



LEVEL 2 CERTIFICATE IN GYM INSTRUCTING

Coursework Manual

THE FITNESS GROUP

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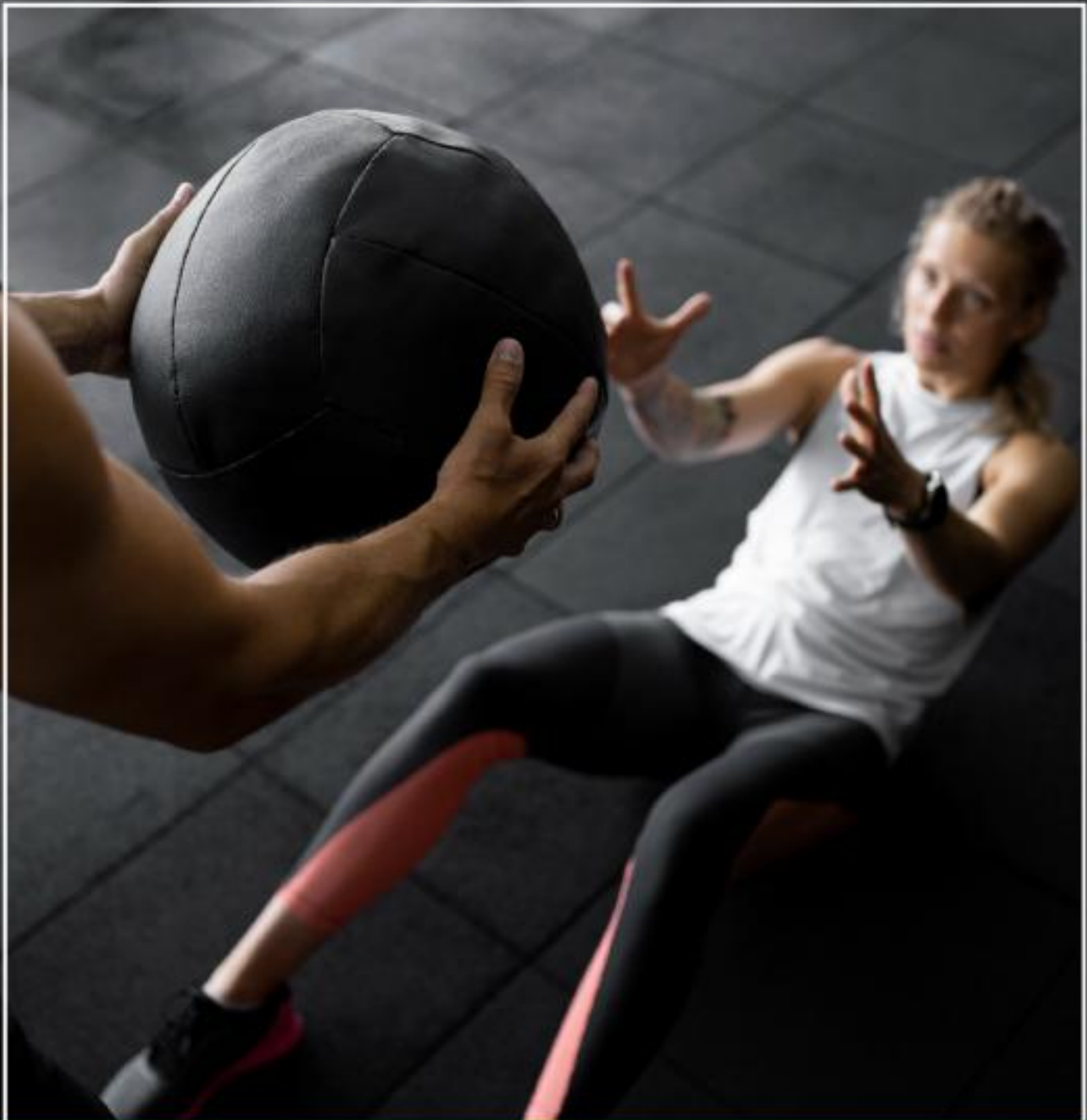
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Unit 1 : Section 1

The Roles and Responsibilities of a Gym Instructor in a Fitness Environment.

PROFESSIONALISM AND CUSTOMER CARE:

- ❖ Playing a supporting role in the overall customer experience of clients and members in the gym
- ❖ Supporting the gym with member retention through diligent and professional practices
- ❖ Assisting members with their motivation to exercise consistently over time
- ❖ Working with clients to carry out pre-exercise screening, consultations, demonstrations of safe exercise technique and gym inductions
- ❖ Assisting members with planning and safe and effective gym-based exercise programmes
- ❖ Supervising a gym-based environment to ensure safety, and assisting gym members where appropriate
- ❖ Being available to members by walking the gym floor, and providing assistance where appropriate
- ❖ Where appropriate signposting clients to other professionals
- ❖ Taking an active role in the health and safety of the fitness environment

EQUALITY & DIVERSITY

Equality refers to providing equal opportunities to everyone and protecting people from being discriminated against. Diversity refers to recognising and respecting and valuing differences in people.

In the modern workplace, equality and diversity are of high importance, this is especially the case in the fitness environment. In order to remain compliant with ethical codes of practice and relevant legislation, a gym instructor has to remain conscious of equality and diversity at all times.

There are currently nine characteristics that are protected by law in the United Kingdom:

- ❖ Age
- ❖ Disability status
- ❖ Gender, whether birth gender or gender reassignment
- ❖ Marriage/Civil partnership status
- ❖ Pregnancy and maternity
- ❖ Race
- ❖ Religion/belief
- ❖ Sex
- ❖ Sexual Orientation

Occupation/
employment
status

Taste in
music/TV
programmes

Political
persuasion

Accent

Favourite
sports
teams

Skin/hair
colour

Family

Mental/
Physical
ability

Sexual
orientation

Appearance

Socioeconomic
status

Schooling
public/private

Geographic
location

Hobbies/
talents

Height &
weight

Ability and
confidence

There are various legislative acts that seek to protect individual and collective characteristics. The Equality Act 2010, is one such act that covers previous acts such as the Race Relations Act, 1976, updated in the Race Relations Amendments Act, 2000.

In any professional setting it is required that a person should act within the legal bounds of equality at any given time, especially when providing a service. This seeks to ensure that all people who are either clients, employees or partners are treated fairly, in irrespective of any differences between them and others.

ETHICAL CONDUCT AND CODES OF PRACTICE

It is common for any given profession or specialisation to be subject to specific codes of practice that individuals and organisations across a given industry should uphold.

Though, enforcement of ethical practices and codes of practice can bring serious consequences to those professionals who breach the ethical guidelines to which they are bound. Ethical codes of practice are however, separate to legislation and a professional can experience the consequences for breaching ethical codes of practice without necessarily breaking the law.

Generally speaking, the following are considered to be ethical standards rather than legally enforceable considerations to the practice of a gym instructor:

- Professional action must bring no harm to clients.
- Clients have the right to choose their own direction.
- Be faithful to clients, the profession, the employing organisations and ultimately yourself.
- Be just and fair to all clients, thereby ensuring non-discriminatory professional actions.
- Be of benefit to clients by promoting their welfare.
- Treat all clients with dignity and respect.
- Be fully accountable to clients.
- Maintain clear and unwavering professional boundaries.

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SCOPE OF PRACTICE

The term scope of practice refers to the things that a professional is allowed to do within the bounds of their qualification and role.

For Gym Instructors, this is especially important, as operating in areas that fall out with the scope of practice, would potentially lead to a client being harmed, and the instructor being held liable.

Common things that would fall out with the scope of practice for the gym instructor can include:

- ❖ Advice and prescription of exercise for chronic or severe back pain
- ❖ Building a programme for an athlete who is planning to run a marathon
- ❖ Giving exercise advice to a client who is living with a mental health condition
- ❖ Clients who require advanced nutritional advice, or who are pregnant

In the instance that a person who would fall out with the scope of practice approached a gym instructor, this is the point at which, they should be referred, or signposted to another professional.

Another professional could be another person within the fitness industry such as a personal trainer who is qualified to work with clients who are in their pre or postnatal period, or it could be a medical professional such as a nutritionist, GP or a physiotherapist.

Other examples of fitness professionals who it may be appropriate to sign post clients to can include:

- ❖ Those who are qualified to work with clients that have been referred for exercise by their GP
- ❖ Personal trainers who are qualified to work with clients who are living with diabetes and/or obesity

INSURANCE REQUIREMENTS

Due to the very nature of the industry and the activity performed within it, there is a higher risk of both fitness industry customers and fitness professionals of becoming injured or experiencing ill health than in other sectors.

It is therefore important for all fitness professionals, regardless of position or specialism to be covered by the appropriate insurance policies.

If a gym instructor is employed by a business or a gym directly, then they will be covered by that company's policies where relevant. Usually this would allow them to be covered under the public liability insurance which offers a level of legal cover for the company and its employees against claims such as personal injury, ill health or damage to a person's property.

If however a gym instructor is self-employed, it is likely that they will have to obtain their own public liability insurance in addition to other policies that may be required depending on the gym instructor's individual position.

These can include:

- ❖ Professional indemnity insurance which provides a degree of legal protection against the gym instructor for any injury or damage that could occur as a result of the instructor giving a client poor advice or inadequate service
- ❖ Personal liability insurance
- ❖ Business equipment insurance, which would provide a degree of protection to the instructor for any claims that they might incur as a result of causing damage to another party's equipment

Claims are inherently varied in nature, however commonly they often stem from either negligence and poor quality of advice given to clients or because of behaviour whether actual or alleged.

These two overarching categories can include claims such as:

- ❖ The personal injury of a client, and the costs that can come with this such as compensation and loss of earnings
- ❖ Negligence in such a way that a client does not make any progress guaranteed by the instructor, amounting to a lack of service being provided
- ❖ Behavioural claims, are commonly associated with harassment or sexual harassment, whether actual or alleged

WHAT CAN THE GYM INSTRUCTOR DO TO PREVENT CLAIMS BEING MADE AGAINST THEM?

There are several key processes that every gym instructor should follow with an appropriate degree of diligence in order to mitigate the risk of claims being made against them in the first instance. These processes, can also assist the gym instructor in facing any issues that may arise in the event that a claim is made against them.

KEEP ACCURATE AND CONSISTENT DOCUMENTATION

Before the first session with a given client takes place, the gym instructor should ensure that the proper procedure and accompanying documentation has been carried out.

Prior to working with any client, a gym instructor should have several items of documentation, these will most commonly include:

- ❖ Details of their health and fitness screening
- ❖ A copy of the physical activity readiness questionnaire
- ❖ A copy of their informed consent form stating that they understand the contents of a given session/programme, and that they understand the presence of certain inherent risks to exercise

An accurate and complete training log should also be maintained by the gym instructor, specifying times and dates that certain instruction was given to the client, and the client's confirmation that they have understood what they have been instructed in, and that they did not have any questions about it prior to beginning. This can help a gym instructor provide evidence in their defence if there is a claim of a lack of instruction or of negligence.

This can be as simple as a couple of sentences to summarise the contents of the session.

If a client is working on a fitness programme, a Fitness Professional should help them to review this regularly, and check for understanding before answering any questions or uncertainties that the client might have.

