 Explain how to feedback results of nutritional assessments to clients<br>3.5 Explain the circumstances in which a client |

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| | should be referred to another professional before commencing an exercise programme |
| 4. Be able to collect and analyse nutritional information | 4.1 Use nutritional assessment tools to collect information about client's dietary habits<br>4.2 Record information from nutritional assessments<br>4.3 Analyse collected information and identify areas for improvement within own scope of practice |
| 5. Be able to apply the principles of nutrition | 5.1 Use appropriate strategies to educate clients about healthy eating within:<br>• scope of own practice<br>• current government guidelines<br>5.2 Provide clients with information according to their individual health and nutrition needs<br>5.3 Agree review points with the clients<br>5.4 Monitor, evaluate and review the clients' progress towards their nutritional goals |

## Additional information

**Main nutrient groups:**

- proteins
- fats (saturated, unsaturated and essential fatty acids)
- carbohydrates
- vitamins
- minerals
- water

**Nutritional assessment tools:**

- food diary
- food recall log
- food frequency questionnaire body composition assessment

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| **Unit aim (s)** | This unit will enable the learner to demonstrate that they can apply the principles of nutrition to support client goalsas part of an exercise and physical activity programme. |
| **Assessment requirements** | N/A |

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|---|---|
| **Title:** | **T/617/1194 Business Acumen for Personal Trainers** |
| **Level:** | **3** |
| **Credit Value:** | **5** |
| **GLH:** | **29** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand how to create business and marketing plans to support a successful personal training business | 1.1 Describe marketing strategies and techniques that could help to support a personal training business<br>1.2 Explain how to conduct market research<br>1.3 Explain the purpose of developing a:<br>• marketing plan<br>• business plan<br>1.4 Explain the importance of developing a:<br>• business plan<br>• marketing plan<br>1.5 Explain how to produce a business plan<br>1.6 Describe how IT systems can be used to:<br>• support marketing and sales<br>• monitor and interpret data<br>1.7 Explain current legislation and ethical practice that affects the use of technology |
| 2. Understand how to manage finances related to a personal training business | 2.1 Explain the principles of business financials including:<br>• financial forecasting<br>• planned income and expenditure<br>• sales<br>• targets<br>2.2 Describe accounting methods for recording financial performance<br>2.3 Identify current tax and insurance legislation<br>2.4 Explain UK tax requirements, including:<br>• Income tax (PAYE)<br>• national insurance contributions<br>• self-assessment<br>2.5 Identify where to find information and support regarding UK tax |

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| | 2.6 Explain how IT systems can be used to support record keeping, finance and accounting |
| 3. Be able to create a business and marketing plan to support a successful personal training business | 3.1 Conduct market research relevant to their prospective personal training business<br>3.2 Describe the profiles of prospective clients<br>3.3 Create a mission statement for a personal training business<br>3.4 Develop a marketing plan for a personal training business<br>3.5 Create a business plan for a personal training business<br>3.6 Use IT products to support and manage a personal training business<br>3.7 Present a financial forecast for a personal training business |

## Additional information

**Marketing strategies and techniques**:

- Brand awareness
- Self-promotion
- Use of social media

**Market research:**

- SWOT analysis (strengths, weaknesses, opportunities, threats)
- PEST analysis (political, economic, social, technological)
- On-line research
- Review of competitors
- Industry reports

**Current legislation**:

- General Data Protection Regulation (GDPR, 2018)
- intellectual property (IP) law
- patents
- copyright law

**Accounting methods:**

- Profit and loss (include differences between gross and net profit)
- Balance sheet

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| **Unit aim (s)** | This unit will enable the learner to show they know and understand the principles of settingup and running a personal training business from the creation of a business plan. |
| **Assessment requirements** | N/A |

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| **Title:** | **Y/618/1894 Safeguarding adults and adults at risk in a fitness environment** |
| **Level:** | **3** |
| **Credit Value:** | **5** |
| **Calculated GLH:** | **33** |