FORMING AND MAINTAINING PROFESSIONAL RELATIONSHIPS

A crucial part of professional practice, especially in the fitness environment is forming and maintaining professional relationships with clients. The Key to this is to seek to understand your client in a given moment and this can be done by asking them open ended questions about what they are experiencing such as the following:

- ❖ "How do you feel about this exercise?"
- ❖ "Can you tell me about why you don't like particular exercises?"
- ❖ "Is there anything about this exercise you would like to change?"



When using open ended questioning, it is important to remember that the gym instructor should not be looking for a quick fix to a problem, but rather attempting to understand the client and their preferences so that they can be guided in the most effective way for them.

It is possible that a client might not like a particular movement or exercise as a result of being anxious about their safety, or having a lack of confidence in their ability to carry out the exercise. In this instance, the gym instructor can then determine whether or not the client needs to be taught the exercise in more depth so that the client might feel confident in carrying it out, or if they need to find an adaptation to the exercise so that the client can carry it out safely.

BEING AS ORGANISED AS POSSIBLE TO ENHANCE CLIENT EXPERIENCE

At the most basic level a gym instructor should be organised in such a way that they are storing all documentation, especially documents that contain personal data in a manner that is both secure and organised. This means that they will be able to find any relevant documentation in the event that they need it to support their client, or in the event of a claim being made against them. This will also help them adhere to data protection regulations.





Unit 1 : Section 2

Exploring the Needs of Fitness Facility Customers

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In all dynamic industries, customer needs and industry standards grow with the changes in the market.

There are many things that the fitness industry provides that aim to satisfy the needs of a given client or group of clients.



It is important for a gym instructor to be aware of this and understand the needs to the customer as it is a key part of their role to support a gym in satisfying the varying needs of the client. The above diagram states and categorises some of the equipment and services that clients expect to see in different types of facilities.

All gyms and fitness facilities will attempt to provide at least one broad category of these services and equipment in order to appeal to their target market. Some gyms will only offer some areas of client needs and will remain specialised, targeting a particular activity or type of training, while others will be more varied and inclusive of other services and equipment.

An example of this might be that a large-scale commercial gym, with branches in most large cities, will provide a wide array of equipment and services ranging from personal training to swimming and spa facilities in addition to regular gym access. Gyms and health clubs such as this can either be budget friendly and low cost, offering basic equipment and services, right through to premium services and equipment.

Another example of a gym fitting into this category might be smaller studios that are utilised by fitness instructors and personal trainers. Although these often do have a breadth of equipment, this will also be limited in availability, and the facility is most likely to only cater to a small number of clients.

TYPICAL PRODUCTS AND SERVICES THAT CAN BE FOUND IN A FITNESS FACILITY

Fitness instructors can offer a wide range of products and services themselves, and assist the wider facility in providing others.

Typically, the services that a gym instructor can provide include the following:

- ❖ Inductions, in which, they lead new clients through the safe and effective use of gym equipment and briefing them on the necessary health and safety information
- ❖ Health screenings and initial consultations with gym members and clients. This can also include fitness testing.
- ❖ Providing more comprehensive explanations of exercises to clients to help them understand the movements that they are carrying out
- ❖ Helping clients with their motivation and helping them to set SMART goals that facilitate them surpassing their previously identified barriers to success
- ❖ Offering basic guidance on the healthy eating guidelines in line with the national, publicly available guidelines

Specialist services that seek to address a specific target market can most commonly include:

- ❖ Standard and enhanced personal training that can sometimes cover specialisms such as exercise referral schemes, or personal trainers who have a specialism in pre and postnatal training
- ❖ Some facilities will host an in house nutritionist and/or physiotherapist who gym instructors can sign post to if appropriate
- ❖ Other professionals that can operate in a fitness facility include sports massage therapists and sports coaches.

COMMON OPTIONS FOR MEMBERSHIP AND CONTRACTS THAT CLIENTS CAN SIGN UP TO

Businesses that operate fitness facilities offer a wide variety of membership, billing and contractual options, depending on the specific needs identified for their target market.

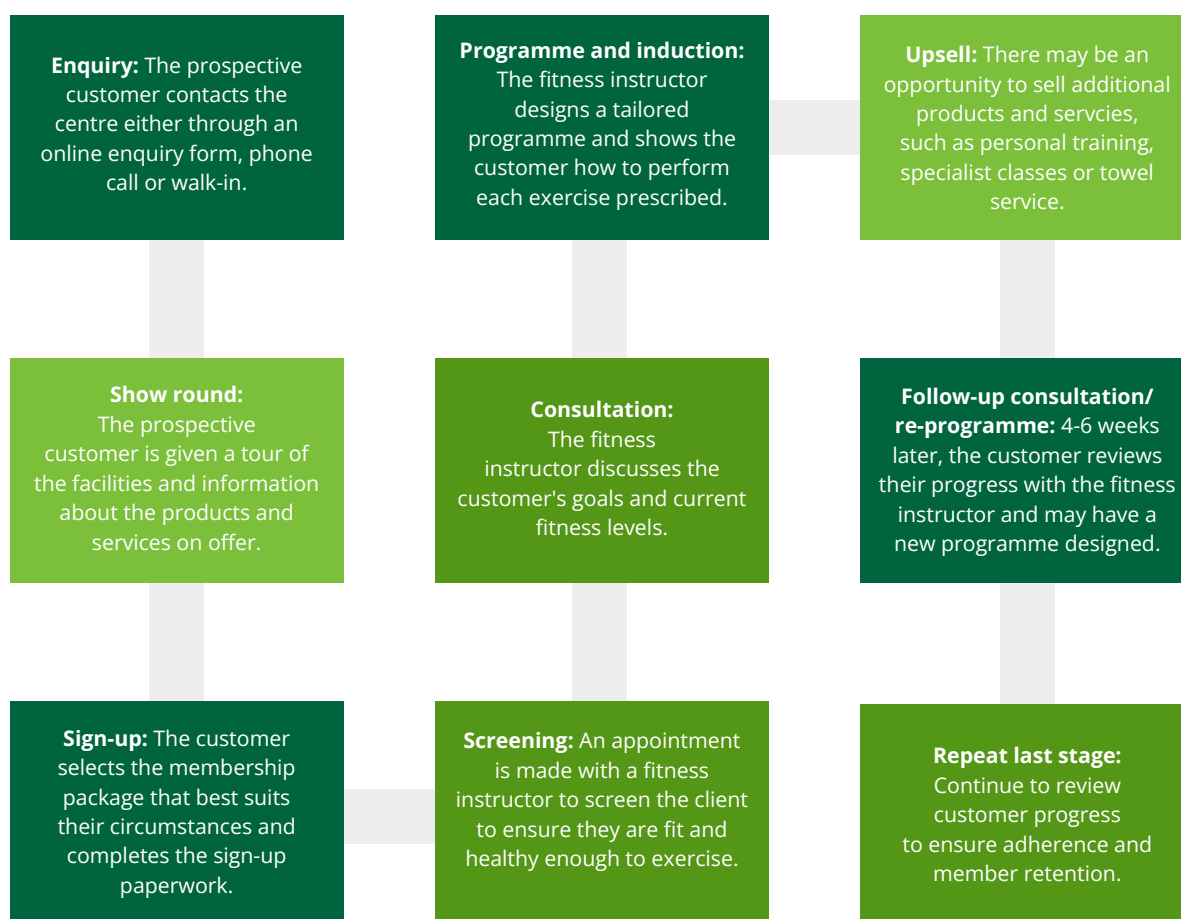
Often, more budget friendly facilities will capitalise on no-contract arrangements with their members to maximise the number of people who sign up to their membership options.

Whereas, more comprehensive, premium options, often use fixed term contracts with higher average costs to focus more on member retention, rather than generation of new memberships as their primary source of income.

Membership/Contract	Description	Who might it benefit?
Membership/Contract	Minimum 12-month membership to access all facilities and services offered as standard. This can be offered either. through monthly payments, which may include a 'sign-up fee', or payment in full, which is normally at a lower price than the total yearly cost of the pay monthly option.	Customers who plan to attend regularly normally consider this the best value for money.
'Pay as you go'	This gives the customer the option of only paying for access to fitness facilities as and when they use them.	Customers who, for various reasons, cannot commit to regular attendance may find this a cheaper option. It is also useful for customers who may not be staying at the same location for a full year and only wish to commit to a few months of gym membership.
Off-peak membership	Customers can only use the fitness facility during quieter periods - normally between 10am and 3.30pm and on weekends at some facilities. This is normally a cheaper option than peak membership.	Customers who are retired, work unsociable or part-time hours or are not in work may benefit from this cheaper option.
Family membership	Fitness facilities offer family memberships that provide additional services such as a 'kids' clubs' and sports coaching lessons.	Families who wish to be active together without having to attend different activities/events at various locations.
Corporate membership	Some fitness facilities offer local employers the option of a discounted membership if their employees join.	Local employees would benefit from a cheaper contract. Employers benefit from a healthier workforce, increased
No contract membership	Fixed monthly payments with no minimum duration, meaning the customer can cancel at any time.	Customers not willing to commit to a 12-month contract normally find this option cheaper than 'pay as you go'.
Membership offering additional services e.g. 'Platinum membership'	The basic offering with additions such as access to unlimited sports facilities, e.g. squash or tennis courts.	Customers who want to make full use of everything the fitness facility has on offer.

THE JOURNEY OF A CLIENT IN THE FITNESS ENVIRONMENT

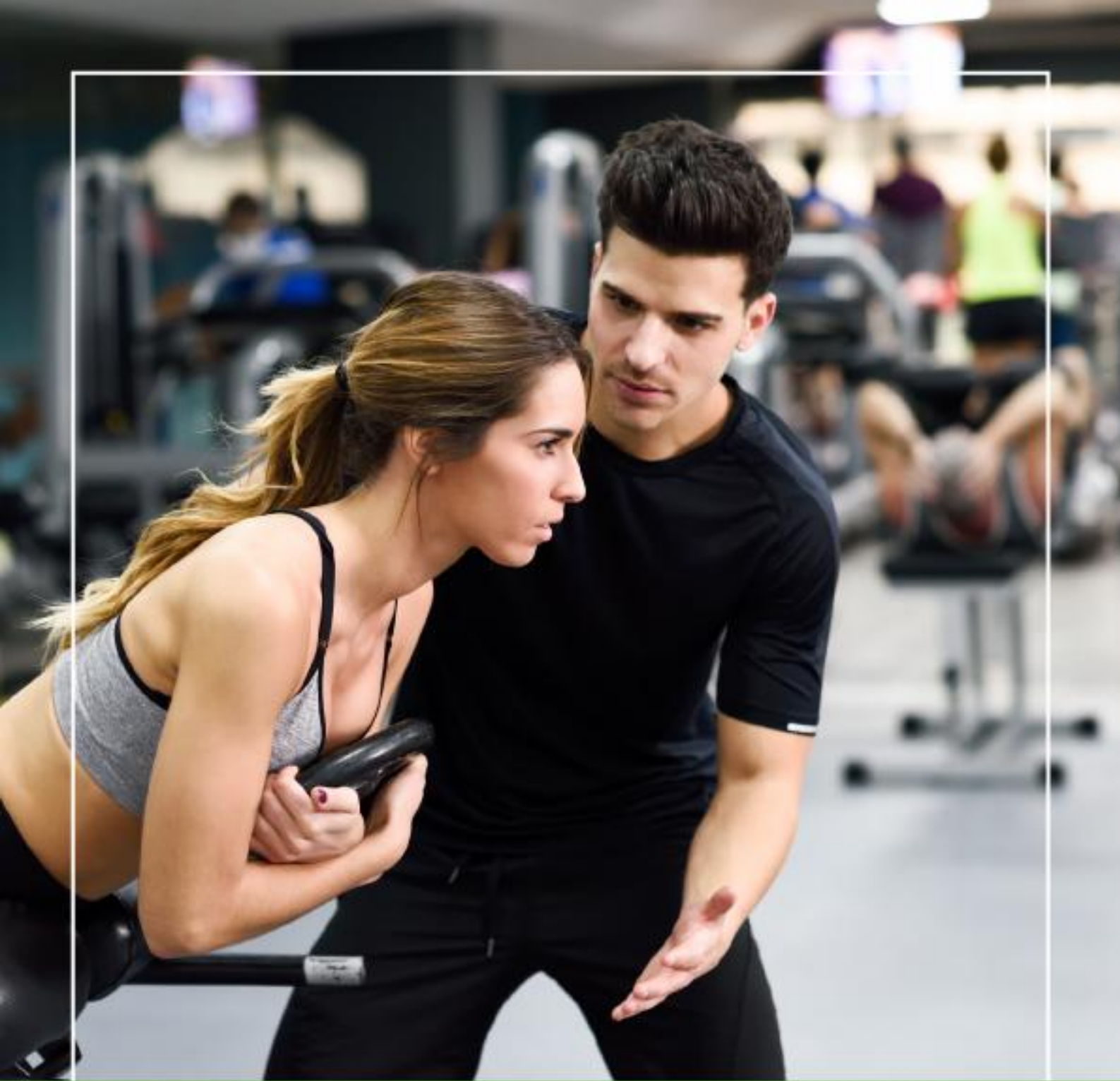
When we discuss the journey of a client, we refer to the stages a client goes through from the point of entering the facility to the first time until they renew a membership or make the decision to leave the facility.