| Learning Outcomes<br>The learner will: | Assessment Criteria<br>The learner can: |
|---|---|
| 1. Understand what is meant by safeguarding adults and adults at risk | 1.1 Define the term 'safeguarding'<br>1.2 Define what is meant by adults 'at risk'<br>1.3 Describe different types of abuse, including:<br>• Indicators<br>• Static and Dynamic risk<br>1.4 Explain the 6 key principles of safeguarding adults and adults at risk |
| 2. Understand how safeguarding legislation is regulated | 2.1 Describe the current Government legislation that supports the safeguarding ofadults and adults at risk<br>2.2 Describe safeguarding policies that are relevant to adults and adults at risk<br>2.3 Describe procedures for reporting concerns regarding safeguarding for adults and adults at risk<br>2.4 Describe the recruitment procedure for those working with adults in sport |
| 3. Understand the safeguarding of adults andadults at risk in a fitness environment | 3.1 Explain measures to ensure 'good practice'<br>3.2 Explain behaviour that would constitute 'poor practice'<br>3.3 Explain what is meant by 'appropriate behaviour' in relation to safeguarding adults and adults at risk<br>3.4 Describe the difference between appropriate and inappropriate behaviour<br>3.5 Explain the difference between poor practice and abuse in a fitness environment<br>3.6 Outline where to seek advice and support on safeguarding adults and adultsat risk in a fitness environment |

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| 4. Understand roles and responsibilities in safeguarding adults and adults at risk in a fitness environment | 4.1 Describe own role and responsibilities interms of safeguarding adults and adults at risk<br>4.2 Describe the roles and responsibilities ofother people who are involved in safeguarding adults and adults at risk<br>4.3 Explain the scope of own role regarding safeguarding and in what circumstances help and support of others would be sought<br>4.4 Describe how to appropriately respond toan adult should they make a disclosure<br>4.5 Explain why it is important to share relevant information regarding the safeguarding of adults and adults at risk |
| 5. Be able to safeguard adults and adults at risk in a fitness environment | 5.1 Create a safe fitness environment<br>5.2 Employ appropriate behaviour and good working practices with all adults in the fitness environment, including applying:<br>• the 6 key principles<br>• relevant government legislation<br>5.3 Recognise potential indicators of adult abuse<br>5.4 Recognise poor practice that could putadults at risk<br>5.5 Apply procedures around safeguarding adults and adults at risk<br>5.6 Seek advice and support when required<br>5.7 Demonstrate accurate report writing |

## Additional Information

**Government legislation** can include:

- The Care Act 2014
- Safeguarding Vulnerable Groups Act 2006
- The Equality Act 2010
- The Mental Capacity Act 2005
- GDPR 2018
- Human Rights Act 1998
- Sexual Offences Act 2003

Where to seek advice and support on safeguarding adults and adults at risk in a fitnessenvironment can include:

- local authority
- local sport advisory board
- National Governing Bodies (NGB)

<table>
<tr><td colspan="2">

- adult social services

**6 key principles** of safeguarding adults and adults at risk:

- Empowerment
- Prevention
- Proportionality
- Protection
- Partnership
- Accountability

**Indicators:** the signs and/or symptoms associated with each type of abuse identified

**Static and Dynamic risk** factors: the possible circumstance/s that may lead to abuse

</td></tr>
<tr><td>Unit aim (s)</td><td>This unit will give learners an understanding of safeguarding appropriate to their role.<br>They will explore the legislation, policies and procedures relevant in a fitness environment and gain the confidence to implement safeguarding procedures that are necessary in order to safeguard and protect adults and adults at risk.</td></tr>
<tr><td>Assessment requirements</td><td>For some criteria in LO5 where there is no naturally occurring evidence, learners may provide alternatives to observable assessment such as through questioning or reflective accounts</td></tr>
</table>

# Additional Information:

## Test Specification for A/617/1178 Level 2 Anatomy and Physiology for Exercise

The unit "A/617/1178 Anatomy and Physiology for Exercise" is externally assessed by a Multiple Choice Question (MCQ) examination. The test rules for this MCQ test are as follows:

- Total number of questions: 40
- Pass mark: 24/40 this equates to 60%
- Test duration: 60 minutes

**Additional notes:**

- Learners should attempt all questions within each section of the test.
- The MCQ test will be taken on Surpass.
- The questions are written against the assessment criteria which is set out within the qualification.
- The table below shows the split of the questions against the assessment criteria and their learning objectives.

| Learning Outcome | Assessment Criteria | Number of Questions per learning outcome |
|---|---|---|
| **1. Understand the structure and function of the cardiorespiratory system** | 1.1 Describe the structure and functions of the:<br>• heart<br>• blood vessels<br>• lungs | **7** |
| | 1.2 Describe how blood moves through the four chambers of the heart | |
| | 1.3 Describe the difference between systemic and pulmonary circulation | |
| | 1.4 Outline systolic and diastolic blood pressure | |
| | 1.5 Identify blood pressure classifications | |
| | 1.6 Identify the main muscles involved in breathing | |
| | 1.7 Describe the passage of air through the respiratory tract | |