Whether during an initial conversation about signing up, or whether it is once their membership is active, a prospective member, or a member can decide that they will not sign up, or not continue with their membership.

Client retention is one of the most important factors for facilities to consider when considering their income and outgoings as a business. This is why it is so important for a gym instructor to actively engage in professional practice that seeks to both maintain and improve member retention.

As a guide; it is suggested that it can cost more than six times more for a gym or fitness facility to obtain a new member than it does to keep an existing one. In some instances the actual figure can be higher, or indeed lower, however this highlights the importance of the role that the gym instructor plays in the overall picture of member retention.



Unit 1 : Section 3
Providing Clients and Members with
the Best Customer Care Possible

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CUSTOMER CARE COVERS WIDE AREAS OF INTERACTION

This can cover both direct and indirect, with customers and clients. Providing the best care possible allows a fitness facility or gym to provide service that both provides new members, and increases member retention.

At a bare minimum a fitness facility should offer fitness staff who are competent and practice their role safely and effectively in addition to equipment and facilities that are both functional and hygienic. Most customers would also expect any process they have to go through to be efficient and considerate of their time.

If these basic things are not met, it is likely that the member will complain, or decline to renew their membership, which not only loses business for a gym and the staff that work there, but also incurs a cost for the gym in finding new members.

All facilities and fitness professionals within them, should therefore aim - at all times - to exceed this and provide an exceptional customer experience for their clients.



WHAT DOES PROVIDING EXCELLENT SERVICE AND CUSTOMER CARE DO FOR THE FITNESS FACILITY AND THE GYM INSTRUCTOR?

Economic Importance

As all fitness facilities are businesses, they need to make money in order to remain open and to be successful. Providing excellent customer care and exceeding the expectations of the client can mean that the overall profits and sales improve, and that these sales are more frequent. It also means that the fitness facility is able to invest less of its resources into attracting new members, and can instead aim to signpost clients to other services they offer such as physiotherapy or to an in-house restaurant.

Importance for Employers and Facility Managers

Customers will be more loyal to the facility and in turn be more willing to continue attending, and renew their membership. There will also be a reduction in the number and the severity of complaints as a result of preventing customer relation issues arising through good service.

Importance for the Working Life of the Gym Instructor

Having a more positive, customer-centred environment to work in will lead to gym instructors being more comfortable carrying out their duties, and will mean there are higher levels of motivation and productivity, which is especially important to self-employed gym instructors and Fitness Professionals.

There will also be a more comfortable working environment between employer and employee in fitness facilities, as there when good service is carried out regularly, there will be fewer

complaints, and thus there will be less pressure on employees from management to improve customer relations.

HOW DO WE AS GYM INSTRUCTORS HELP OUR CLIENTS TO HAVE A POSITIVE EXPERIENCE?

There are several factors in a customer's experience that will contribute to that experience being positive. Perhaps the simplest of which, is positive working relationships between them and the staff being formed, and used to reinforce a customer-centred environment.

Throughout the day to day activities of the gym instructor, there will be various opportunities upon which they can choose to assist gym members in ways that either involve minimal effort from the gym instructor, and some in which they would have to go out of their way to help.

Meeting a Client for the First Time

When the gym instructor meets a client or a gym member for the first time, it is critical that they make a positive first impressions. This will help the client to view the gym instructor in a positive light and begin to associate them with an overall positive experience with the fitness facility.

This will also act as a first step towards the client forming a working relationship with the gym instructor such that they are more likely to want to work with that person directly and in a way that allows them to continue supporting the client through their customer journey.

A positive first impression being made by the gym instructor can also directly influence client retention as a positive relationship with staff will encourage a member to continue or renew their membership, and also makes it more likely that staff can resolve queries before they become complaints.

Walking the Gym Floor

Walking the gym floor is a term that is commonly used to describe a gym instructor being present on the gym floor, and available to assist clients when they are either looking for help, or don't seem sure what to do.

In this situation, a gym member could signal to the gym instructor that they are looking for assistance, or the gym instructor can recognise that the member might need a bit of assistance.

When approaching a gym member to offer help, the gym instructor should consider the following:

- ❖ Approaching in a friendly manner, either smiling, or making a friendly gesture, such as waving
- ❖ The instructor should always make sure to approach the client from the front or from the side to prevent frightening them
- ❖ They should first ask how the client is on that given day and take the time to listen authentically
- ❖ They should then offer help with anything that the client

If the gym instructor sees a client performing an exercise that is in any way unsafe, they should stop them from doing so as soon as possible. Where possible, this however, should not be done in such a way that will lead to the client feeling embarrassed or put out of sorts.

In this instance, the gym instructor should approach the client, using the above method as a framework and ask if they can demonstrate a safer and more effective method of carrying out the exercise. If the client declines the help of the instructor, they may have to clearly tell the client that their exercise was unsafe and that they should perform the exercise correctly in order to minimise their risk of injury.

While being present on the gym floor, it is also possible that the gym instructor will come across a client who is looking at a poster or at a noticeboard. In this instance the gym instructor should approach the client, again following the above protocol to make sure that they are addressing them in a welcoming manner, before proceeding to offer their help with any questions relating to the notice board that the client might have and to signpost them to other services or classes, depending on what they are interested in.



USING INFORMATION TO SUPPORT CLIENT NEEDS

There are various forms of information and types of information that a gym instructor may be required to access in order to help support their clients.

This can range from general policies set by the fitness facility, right through to medical information about clients, however the information that the gym instructor will need to obtain or access will broadly fit into the categories of internal to the organisation or facility and external to the facility or organisation.

Standard information that can be found and accessed and updated within the organisation or facility can include:

- ❖ Booking information for classes or uses of space
- ❖ Booking and referral information for any other professionals working within the facility who might have clients sign posted to them by gym instructors
- ❖ Codes of practice for the facility staff and codes of conduct for members or clients
- ❖ Any record of external information that has been stored in the facility and is subject to data protection regulations

Any external information that will be handled, obtained or accessed by the gym instructor, will be subject to the facility's GDPR policy which the gym instructor should strictly adhere to.

It might also be relevant to sign post a client to another professional that is external to the facility such as a GP, or a charity dealing in support services.

Information requested	Source of information
Medical Information	GP
Diet & weight loss	Dietitian
Mental health concerns e.g. stress, depression or eating disorder	Counsellor or mental health charity
Pregnancy	GP or Clinic
Alcohol or Drugs	Alcohol charity. E.g. Drinkaware
Giving up smoking	Smoking cessation service

Although the professionals running a fitness facility should always aim to provide excellent customer care through the accurate use of information and planning, sometimes things can go wrong.

For instance, a group fitness class could be cancelled at the last minute due to instructor absence. If there was nobody else in the facility who was suitably qualified and insured, then it would be the case that the gym instructor might have to cancel the class.

If this is done last minute then they would likely have to speak to clients and let them know that this has happened. In this situation they should explain clearly what has happened, and that they have already tried to find a replacement instructor, but that they were unable to do so on such short notice.

The should also accept accountability for the cancellation, however they should not place the blame onto themselves, but rather acknowledge the issue and empathise with the clients frustrations.

In all instances such as this, the instructor should offer alternatives to this, and if there are no available classes for clients to attend, they could offer to run a circuits based class for them that would fit within the scope of practice of their qualification.

PRESENTING A PROFESSIONAL IMAGE

How you present yourself is crucial in any business or industry. Being professional is a given. Being negative can have a huge detrimental effect on not only yourself but also your colleagues. Being positive has the potential to not only help clients but also the team and business.

No one is always positive and upbeat all the time. Things can happen in your day to day life, even traveling to your place of work, for example you have forgotten your lunch! Little things like that can change your mood! Try your very best to put things like that aside. Personal matters should be managed outside of the workplace and work matters should be dealt with with the suitable organisation policies and procedures.

Professional Appearance

Everyone prides themselves on their appearance! Certain organisations may require a dress code or appearance policy. Examples of a positive appearance are:

- ❖ Wearing clean clothes/uniform
- ❖ Having badges clearly visible
- ❖ Maintaining personal hygiene
- ❖ Ensuring jewellery is safely stored away if possible
- ❖ Appropriate clothing
- ❖ No high heels or working boots etc



Using social media profiles



Social media is an excellent way to promote yourself and perhaps your own business. Facebook, Twitter and Instagram are examples of great social media platforms. For example, Instagram, a picture based social media platform, is perfect for clients before and after pictures.

Facebook is good for news related posts, deals you may be running in your business.

Facebook

- Share photos, videos and updates on their personal or professional life.
- Share information about their business or the organisation that employs them.

Twitter

- Share opinion and thoughts on topical subjects.
- Share information about their personal or professional life.

Instagram

- Share photos and videos of their personal or professional life.

LinkedIn

- Share information about their professional life.
- Share information about their business or the organisation that employs them.

Understanding the benefits and risks of social media can help drastically. Be mindful of the following:

Benefits of social media

Excellent way of keeping up to date with industry changes.

Free opportunity to promote yourself or the business that employs you.

Certain platform provide an opportunity to seek employment (LinkedIn).

Risks of social media

Information provided through social media may not be reputable, or could be sales-focussed and therefore biased.

Personal opinions or images shared may not represent the views of all customers and could upset certain individuals. They may also not represent the views of the employer and result in disciplinary action if serious offence has been taken.

Excessive use in the workplace could reduce productivity and result in disciplinary action by the employer.

WHAT PERSONAL QUALITIES SHOULD A GOOD GYM INSTRUCTOR HAVE?

Patience

- Everyone's journey is different and a good gym instructor should always endeavor to be patient with their clients

Compassionate

- Not everyone's goals are the same
- Client could be in a difficult life situation

Sensitive

- They may confide in you

Passionate

- Someone who loves their job makes the workplace a better place!

Approachable

- This can lead to more clients

Motivated

- If you are motivated, you are motivating your clients!

Organised

- Keeping up to date
- Disorganisation can lead to mistakes like double booking clients

Punctual

- Turning up late gives a bad impression

Reliable

- Keeping appointments

Being a role model

- Practicing what you preach

Adaptable

- Being flexible
- Not all clients react the same way

Empowering

- Educating clients effectively
- Effective communication
- "Knocking down barriers"
- Facilitate rather than dictate

COMMUNICATING CLEARLY AND EFFECTIVELY WITH CUSTOMERS

Communicating effectively with clients is an absolutely great way of getting the most of them. Building a rapport with them and supporting them in their fitness journey can help them commit to a long term commitment participating in the fitness industry.

There are several different techniques and skills for communicating with clients:

Active listening skills

- Nodding as the client speaks.
- Leaning forward.
- Positive facial expressions.
- Eye contact.
- Paraphrasing.
- Reflecting and summarising.

Non-verbal communication skills

- Being aware of personal space.
- Using hand gestures.
- Smiling.
- Maintaining eye contact.
- Awareness of body language and posture, e.g. avoiding crossing arms when interacting as it can appear hostile.
- Avoiding aggressive acts, e.g. pointing or standing over the client.

Verbal communication skills

- Appropriate tone, rhythm and pitch of voice.
- Appropriate richness, warmth and volume of voice.
- Matching the customer's words.
- Appropriate language.

LISTENING

Anywhere you work or go, listening is the golden skill we all should be aware of. Listening to people can go a long way. A technique known as Active Listening is a good skill to have. Active Listening is gathering information from the clients and using it to their advantage. It isn't just listening to their spoken work, it's using the information to form a picture of what the client likes, wants and how they feel essentially.

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TO EFFECTIVELY LISTEN, YOU SHOULD:

Show genuine interest

- Ask questions
- Do some research if needed

Verbally acknowledge them

- "Okay, I understand" etc

Non Verbal gestures

- Nodding
- Thumbs up

Being non judgemental

Summarize what they are saying

"So you don't like doing CV but like the functional machines, okay

Membership/Contract	Description	Who might it benefit?
Use of terminology.	Using simple, accessible language.	Overly technical or medical jargon can confuse and frighten clients.
Feedback.	Using constructive descriptive and positive feedback, e.g. 'great alignment and control!'	Critical or negative comments are not helpful; they can trigger feelings of shame and humiliation that demotivate clients.
Listing and giving advice.	Listening and using active listening skills before offering advice	Jumping in with 'expert opinions' or advice before you have seen the bigger picture shows a lack of interest and respect.
Body language.	Keeping an open posture, smiling, maintaining eye contact and being friendly and approachable.	Closed posture, avoiding eye contact, scowling and raising eyebrows are all likely to put clients off.
Words and language	Using positive, inspiring words, e.g. 'well done!', 'good to see you', 'great work!' and 'fabulous!'	Negative language and an aggressive tone of voice, e.g. 'not like that', 'just don't' and 'that's bad'.
Interest and attention.	Paying attention to people and showing a genuine interest in motivate in them.	Being dismissive and disinterested doesn't motivate clients. Feigning interest is also usually recognised at some level of consciousness.
Perception.	Aiming to understand clients.	Passing judgement - this is a way of telling people that they are 'not okay'.

GOING THE EXTRA MILE

Going the extra mile means going above and beyond the call of duty sometimes. This means doing something extra for someone else that might not necessarily be needed to do. Small acts such as setting up equipment or classes for another colleague if they are running late with a client. Bigger acts such as taking prospective clients for a tour of the gym during your break or downtime. Using the acronym CARE should be used when thinking about going the extra mile.

C.A.R.E

Considerate

- ❖ Always offering to help
- ❖ Not making promises you can't keep
- ❖ Honesty
- ❖ Considering clients feelings

Active listening

- ❖ Listening to the clients needs
- ❖ Demonstrating what you have listened to
 - Client doesn't like CV so using more free weight based exercises

Responsiveness

- ❖ Dealing with comments and complaints quickly, if possible
- ❖ Making an effort resolve the issue
 - Not just listening them leaving it alone

Empathy

- ❖ Being non judgemental
- ❖ Understanding clients feelings and needs
- ❖ Seeing the clients perspective

FORMING WORKING RELATIONSHIPS WITH CLIENTS

It is important to not only develop but also to maintain relationships with all clients that a gym instructor works with. This not only ensures that the client is happy and wishes to continue working with a particular instructor in a particular facility, but also that the gym instructor will also have a more positive experience working with the client.

This is because:

- ❖ It makes the client feel important and valued
- ❖ They will engage in a healthy lifestyle
- ❖ They will listen to your advice
- ❖ They will engage in your support
- ❖ They reflect you or your business
- ❖ They trust you
 - You will in turn trust them
- ❖ You will meet their needs and expectations
- ❖ You will earn their respect
 - Again, they will earn yours
- ❖ They will know where they stand with their own responsibilities
- ❖ They will hold you to a higher standard
- ❖ Boundaries will be set
- ❖ Communication will be more effective
- ❖ They will a more positive customer experience
- ❖ They will feel safe and secure

All professional relationships are based on a foundation comprised of several key factors that contribute to an overall relationship being formed.

These factors can be:

- ❖ Respect between each other
- ❖ The trust you have between each other
- ❖ Your rapport and communication
- ❖ Professional standards and practices of conduct.
- ❖ Respect for each other's boundaries.

ESTABLISHING AND RESPECTING BOUNDARIES

From the start of the client's fitness journey, boundaries should be set fairly early on. Clear boundaries and agreements can minimise conflicts and disagreements. It is helpful to know where you stand with each other. This can also make the fitness journey more accessible to the client (a transactional relationship, for example).

Working relationships are key to a gym instructor working with a client successfully, but in some instances, these relationships should include boundaries to protect the interests of both parties.

- ❖ Punctuality and timekeeping.
- ❖ Payment for services, e.g. method and time of payment.
- ❖ Appointment cancellation and any sundry charges .
- ❖ Information sharing and confidentiality .
- ❖ Appropriate areas for imparting information, e.g. fitness instructors should not give advice on diets or attempt to diagnose medical conditions.
- ❖ Equality, diversity and treating people fairly .
- ❖ Advertising professional services honestly; this entails delivering sessions for which qualifications are held.
- ❖ Personal relationships with clients.
- ❖ Accepting gifts.
- ❖ Attending social events with clients .

PROVIDING ADVICE, GUIDANCE AND SUPPORT

As a fitness instructor, you will be a constant source for advice. Clients will look to you for advice and support. Because you are the first point of contact for clients it is important to be knowledgeable and supportive. Being dishonest with your support and advice is never a good idea. You could potentially be jeopardising your own career and their own safety

Supportiveness is a key characteristic of any gym instructor and plays a crucial role in helping clients to not only reach their goals, but to train sustainably into the future.

- ❖ Making sure the client is doing the correct technique
- ❖ Advice on progression and regression of exercise
- ❖ Information on classes offered
- ❖ Nutritional advice
 - Based off national guidelines
- ❖ Advice and demonstrations on exercises
- ❖ Spotting
 - Helping with lifts and free weights
- ❖ Advice on how to improve a specific part of their fitness e.g. a 5 km race



OBTAINING FEEDBACK, AND USING IT TO HELP CLIENTS CONTINUE EXERCISING

Feedback from clients is crucial for fitness instructors. Feedback can mould and shape not only sessions or classes but how you work and conduct yourself in the fitness industry. There are several ways of receiving feedback:

Verbal Feedback

- ❖ As simple as “That was a good class!”
- ❖ A sit down session with clients regarding full programmes
- ❖ This makes the customer feel appreciated and valued. This also provides true and qualitative feedback that can help improve the service.

Written Feedback

- ❖ Annual Questionnaires
 - Customer range is always changing
- ❖ Comment cards
- ❖ Written Letters
- ❖ Email letters
- ❖ Reviews
 - On comparison websites
 - On your employers websites

Attention to detail being given to a client in both a written and a verbal medium, acts to demonstrate to a client that they are valued and that the gym instructor genuinely cares not only about their progress, but about them as a person.

HANDLING COMPLAINTS AND NEGATIVE FEEDBACK FROM CLIENTS

Not everyone is going to be satisfied with what happens at your place of work. Complaints are likely to be made.

Complaints are designed to better either the business or yourself. Complaints are not to be taken personally. Don't become defensive, the customer usually just wants to let off some steam. You are essentially there to listen!

How the complaint is dealt with determines whether the complaint could be turned into a comment or a full on complaint.

When dealing with a complaint, you should:

- ❖ Listen without interrupting.
- ❖ Thank the client for their feedback and for bringing the issue to your attention.
- ❖ Take ownership of the complaint.
- ❖ Be polite.
- ❖ Remain calm and never enter into an argument.
- ❖ Follow organisational procedures - record the complaint (fill in a complaint form), acknowledge receipt of
- ❖ it and reassure the customer that it will be resolved in a timely fashion.
- ❖ Offer a point of contact - advise the client of possible solutions or alternatives, allow them to decide on
- ❖ an appropriate solution and ensure that they are appeased before they leave.
- ❖ Inform relevant staff of the problem.
- ❖ Communicate with the client and update them on progress.

A crucial part of a complaint is Listening. Most complaints can be overturned by just listening. Once you have been told everything, try your best to deal with the complaint as soon as possible. A customer will be less likely to complain again if an issue is dealt with quickly. If it is left unresolved, the customer will feel unvalued and could complain again.

Keeping customers informed and giving them updates is also important. If an issue is more difficult to deal with and potentially may take longer to resolve, updating a customer is better than leaving unaware of what's going on.

DEALING WITH CLIENTS WHO ARE UPSET OR ANGRY

A crucial part of a complaint is Listening. Most complaints can be overturned by just listening. Once you have been told everything, try your best to deal with the complaint as soon as possible. A customer will be less likely to complain again if an issue is dealt with quickly. If it is left unresolved, the customer will feel unvalued and could complain again.

Keeping customers informed and giving them updates is also important. If an issue is more difficult to deal with and potentially may take longer to resolve, updating a customer is better than leaving unaware of what's going on.

Aggressive language	Assertive language
'Don't you dare speak to me like that!'	'I'd prefer it if you didn't speak to me in that way.'
'With that attitude, how do you expect to resolve this?'	'I can understand your frustration; let's see what we can do about this.'
'Shut up or I won't continue this conversation!'	'I won't be able to continue this conversation if you keep using bad language.'
Aggressive body language	Assertive body language
Scowling	Open facial expression
Closed posture with the arms folded	Open posture
Invading personal space	Standing at respectful distance

Once complaints have been made, each organisation will have different ways of dealing with them. For example, they must respond within 5 working days on the first point of contact. Each complaint is an opportunity to improve and should not be seen as a negative aspect of the organisation.

If a customer wants to speak to a manager then let them! Be honest with senior management and let them know what has been said. Get as much information from the customer to pass on to whoever they need to be passed onto. Try to give the customer a valid timeline - similarly to the organisations if needed.

TEAMWORK, AND WORKING COLLABORATIVELY WITH OTHER FITNESS PROFESSIONALS

Working as a team is an important part of any workplace. Teamwork promotes positive attitudes and increases intra-team morale. An example of this is to help support colleagues, by helping them with swapping of shifts, and agreeing to cover sessions in a manner that builds mutual cooperation between staff members. When there is a positive environment between staff, this is clear to clients, and will serve to boost their engagement with the fitness facility.