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| | 1.8 Explain the process of gaseous exchange including:<br>• internal respiration<br>• external respiration | |
| **2. Understand the structure and function of the skeleton** | 2.1 Describe the functions of the skeleton | **6** |
| | 2.2 Identify the bones of the:<br>• axial skeleton<br>• appendicular skeleton | |
| | 2.3 Explain the classification of bones | |
| | 2.4 Describe the structure of a long bone | |
| | 2.5 Explain the stages of bone growth | |
| | 2.6 Describe posture, including:<br>• curves of the spine<br>• neutral spine alignment<br>• potential ranges of motion of the spine<br>• postural deviations | |
| **3. Understand the joints of the skeleton** | 3.1 Explain the classification of joints | **5** |
| | 3.2 Describe the structure of synovial joints | |
| | 3.3 Describe the types of synovial joints and their range of motion | |
| | 3.4 Describe joint movement potential and joint actions | |
| | 3.5 Describe the anatomical planes of movement | |
| | 3.6 Explain the effect of exercise variables on biomechanics and kinesiology | |
| **4. Understand the muscular system** | 4.1 Describe the characteristics and functions of the three types of muscle tissue | **8** |
| | 4.2 Describe the structure of skeletal muscle | |
| | 4.3 Describe the structure of the different types of connective tissue | |
| | 4.4 Identify anterior and posterior skeletal muscles | |
| | 4.5 Describe the structure and function of the pelvic floor muscles | |
| | 4.6 Describe skeletal muscle fibre types and their characteristics | |
| | 4.7 Describe the different types of muscle actions:<br>• isometric (static)<br>• isotonic (concentric and eccentric) | |
| | 4.8 Identify the joint actions brought about by specific muscle group contractions | |
| | 4.9 Define anatomical terms of location | |
| **5. Understand the life-course of the** | 5.1 Describe the life-course of the musculoskeletal system and the implications for exercise when working with:<br>• young people (13 – 18) | **1** |

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| **musculoskeletal system** | • antenatal and postnatal period<br>• older adults (50 plus) | |
| **6. Understand the energy systems and their relation to exercise** | 6.1 Describe how carbohydrates, fats and proteins are used in the production of energy and adenosine triphosphate | **4** |
| | 6.2 Describe the by-products of the three energy systems including their significance in muscle fatigue | |
| | 6.3 Explain the use of the three energy systems during aerobic and anaerobic exercise including the effects of:<br>• exercise type, duration and intensity<br>• endurance training on the use of fuel for exercise | |
| | 6.4 Describe:<br>• anabolism<br>• catabolism<br>• excess post-exercise oxygen consumption (EPOC) | |
| **7. Understand the nervous system and its relation to exercise** | 7.1 Describe the functions of the nervous system | **4** |
| | 7.2 Describe the principles of muscle contraction | |
| | 7.3 Describe the 'all or none law'/motor unit recruitment | |
| | 7.4 Explain how exercise can enhance:<br>• neuromuscular connections<br>• improve motor fitness | |
| **8. Understand the digestive system** | 8.1 Describe the functions of the alimentary canal | **5** |
| | 8.2 Explain how fats, proteins and carbohydrates are digested and absorbed | |
| | 8.3 Explain the role of dietary fibre in the maintenance of gut function | |
| | 8.4 Explain the role of the liver and pancreas in assisting digestion | |
| | 8.5 Identify typical timescales for the digestive process | |
| | 8.6 Explain the importance of fluid for the digestive process | |

# Test Specification for Y/617/1186 Level 3 Applied Anatomy and Physiology

The unit "Y/617/1186 Applied Anatomy and Physiology" is externally assessed by a Multiple Choice Question (MCQ) examination. The test rules for this MCQ test are as follows:

- Total number of questions: 40
- Pass mark: 24/40 this equates to 60%
- Test duration: 60 minutes

**Additional notes:**

- Learners should attempt all questions within each section of the test.
- The MCQ test will be taken on Surpass.
- The questions are written against the assessment criteria which is set out within the qualification.
- The table below shows the split of the questions against the assessment criteria and their learning objectives.

| Learning Outcome | Assessment Criteria | Number of Questions for learning outcome |
|---|---|---|
| **1. Understand the cardio-respiratory system and its relation to exercise and health** | 1.1 Explain the following terms in relation to short and long term exercise and the efficiency of the heart:<br>• cardiac cycle<br>• stroke volume<br>• cardiac output | **4** |
| | 1.2 Explain the effect of disease processes on the structure and function of blood vessels | |
| | 1.3 Describe health risks associated with systolic and diastolic blood pressure classifications | |
| | 1.4 Explain the short and long term effects of cardiorespiratory exercise on:<br>• blood pressure<br>• respiration<br>• venous return<br>• implications of blood pooling | |