Collaborative work can also take place in the form of different instructors working with the same clients or the same groups of clients to ensure that they are providing them with great service. This however, requires considerable cooperation and teamwork from the team members that are doing this. For example, they would need to maintain an accurate handover between them to reflect any developments or work that has been carried out with the client or the group of clients.

SOCIAL INCLUSION

Social inclusivity is critical to overall client satisfaction and thus retention; one way of achieving this in a fitness environment is to ensure that there are adequate group training sessions that focus on social aspects of exercise, allow clients to be brought together such that they will become friendly and ultimately. This can influence gym members to want to return to the group training session, as it is no longer simply providing attention to physical fitness, but is taking an active step towards addressing total fitness by including social elements.





Unit 1 : Section 4
Continuing professional development
and reflective practice

CPD IS DEFINED BY CIMSPA AS:

“Practise of undertaking additional learning through courses, workshops or conferences or taking part in other activities which confirm that knowledge, understanding and skills are suitable for the specific job role”

There is continuous growth in the fitness industry. With skills and knowledge ever changing. It is therefore important for a gym instructor to always remain abreast of these changes, and grow their professional practice in line with the growths and developments in the industry.

Example of changes are:

- ❖ New Exercise guidelines
- ❖ Types of stretches before warm ups
- ❖ Intensity due to age or medical conditions
- ❖ New Equipment
- ❖ Layouts constantly changing
- ❖ Traditional gym equipment replaced by Functional equipment
- ❖ New Research
- ❖ More research means new ideas suggesting “x” is now better CV fitness etc.
- ❖ New Healthy Eating Guidelines
- ❖ Guidelines change due to increase/decrease population size
- ❖ National guidelines changing constantly
- ❖ Financial issues with clients

BENEFITS OF CPD TO THE INDIVIDUAL, THEIR EMPLOYER AND CLIENTS

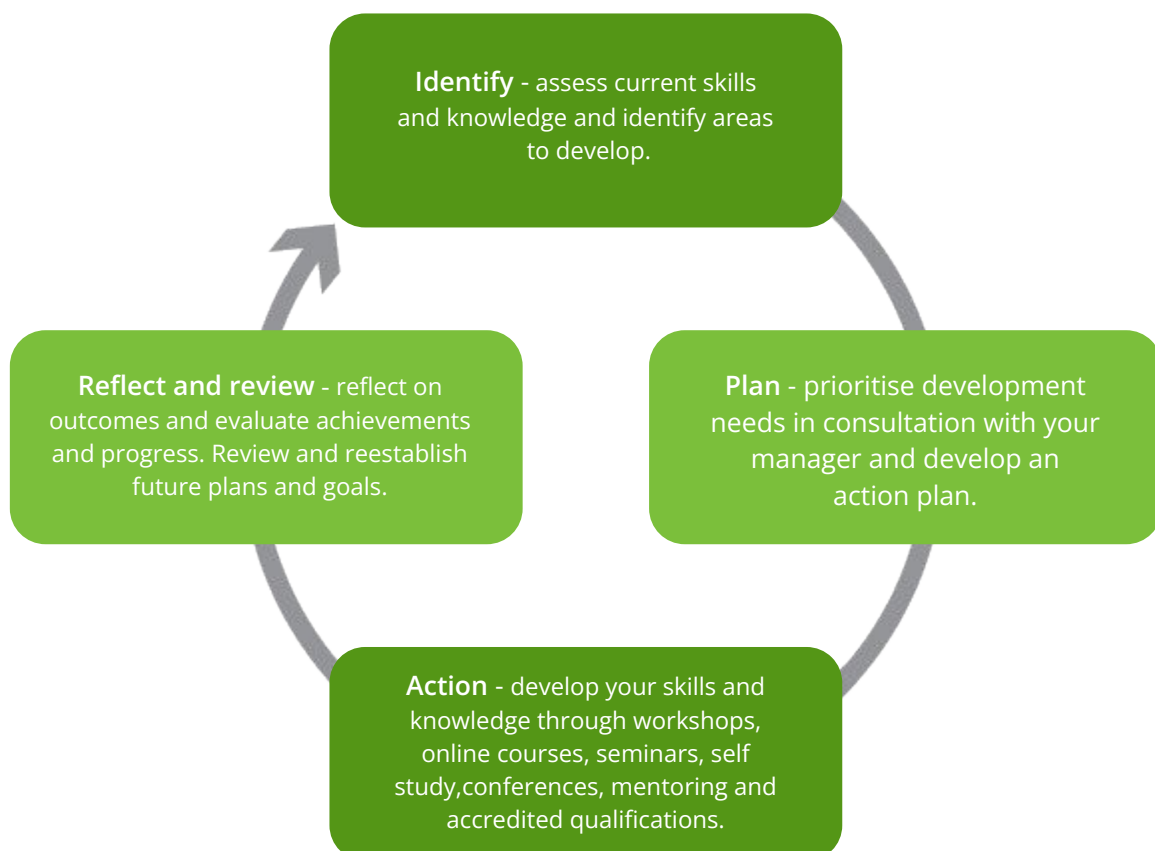
Essentially, CPD keeps you in track with everything you need to know in the industry but will make employment more enjoyable and give you more satisfaction while performing your role.

There are a number of benefits for CPD ranging from a growth in a gym instructor's confidence in their own abilities to developing the ability to mentor other, more junior instructors.

- ❖ Actively engaging in CPD allows gym instructors to remain abreast of changes and developments in the industry
- ❖ Successfully completing CPD can result in a growth in a gym instructor experience and skill set which can potentially lead to a growth in their role
- ❖ An advanced repertoire of CPD skills can lead to a growth in the overall skill set of the gym instructor
- ❖ The inherent increase in skill set is likely to lead to customers feeling more confident in the gym instructor
- ❖ With a growth in skill set and ability, the gym instructor will be more confident in their own abilities
- ❖ CPD can result in a gym instructor being experienced enough to take on a mentoring role with more junior instructors

PLANNING AND REVIEWING CYCLE

A continuous self reflection, review and action plan is essential to CPD. Therefore a “plan and review” cycle is needed.



PERSONAL DEVELOPMENT PLAN (PDP)

PDP is the result of goals and ambitions that you wish to achieve. It is a personal action plan.

A PDP should include:

- ❖ SMART Goals (specific, measurable, achievable, realistic and timebound)
- ❖ ○ Short, medium and long term goals
- ❖ Review dates
- ❖ Who could help, how they could help, where could these be done and when these goals need to be achieved.
- ❖ Reviewing previous SMART goals
- ❖ Were they achieved? Why not or what challenges did they pose.

Reviewing goals is critical as things change. Life changes, financial changes, educational changes. These all impact PDP. Therefore PDP should be flexible and allow for changes.

SWOT ANALYSIS

To effectively improve your working knowledge and skills, we can use the SWOT (Strengths, Weaknesses, Opportunities and Threats) method.

Strengths - What are you good at? What do you know a lot about?

Weaknesses - What areas do you need to improve on? What do you need to know more about?

Opportunities - What opportunities are there for you to develop your skills and knowledge? Are there any gaps in the market or in your workplace that you could take advantage of?

Threats - What threats are there to your job role or the industry you work in? How can you overcome these?

Strengths

- Knowledge of resistance exercises and free weights.
- Knowledge of how to build muscle.
- Approachable and friendly character.

Weaknesses

- Knowledge of CV fitness-based goals, e.g. distance running.
- Ability to teach group exercise classes. . Knowledge of nutrition.

Opportunities

- New classes added to the timetable.
- Free training available with local provider.
- Access to online CPD portal through work.
- Increase in membership sales, therefore more clients available for personal training, once qualified.

Threats

- Qualified instructors who have a broader range of skills, e.g. can teach classes.
- High staff turnover.

SELF REFLECTION IS A GOOD WAY TO IDENTIFY WHERE YOU ARE IN YOUR CPD JOURNEY.

There are various ways this can be done:

- ❖ Written evaluations
- ❖ Writing down what went well or not so well after a class
- ❖ Changes you will make next time
- ❖ Monthly performance reflections
- ❖ Has any progress been made?
- ❖ Biannual and annual sessions of reflection on CPD

SUPPORTING YOU WITH CPD

Others can help and support you with CPD in various ways:

- ❖ Customers: feedback from the clients and customers that you work with can be crucial in helping to build a clear picture of what you can improve on in your professional practice
- ❖ Managers/mentors: feedback from managers or mentors who have built their own experience in the industry can be crucial in identifying areas that can be improved upon
- ❖ Self-evaluation: self-evaluation can allow you to develop strong and highly personalised areas that can be actioned in order to improve your professional practice



REVISION SECTION:

Define what CPD means according to CIMSPA?

Why is it important to do CPD in the Fitness Industry?

Define all the parts of SWOT

Who can support you with your CPD?

What sources of information can be used to assist you with CPD?





Unit 2 : Section 1

Health and Safety in A Fitness Environment

LEARNING OBJECTIVES

- ❖ To understand the theory and practice of health and safety in the workplace
- ❖ To understand the hazards and the risks that are present in a fitness environment
- ❖ To understand both emergency and normal operating procedures in the workplace
- ❖ To understand how to maintain a safe and effective fitness environment
- ❖ To understand the cleaning requirements in fitness environments
- ❖ To understand safe working practices relating to the Control of Substances Hazardous to Health (COSH) Regulations

THE IMPORTANCE OF HEALTH AND SAFETY IN A FITNESS ENVIRONMENT

We can think of health and safety in the workplace being the guiding principle by which we abide to help protect the health and wellbeing of all people who may interact with a given service or area.

Health and safety procedures and legislation should always be adhered to where reasonably possible so as to ensure safety for all.

Legal and Regulatory Requirements:

Within the act, there are several key areas that outline the duties that are to be upheld by employers and by employees alike. This act is enforced by the Health and Safety Executive(HSE) in addition to other, more specialised enforcing authorities.



Below is a summary of the common acts of legislation that pertain to health and safety in the workplace:

Legislation	Requirements
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 2013 (RIDDOR)	Employers must report occupational injuries, diseases and dangerous events that happen in the workplace.
Manual Handling Operations Regulations, 1992	Employers must have procedures in place for the lifting or moving of objects by hand or bodily force. Hazardous lifting should be eliminated where possible; if it is unavoidable, mechanical aids must be provided.
Management of Health and Safety at work Regulations , 1999	Employers must carry out risk assessments and implement appropriate measures to manage risks, e.g. appointing and training staff to deal with safety issues.
Employers' Liability (Compulsory Insurance) Act, 1969	Employers must have insurance for covering accidents and ill health.
Health and Safety (First Aid) Regulations, 1981	Employers must have at least one qualified first aider or appointed person (depending on risk assessment). First aid kits and facilities must be available.
Personal Protective Equipment at Work Regulations, 1992	Employers must provide adequate, suitable protective clothing and equipment for their employees (as appropriate). Equipment must fit properly, carry the CE Kitemark and be kept clean and stored correctly.
Control of Substances Hazardous to Health Regulations, 2002 (COSHH)	Employers must assess and take precautions against the risks of hazardous substances (e.g. chemicals, dust, gases and fumes) and train their staff to use them safely.
Health and Safety INformations for Employees Regulations, 1989	Employers must display a poster that provides employees with information on health and safety.
Provision and Use of Work. Equipment Regulations, 1998	Employers must ensure that all equipment and machinery is safe to use and adequately checked and maintained.
Noise at Work Regulations, 2005	Employers must take action to ensure employees are protected from hearing damage in the workplace, e.g. caused by drilling or music.
Workplace (Health, Safety and Welfare) Regulations, 1992	Outlines numerous welfare issues for employers to consider, including workstations, seating, heating, lighting and ventilation.

WHAT ARE THE RESPONSIBILITIES OF EMPLOYERS?

1. Carry out relevant risk assessments
2. Create and implement emergency procedures to mitigate risk if there is a health and safety issue that arises
3. Action the areas/issues highlighted in risk assessments by introducing safety measures to address each issue
4. Ensure that those who are responsible for the welfare of anyone else is competent and is able to implement safety measures
5. Ensure that all employees are trained in the relevant level of health and safety that they will need to be in order to carry out their role safely
6. Employers should also maintain an accurate log of staff training
7. All injuries that occur in the workplace should also be documented fully and reported where appropriate
8. All employers should provide the correct degree of insurance coverage for injuries
9. Ensure that there is suitable equipment and facilities available to deal with any health and safety issue that might arise
10. Visibly display a compliant health and safety policy

1. Employees must ensure that they are following the procedure and training set out for them by their employer
2. Employees are responsible for taking reasonable care over their own health and safety and the health and safety of others around them
3. All staff members should ensure that they abide by all regulations set out for them, and that they should report all health and safety concerns

WHAT ARE THE RIGHTS OF EMPLOYEES?

It should be made clear to an employee how any risks in the workplace will be managed and mitigated in a clear, accessible format. If it is necessary, specific health and safety training should be offered by an employer to build on this awareness by the employee.

Employers are also expected to maintain any equipment present or issued to employees that they require to do their jobs safely. This can include everything from Personal Protective Equipment (PPE), to cleaning materials that may be needed to address spillages or hazardous substances.

All employers should also ensure that they are providing bathroom facilities and clean drinking water for their employees.

All employees should also be covered under an employer's insurance in case they should suffer injury or illness as a result of work.

DUTY OF CARE AND SCOPE OF PRACTICE

There is a reasonable level of responsibility placed upon every person in every workplace to take care of themselves and anyone else they might come into contact with.

There are three main areas under which duty of care falls for gym instructors; Personal Safety, Client Safety and Environment Safety.

Please review the specific detail for each area in the diagram below:



Role aspect	Adaption
Personal safety	• Holding appropriate qualifications for any session delivered . • Only working with people or groups for which they are qualified . • Holding public liability insurance and employer liability insurance . • Maintaining continuing professional development (CPD) . • Being a member of an appropriate regulatory body (e.g. CIMSPA) . • Adhering to industry codes of conduct . • Following organisational procedures . • Holding a first aid or cardiopulmonary resuscitation (CPR) qualification if working with certain groups (e.g. exercise referral). • Awareness of health and safety policy and responsible behaviour, e.g. reporting hazards . • Knowing the on-duty first aider, location of the nearest contact phone and first aid kit and procedure for reporting accidents.
Client Safety	• Screening clients before exercise using appropriate methods, e.g. PAR-Q and verbal screening checks. • Referring clients to their GP when necessary (e.g. medical conditions) . • Ensuring clients dress appropriately (e.g. acceptable footwear and no jewellery) . • Ensuring that clients are not chewing gum . • Ensuring that clients' technique and use of equipment is safe by observing and correcting them wherever necessary.
Environment Safety	• Ensuring there is enough space for participants (no overcrowding or risk of collision). • Ensuring there are no trailing wires (risk of slips and trips) . • Ensuring floors are dry or signs are positioned to identify wet floors . • Ensuring the environment is prepared for exercise (e.g. checking that equipment is set up properly and nothing is causing an obstruction). • Ensuring the environment is left clear and tidy after exercise, with everything put away in the correct place. • Keeping floors clean and swept.
Equipment Safety	• Ensuring equipment is stored appropriately, e.g. steps stacked at an appropriate height, weights stored on racks and pool equipment in baskets. • Ensuring equipment is clean, e.g. wiping down CV equipment or mats . • Placing 'Out of order' signs on any broken equipment. • Reporting broken equipment to maintenance personnel.



WHAT ARE THE CONSEQUENCES OF NOT ADHERING TO HEALTH AND SAFETY REQUIREMENTS?

If a fitness professional, or the fitness facility in which they work fails to adhere to health and safety requirements, then there can be serious consequences that can apply to both individual fitness professionals and to the organisation that they work for.

What could the consequences be?

In circumstances such that a person has been harmed by an incident that should have been corrected by reasonable health and safety measures before it happened, then there is the potential for the Health and Safety Executive to fine an organisation for the breach of health and safety.

Individuals can also be held to account for failing to adhere to the health and safety requirements, however it is more likely that the ultimate responsibility will fall on the organisation to which that person belongs.

It is crucial therefore that all reasonable measures are taken and as gym instructors we always ensure that we are mindful of health and safety in the workplace in order to protect ourselves, our clients and where we work.

KEY HEALTH AND SAFETY ROLES IN THE FITNESS ENVIRONMENT

The most senior individuals in an organisation bear the ultimate responsibility for health and safety procedures being adhered to. This can include **managers, owners and directors**.

Generally speaking there should be a **Health and Safety Officer** available at all times when the fitness facility is operational. Often this could be a duty manager who would control the shift, or a smaller team leader who may have health and safety incorporated into their role.

First Aiders are also another key element of a health and safety team within a fitness facility and often there will be a first aider in each given work area or department.

Gym Instructors, in addition to their duties checking and where appropriate, maintaining equipment and logging where safety issues may be present, will also likely be first aid trained.



Unit 2 : Section 2

Controlling Hazards and Risks

WHAT ARE HAZARDS AND RISKS

It is common in a gym instructor's role that they will both come across active hazards and risks when performing other duties, and indeed for them to take an active role in identifying hazards and mitigating risks as far as is reasonably possible.

It is therefore highly important for gym instructors to understand what constitutes a hazard and to recognise hazards that are common in fitness facilities.

So too, is it important for gym instructors to be able to understand the concept of risk and how they can take an active role in mitigating risk, both to themselves and to others.

A hazard can be defined as anything that may cause harm.

This definition is sometimes excessively broad and in a fitness environment, the fitness instructor should consider how they think of a hazard with a little more specificity. For further information on hazards and examples of hazards, **please refer to Unit 2: Section 2, Controlling Hazards and Risks.**

A risk refers to how likely it is that a person could be harmed by a given hazard in addition to how severe this harm could be. For example, water on a smooth floor would be high risk, as it is likely that a person moving over it could slip and fall, the severity would also be high as this could result in a serious injury.

CONTROLLING HAZARDS AND RISKS

It is always better to prevent an accident or a health and safety incident occurring rather than reacting to it.

It is therefore important for everyone involved in the operation of the fitness facility to understand the range of hazards and dangers that exist and to be able to judge how much risk of harm a given hazard would carry.

The definitions of hazards and risks can be broad, especially when considering how to apply this practically to real life situations in a fitness facility. It is therefore important to consider specific types of hazards when operating in a fitness facility. Please consult the below table for further information.

WHAT ARE THE HAZARDS IN A FITNESS ENVIRONMENT?

Area for consideration	Possible hazards	
Facilities	- Loose or trailing electrical wires. - Power cut. - Flooring or carpet damage. - Damaged or loose ceiling tiles. - Lack of ventilation. - High pool chlorine levels.	- Heating Failure - Gas leak - Broken window - Damaged fixtures - Temperatures too hot or cold - Fire exits blocked
Equipment	- Faulty wiring. - Fraying cables on weight machines. - The belt slipping on a treadmill.	- Foot straps broken on a spinning bike. - Loose dumbbell weights. - A damaged seat on a rower. - Poor positioning of equipment. - Barbell use without clips/collars
Working practices	- Insufficient maintenance checks. - A cleaning rota that is poorly adhered to. - An insufficiently monitored gym floor. - Poor manual handling and lifting practices.	- Poor performance on evacuation drills. - Pool plant room chemicals in close proximity. - Poorly filed PAR-Q and member medical records.
Clients	- Medical conditions. - Older adults. - Disability. - Pre or postnatal. - Inactive.	- Cardiovascular disease risk factors. - Injuries. - Deconditioned body shape - Low skill and fitness levels. - Incorrect clothing or footwear.

Area for consideration	Possible hazards	
Client Behaviour	- Aggression. - Drunkenness. - Diving into a shallow pool. - Lifting heavy weights without a spotter. - Not cleaning machines after use. - Failure to disclose essential information (e.g. medical conditions).	- Unsafe exercise technique. - Incorrect back alignment when handling heavy weights. - Stepping on and off a moving treadmill belt. - Chewing gum. - Ignoring instructions or guidelines. - Not replacing equipment after use.
Security	- Broken security camera. - Faulty emergency exit door. - Emergency doors left open in hot weather.	- A late night lone worker left to secure the building. - An unmanned reception area. - A busy reception area (security monitors not observed).
Hygiene	- Insufficient cleaning rota. - Bins not emptied regularly. - Drinking fountains with lime scale build-up. - Stretching mats not disinfected. - Dirty toilets. - Dirty CV machines.	- Obvious scum line in the pool. - Excessive foam in the spa. - Mould build-up in shower sealant. - Dirty shower room floors. - No toilet roll.



ASSESSING RISK IN A FITNESS ENVIRONMENT

The process of carrying out a risk assessment seeks to analyse what could potentially harm either employees in a workplace, or anyone else who might use the facility such as a gym member using the main gym floor.

This ensures that those within the organisation who have positions of responsibility can review this information and make decisions as to what could and should be done to mitigate risk. The intention of this process is to ensure that there are no preventable injuries or illnesses caused by a lack of rigour in the following of health and safety procedures.

The following model should be used when assessing risk in the workplace:

Five step to risk assessment		Considerations
1	Identify the hazard	What are the hazards? Slips, trips, falls, chemicals, machinery, electricity, manual handling, noise, exercise risks, poor lighting and temperature.
2	Decide who might be harmed	Who might be harmed and how could they be harmed? Office staff, cleaners, visitors, contractors, gym members, gym staff (pay particular attention to people with disabilities). Is it a minor injury or are there more severe consequences?
3	Evaluate the risk & decide on precautions	Evaluate the risks and decide whether the existing precautions are adequate or whether more should be done. Provide instruction or training where necessary, reduce risk as far as reasonably practicable. What is the likelihood of an accident occurring? What level of risk is attached? What control measures can be used to control the risk?
4	Record the findings and implement them	Use a risk assessment tool to report and manage all identified risks. An example risk assessment report is available from the HSE website.
5	Review the assessment & update (as required)	Review and update all risks and procedures at agreed intervals.

EVALUATING RISK IN FITNESS ENVIRONMENT

The gym instructor should consider risk and being composed of two key elements; how probable is it that this risk would occur and how serious would this risk be if it did occur?

When carrying out a risk assessment, this is done by assigning a value to the risk between 1-5 to account for how likely the risk is to happen.

Another value between 1-5 is then assigned to how severe the risk is.

Once this has been done, the risk rating can be determined by multiplying the two numbers together.

Possible Risk	Likelihood	Severity	Score	Risk & Action	Action
An apparently healthy adult, who exercises regularly, experiencing a cardiac emergency when exercising.	1	4-5	4-5	Medium - maintain control	Pre-screen. Monitor intensity. Warm up and cool down appropriately. Programme training to meet specific needs.
An inactive client with an existing cardiac condition experiencing a cardiac emergency when exercising.	5	5	25	High - Stop! Immediate action required.	Signpost to GP Specialist and clinically supervised exercise.