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| **2. Understand the skeletal system and its relation to exercise** | 2.1 Explain how bones and bone density are affected by:<br>• the role of osteoblasts and osteoclasts<br>• hormonal contribution<br>• body weight<br>• dietary influences<br>• weight bearing and non-weight bearing exercise<br>• high and low-impact exercise | **5** |
| | 2.2 Explain factors that affect the stability of joints | |
| | 2.3 Explain potential risks resulting from unstable and dysfunctional joints | |
| | 2.4 Explain how the structure of joints enables them to act as shock absorbers | |
| | 2.5 Explain the bone modelling and remodelling processes | |
| **3. Understand the muscular system and its relation to exercise** | 3.1 Describe the actions of the major muscles of the body | **10** |
| | 3.2 Identify the muscle attachment sites (origins and insertions) for the major muscles of the body | |
| | 3.3 Describe joint actions brought about by contraction of specific muscle groups | |
| | 3.4 Describe the role of contributory muscles as:<br>• agonist<br>• antagonist<br>• synergist<br>• fixators | |
| | 3.5 Describe the significance of anatomical axes and planes of movement to muscle balance and function | |
| | 3.6 Explain the effect of the following exercise variables on biomechanics and kinesiology:<br>• first, second and third class levers<br>• centre of gravity<br>• momentum<br>• force<br>• length-tension relationships<br>• open and closed kinetic chain movements | |
| | 3.7 Explain the following principles of muscle contraction in relation to exercise:<br>• concentric and eccentric (isotonic)<br>• isometric and isokinetic<br>• stretch and reverse stretch reflexes<br>• sliding filament theory<br>• size principle of motor unit recruitment | |

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| | 3.8 Explain the short and long-term effects of exercise on muscles including:<br>• delayed onset muscle soreness (DOMS)<br>• muscle fatigue<br>• hypertrophy<br>• metabolic benefits | |
| | 3.9 Describe the response of muscles to:<br>• overuse<br>• underuse<br>• misuse | |
| **4. Understand postural and core stability** | 4.1 Describe the structure and function of:<br>• 'core' muscles<br>• stabilising ligaments of the spine | **6** |
| | 4.2 Explain the classification of core muscles including if they are:<br>• 'local/deep'<br>• 'global/superficial' | |
| | 4.3 Describe the structure and function of intervertebral discs | |
| | 4.4 Explain the effects of abdominal adiposity and poor posture on movement efficiency | |
| | 4.5 Describe abnormal degrees of curvature of the spine and their implications for physical activity | |
| | 4.6 Explain the impact of core stabilisation exercise including the potential for injury and aggravation of problems | |
| **5. Understand the nervous system and its relation to exercise** | 5.1 Explain the function, in relation to exercise, of:<br>• the central nervous system (CNS)<br>• the Peripheral Nervous System (PNS) including somatic and autonomic systems | **7** |
| | 5.2 Describe nervous control and transmission of a nervous impulse | |
| | 5.3 Explain the process of motor unit recruitment including the:<br>• significance of a motor unit's size<br>• number of muscle fibres | |
| | 5.4 Explain the function of muscle proprioceptors including muscle spindles and Golgi tendon organs | |
| | 5.5 Describe the relevance of proprioceptors to exercise, to include:<br>• the stretch reflex<br>• reciprocal inhibition (inverse stretch reflex)<br>• the 'stretch-shortening cycle' and its application to plyometric training | |

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| | 5.6 Explain the neuromuscular adaptations associated with training, to include:<br>• more efficient motor unit recruitment<br>• improved inter-muscular coordination<br>• improved intramuscular coordination | |
| | 5.7 Explain the benefits of improved neuromuscular coordination to exercise performance | |
| **6. Understand the endocrine system and its relation to exercise and health** | 6.1 Describe the structure of the endocrine system, including both glands and hormones | **4** |
| | 6.2 Explain the main functions of the following hormones:<br>• Human Growth Hormone (HGH)<br>• Thyroxine<br>• Parathyroid hormone<br>• Corticosteroids<br>• Adrenaline and noradrenaline (catecholamines)<br>• Insulin<br>• Glucagon<br>• Oestrogen<br>• Testosterone | |
| | 6.3 Explain typical hormonal responses to:<br>• training<br>• overtraining | |
| | 6.4 Describe signs and symptoms of overtraining | |
| **7. Understand energy systems and their relation to exercise** | 7.1 Explain how the energy systems function independently and interact with one another | **4** |
| | 7.2 Describe ATP re-synthesis | |
| | 7.3 Explain aerobic and anaerobic thresholds and their significance in the planning of training programmes | |
| | 7.4 Explain the effects of different training methods on energy systems | |