Let's think about how this would be done in real life:

A gym member comes up to you on the gym floor; they have recently joined the gym and are not confident in their ability to carry out their own session and you decide to help them. In order to help them get started you put them through a screening process to ensure that they are safe to exercise.

Scenario 1:

You find the following:

- They are 25 years old and identify as female
- They currently exercise but only as a part of organised sport
- Although they are slightly over the recommended weight for healthy living, they are not obese and they have no history of smoking

If we were to risk assess this gym members risk of suffering a major cardiac event while exercising it might look like this:

Likelihood = 1

Severity = 4-5

Score (likelihood X severity) = 4-5

Risk Level = Low - reasonable care should be taken

Actions to be taken = ensure that the client understands safe use of gym equipment and how to monitor their own intensity properly. They should also be given instructions on how to warm up and cool down properly at the start and end of their session. To help them use the gym to suit their needs, the gym instructor should help them with a basic programme suited to their needs whether that be weight loss or getting stronger.

Scenario 2:

You find the following:

- They are 45 years old and identify as male
- They have no history of exercise for many years and lead a relatively sedentary lifestyle
- Their Body Mass Index (BMI) places them in the obese category
- They have disclosed that they have been diagnosed as hypertensive (high blood pressure) and that they have smoked heavily for several years

If we were to risk assess this gym members risk of suffering a major cardiac event while exercising it might look like this:

Likelihood = 4-5

Severity = 5

Score (likelihood X severity) = 4-5

Risk and Action = This client is at an extremely high risk of suffering a major cardiac event if they undertake intense exercise and as such should not be allowed to exercise in the gym until they have been referred to their GP. Their GP will then help them find routes into exercise, potentially by referring them to a trainer who is qualified to work with clients who have high blood pressure.

This is because this client has an absolute contraindication to exercise under the supervision of the gym instructor, and it therefore falls outwith the scope of practice for this role.

HOW DO WE CONTROL THE RISKS?

In an ideal world, we would be able to completely mitigate the risk of any hazard causing any potential injury or illness occurring from circumstances arising in the fitness environment. Although, this is very difficult to achieve, the best practice to attempt to do so could involve the following options:

- ❖ Referring clients to their GP to ask for clearance to work with them. If the gym instructor does not hold a suitable qualification to work with them, then sign posting them onto another professional who holds the relevant qualification would be a perfectly acceptable solution
- ❖ Where appropriate, using professional services in place of in house staff, for example, moving extremely heavy equipment or carrying out specialist maintenance work
- ❖ Checking with another member of staff or a supervisor who is more experienced before undertaking any action that you are uncertain of

REFERRING A HEALTH AND SAFETY ISSUE TO SOMEONE ELSE

If a hazard cannot be safely and effectively addressed by the gym instructor then they should seek to refer this issue to the correct person.

An example of such an issue could simply be a weight that is too heavy for them to move themselves and they require assistance to do so safely, or the hazard could be more specialised and be for example an electrical safety issue that would need to be addressed before anyone could safely use a piece of equipment.

In the first instance, the gym instructor should seek to refer the issue to the health and safety officer available on their shift, and make them aware of the issue so that they can investigate and ensure that a solution has been put in place.

If they are unable to contact the health and safety officer, they should instead go to their supervisor or line manager for assistance.

LIFTING AND MANUAL HANDLING

The Health and Safety Executive (HSE), define manual handling as, “any transporting or supporting of a load (including the lifting, putting down, pushing, pulling, carrying or moving thereof) by hand or bodily force.” (HSE, 2022)

It is inevitable that in the course of their duties that a gym instructor will come across the need to move or otherwise handle objects that are heavy in weight. As such, there is a greater likelihood that a gym instructor could become injured if they move or maneuver objects incorrectly.

The specific motions that are most likely to cause injuries are:

- ❖ Bending
- ❖ Twisting
- ❖ Any overly repetitive motions

Movements such as these can result in undue strain being placed on muscles, ligaments and tendons and can potentially cause a musculoskeletal injury. Injuries and strain can also put pressure on blood vessels and nerves, potentially leading to impingements.

Climbing

If climbing with a load (e.g. using stairs or a ladder), safe manual handling entails maintaining contact with the ladder or stairs at three points (two hands and a foot or both feet and a hand). Bulky loads require a second person or a mechanical device to assist.

Pushing & Pulling

Pushing is generally easier on the back than pulling. It is important to use arms and legs to provide leverage to start the push.

Pivoting

When moving containers, it is safer to pivot the shoulders, hips and feet (keeping the load in front at all times) than to twist the back. The lower back is not designed to torque or twist repeatedly.

HOW TO LIFT AND UNDERTAKE MANUAL SAFELY

When undertaking manual handling or the moving of heavy objects, it is generally advised to ensure that the load is as close to the body as possible to ensure that the weight of the object does not pull the body into a position in which an injury could be more likely.

It is also advised to ensure that foot positions are diagonal, as this will reduce the volume of stress placed upon the knee and ankle joints, and allow the body to more easily use large muscle groups in the legs as opposed to relying on smaller muscles in the back to move an object.

If possible, it is also optimal to begin lifting an object from either waist height, or the height of the hands when kept by the side of the body. This will ensure that the body does not need to withstand as much stress when lifting an object.

If possible, it is also advisable to ask another competent person for assistance in carrying the object, or where appropriate using a machine or wheeled trolley to transport the object.

1

Is there a less risky option

For example, using a spotter or helper to lift a heavy weight, or performing a modification of an exercise for a client with a specific need (e.g. walking instead of running), or using a less hazardous chemical.

2

Can access to the hazard be limited

For example, using a sign to identify a wet floor, or using a rope to identify changes in swimming pool depth, or securing any trailing wires to reduce the likelihood of trips.

3

Can exposure to the hazard be reduced

For example, restricting access to a pool plant area with chemicals, or planning work schedules to limit exposure (e.g. shorter life-guarding rotas), or allowing access only to clients who have been inducted.

4

Would personal protective equipment be useful?

For example, wearing correct clothing and footwear in the gym.

5

Are there welfare facilities in the event of an accident

For example, first aiders, first aid kits.



Unit 2 : Section 3

Maintaining Safety and effectiveness in the gym environment

MAINTAINING SAFETY AND EFFECTIVENESS IN THE GYM ENVIRONMENT

As a part of the regular duties of a fitness instructor, they would be expected to carry out basic health and safety tasks in such a way as to promote not only safety but a smooth and effective customer experience.

We can think of the health and safety components of a fitness instructor's role as falling into two main categories; Normal Operating Procedures and Emergency Action Procedures.

Normal Operating Procedures:

Normal operating procedures refer to all of the general working tasks that a gym instructor would undertake and covers areas such as:

- ❖ COSH
- ❖ Safe Manual handling procedures
- ❖ How and when to use PPE (personal protective equipment)

Robust normal operating procedures ensure that there is as small a chance of human or system error causing an accident, injury or illness as possible. This is of course dependant on employees adhering to the normal operating procedures and ensuring that they are going about the health and safety components of their role as diligently as possible.

EMERGENCY ACTION PROCEDURES

Emergency Action Procedures (EAPs) can be thought of as a set of rules and actions for employees to follow in the event of an emergency occurring.

Generally Emergency Action Procedures will cover instances such as:

- ❖ Accidents or serious injuries occurring
- ❖ Fires
- ❖ Other instances where people might need to be evacuated from an area such as bomb threats or the development of an otherwise unsafe situation

All Emergency Action Procedures should adhere to three basic principles:

- ❖ What should people do when an incident occurs.
- ❖ What should be done during the incident to manage the situation best and mitigate any further risk.
- ❖ What should be done after the incident has occurred to ensure continued safety and future mitigation of risk.

Illness/Medical Emergencies:

Illness and medical emergencies are among the most common serious incidents that can occur in a fitness environment. These can range from Asthma attacks to gym members suffering major cardiac events.

Although, these tend to be the most urgent and life-threatening illness and medical emergencies in the gym environment, other less serious issues, still require a diligent and comprehensive action plan to be in place.

Accidental injuries	Sudden illness or medical emergencies	Other emergencies
- Strains and sprains - Cuts, bleeding and bruising - Back injuries - Collisions (contact sports) - Falls (especially older adults) - Fractures - Burns	- Asthma attack - Dizziness and fainting - Dehydration - Loss of consciousness - Heart attack or angina - hyperglycaemia or hypoglycaemia	- Fire - Bomb alert - Chemical spillage - Missing child - Theft - Gas Leak



MAINTENANCE CHECKS

Another common task that a gym instructor will undertake in their day to day duties will be to carry out maintenance checks on gym equipment and the wider gym environment. Often a given fitness facility will have incorporated this into their normal operating procedures and as such will have a check sheet to carry out, in addition to procedures being in place to report faults, or equipment/areas that could be considered either dangerous or at risk of becoming dangerous.

Depending on the area or the piece of equipment subject to a maintenance check, this will most likely be carried out daily, weekly, or monthly.

Like all elements of health and safety, it is crucial that all maintenance/safety checks are carried out in accordance with the health and safety policy of the fitness facility that the gym instructor works for. If these tasks are not carried out, or are carried out negligently, there is scope for legal action being taken against both the facility and the gym instructor should a person become injured or ill as a result of them using unsafe equipment or an unsafe area.

Piece of equipment	Yes/No	What is wrong?	Action to be taken	Instructor initials
Treadmill				
Electronic display is clear				
All buttons are working				
Treadmill belt is moving smoothly				
Stop clip working				
Power cable is hidden				
Plug is free from damage				
Chest press				
Cable is intact				
Nuts and bolts tight				
All moving parts are intact				
Pins are intact				
Upholstery is in good order				
Seat adjustments are secure				
Cable crossover				
Cable is intact				
Nuts and bolts tight				
All moving parts are intact				
Pins are intact				
Attachments are secure				
Machine is stable				

SAFE SUPERVISION OF THE USE OF A FITNESS FACILITY

A key responsibility of the gym instructor is to be present and available on the gym floor, not only to provide good customer service and to offer assistance, but also to ensure that all who are using the facility are doing so safely, and posing as little risk to themselves and to others as possible.

This is typically referred to as, 'walking the gym floor' and constitutes a key part of the gym instructor's shift. This however, should not be spent idly, and should instead be an opportunity for the gym instructor to proactively engage with gym members, and to ensure that minimum standards of safety and cleanliness are maintained.

The gym instructor should ensure that no areas of the gym are over the safe working capacity of the given area. For example, if a gym instructor sees large groups of people around a small number of free weights, then there is a higher potential risk, of injury through either trips, slips and falls, or by someone becoming injured by a weight. The gym instructor should therefore seek to help support the members in finding alternative exercises or areas to exercise in.

Gym instructors should also ensure that the fitness environment is tidy, clean and safe at all times. For instance, if there are weights left on the floor, it is likely that someone will trip over these and therefore they should be tidied and stored correctly by whoever is responsible for that area.

A gym instructor should also be observant of the exercise technique of gym members, and should ensure that if they see someone exercising in an unsafe manner that they intervene in a professional manner to support the gym member in exercising more safely.



HANDOVERS AND APPROPRIATE COMMUNICATION

A handover can generally be considered as being a note or otherwise recorded piece of information that will be passed from a gym instructor who is finishing their shift to a gym member who is beginning their shift. The intention of this exercise is to ensure that key information around the operational events that have occurred in that shift or any health and safety issues are passed onto whoever needs to know about them.

Specific information that might be included in a handover:

- ❖ The results of any maintenance checks that have been carried out, such as recording information about equipment that may be broken or dangerous
- ❖ Pertinent information about any classes or scheduling issues such as classes being cancelled or any inductions being moved/rescheduled
- ❖ What areas/pieces of equipment have been cleaned or are still to be cleaned

Depending on the particular shift that the gym instructor is on, they could also be responsible for opening or closing the facility and as such, should also record what they do or any issues that arose that might be relevant to people working on later shifts.





Unit 2 : Section 4

Hygiene in a Fitness Environment

HYGIENE IN A FITNESS ENVIRONMENT

Hygiene and cleanliness is of exceptional importance in a fitness environment. Due to the volume of people who pass through a facility in a given day and the type of activity they are carrying out, gyms and fitness facilities are especially prone to build ups of pathogens and bacteria.

There are several key factors that contribute to to this being the case:

- ❖ When people exercise, they sweat and breath more heavily than they otherwise would and as such, they are more likely to spread bacteria and pathogens from their body to the wider environment
- ❖ Temperature: in order to facilitate safe and comfortable exercise in gyms, the temperature is often within the optimal range for bacteria to thrive and reproduce
- ❖ Air flow: even in modern gyms with up to date air filtration systems, a lack of cleaning or a source of contamination can result in pathogens, bacteria and fungi being transferred around the full facility

WHAT ARE THE BENEFITS OF CLEANING AND ENSURING POSITIVE HYGIENE?

First and foremost, cleaner, hygiene positive environment will curb the spread of any harmful bacteria, viruses and fungi, making the environment safer for use by the public and staff alike.

From a customer care and excellence perspective, a clean facility will attract more customers, and act to encourage existing customers to take care of the fitness environment and ensure that they clean up after themselves.

Lifespan of equipment and the general environment: general cleaning and care, generally allows equipment to last longer, meaning that fewer resources are needed to replace equipment prematurely.

Some examples of areas and pieces of equipment that require regular cleaning are below, however this is non-exhaustive and different fitness facilities will have their own policies and rotas in place for cleaning:

- ❖ Any and all machines in the a gym area that people will come into direct contact with and sweat or breathe heavily near
- ❖ All floor surfaces, however special attention should be given to areas with an enhanced need for hygiene measures such as changing rooms and showers, and around machines/equipment where people will sweat as this could result in the floor becoming slippery
- ❖ Water fountains should be regularly cleaned and have clean water run through them to prevent the build up of Legionella
- ❖ Toilets should also be cleaned frequently, as these areas will likely harbour high volumes of microbes, some of which can be harmful to human health

Gym	M	Tu	W	Th	F	Sa	Su
Hoover carpets							
Empty bins							
Wipe mirrors							
Clean and sanitise CV equipment							
Clean and sanitise Resistant equipment							
Clean and sanitise free weights area							
Tidy loose free weights away							
Studio							
Brush and mop studio floor							
Empty bins and pick up rubbish							
Wipe down mirrors							
Clean mats and tidy away							
Clean and sanitise and portable equipment							
Changing Rooms							
Empty Bins							
Check toilets roll is full							
Clean and disinfect toilets							
Clean mirrors							
Brush and mop floor							
Clean and sanitise sinks							
Refill soap and sower gel dispensers							
Clean showers							
Replace empty air freshener							

EQUIPMENT AND CHEMICALS

While undertaking their duties, a gym instructor will likely need to use a variety of cleaning chemicals and equipment.

Cleaning materials can include chemicals that are also often found in the home, however some of these chemicals will inherently be industrial strength, thus a clear awareness of the common chemicals is key.

Common cleaning equipment that can be found in the fitness environment for cleaning can include vacuum cleaners, brushes, cloths and mops.

What **cleaning equipment** the gym instructor will use will depend on the task at hand. For example, it might be more appropriate for them to use a cloth and a spray bottle containing sanitizer or disinfectant if they are cleaning a machine in the gym. Conversely, it might be more appropriate for them to use a sponge if the item or area that they are cleaning could be damaged by abrasive materials.

Most commonly, **cleaning chemicals** such as sanitiser (both hand sanitiser, and surface sanitiser), toilet cleaning fluid, bleach and floor cleaner will be found in a fitness environment. The storage and use of which is controlled under COSHH.

Personal Protective equipment (PPE) is also common place in varying degrees within the fitness environment. Although there will be specialised PPE made available in line with a facility's given health and safety policy, this will typically consist of protective gloves, eye protection and plastic aprons that can be used when handling hazardous materials.

WHAT OTHER MEASURES SHOULD A FITNESS FACILITY TAKE TO ENSURE THAT HYGIENE IS MAINTAINED

Other measures that a fitness facility can take to ensure that there is good hygiene maintained in the fitness environment can include:

- ❖ **Air quality** - ensuring that any air conditioning or air filtration systems are fully functional and have been serviced at the appropriate times
- ❖ **Day to day gym hygiene** - ensuring that there is tissue paper and spray cleaners available in the gym for members to use when cleaning up after themselves
- ❖ **Health and safety** - ensuring that there is clear signage covering all key elements of health and safety such as highlighting first aid kits and the fire exits to members and ensuring that there is clear signage for cleaning materials and equipment for staff awareness in line with COSHH
- ❖ **Personal hygiene of members and staff** - installing hand sanitising stations and ensuring that there are easily accessible hand washing facilities available
- ❖ **Chemical safety** - all staff should be trained in how to handle hazardous substances safely, and they should be stored away where only authorised people are able to access them

KEEPING MEMBERS SAFE DURING CLEANING

Although cleaning is key to both member and staff health and safety, there are a number of considerations that should be taken into account when carrying out cleaning and maintenance.

Firstly, cleaning should primarily be done during quieter times or when the club is closed to ensure that there is as little risk of there being wet floors as possible. When cleaning is carried out, wet floor signs should always be used, and if it is carried out at a time when members are present, these should be especially clear.

The gym instructor should still interact with members if they are cleaning, however when doing so, should ensure that they are not leaving cleaning equipment behind them if they are responding to a query or otherwise helping them.

If a specific piece of equipment has to be closed off or moved in order to facilitate cleaning, then this should be done safely, and with a view of disrupting the members as little as possible.

WASTE AND RUBBISH

There are various types of waste that the gym instructor might come into contact with while working that they will have to dispose of. These can be considered broadly as:

Hazardous - lead acid batteries or mercury light bulbs

Not hazardous - general waste that poses little to no risk to those who are either disposing of it or receiving the disposed waste

Potentially hazardous - paint, ink or other chemical substances that could need assessment before being removed

Hazardous Waste

Within the broad category of hazardous waste, there are several key categories to consider:

- Chemical waste
- Universal waste
- Medical waste
- Construction site waste
- Electronic Waste

There are many **chemicals** that are used routinely in fitness facilities, however, these will most often be cleaning chemicals of one fThere are various types of waste that the gym instructor might come into contact with while working that they will have to dispose of. These can be considered broadly as:

Hazardous - lead acid batteries or mercury light bulbs

Not hazardous - general waste that poses little to no risk to those who are either disposing of it or receiving the disposed waste

Potentially hazardous - paint, ink or other chemical substances that could need assessment before being removed

Universal/general waste is waste that comes from an array of sources, including both domestic and industrial sources. This particular category of waste is not monitored in the same way as hazardous waste is, and will likely end up being disposed either in landfill sites or in incinerators. This form of waste is generally considered to be harmful to the environment.

WASTE AND RUBBISH

Biohazard waste can be considered to be any waste that could pose a biological safety risk and is often what a lot of medical waste would be classified as. Although a fitness facility is unlikely to generate much in the way of medical waste, changing rooms and toilets will have sanitary bins that contain blood products and human waste. This, generally speaking, will be regulated, and it is more than likely that a fitness facility will hire an external company to remove waste such as this.

Construction waste can be considered any waste that is generated as a result of building work, whether that be chemicals or materials. Although this is generally irrelevant to gym instruction, it is possible that the gym instructor would come across this if a fitness facility is undergoing renovations.

Electronic Waste consists of any items or parts of items such as computers that could contain varying volumes of potentially harmful materials which can be environmentally harmful if left in landfill or incinerated.

IDENTIFYING HAZARDOUS WASTE AND WHAT TO DO WITH IT

Hazardous waste is regulated and as such falls under legal requirements. In this instance the identification and handling of hazardous or potentially hazardous waste is covered by the Hazardous Waste Regulations (2005).

The guidelines state that waste that is hazardous should be gathered and disposed of according to the following key points:

- ❖ Without causing harm to humans either physically or in terms of their wider health
- ❖ The clearing and disposal of waste should not cause smells or sounds that would otherwise be disruptive to any surrounding people or organisations
- ❖ Clearing and disposing of waste should take place in such a way that should prevent any harm coming to the environment, whether that be contamination of the ground, or water or possibly posing a danger to animals

When disposing of hazardous waste, the following should also be observed:

- ❖ Ensure that anyone handling the waste is doing so safely
- ❖ Ensuring that hazardous and non-hazardous waste are handled completely separately
- ❖ Ensuring that the policy of the fitness facility with regards to the labelling and logging of waste is observed
- ❖ Ensuring that any records or logs are updated appropriately
- ❖ If an external company has been used to remove the waste, they should provide a detailed record of the waste collected as is required by the regulations

NORMAL DISPOSAL OF WASTE

For most general waste management, there will not be any particular requirements for disposal, however there are some cleaning chemicals that do have certain guidelines.

Generally speaking, if a cleaning product has been purchased to flush down the toilet, then this will also be an acceptable method of disposing of it due to the fact that it will be diluted. However care should be taken to only dispose of one chemical at a time as chemicals mixing can result in adverse chemical reactions that can be harmful to health.

If bleach based cleaning chemicals are being disposed of, advice should be sought first as these can pose an environmental risk in larger quantities.

All large quantities of cleaning materials, and any abnormal chemicals should always be disposed of professionally.

MAINTENANCE AND CARE OF CLEANING EQUIPMENT

Cleaning equipment should always be maintained and cleaned for two reasons; rigorous care and maintenance will prevent the cleaning items themselves harbouring bacteria or pathogens that could be harmful and because this will ensure that the equipment will perform its function for longer.

Typically, this means that any equipment used should be stored correctly after use, and that any potential contaminants have been removed, whether they be biological or chemical.



COSHH REGULATIONS

COSHH Regulations

The most recent update of COSHH was in 2002 and remains a standard to which employers and businesses are required to follow. COSHH regulations exist simply for the purpose of protecting people, whether that be employees or the general public from coming to unnecessary harm as a result of handling substances that have the potential to be damaging to health.

Generally, the substances that could fall under COSHH regulations in a fitness facility would be any products or items containing **chemicals**, **Gases** or **Dusts**. Within these broad categories, harmful forms of these substances could cause or exacerbate respiratory issues, dermatological issues, harm to the eyes or nose.

In order to be compliant with the COSHH regulations, a fitness facility must ensure that they have appropriate processes in place to prevent substances that could be damaging to humans becoming abundant in a volume that would cause harm. To do this, the fitness facility must consider the various ways in which these substances could come into contact with people, and how a given substance could cause harm.

Following this, the fitness facility should then ensure that they have as much control over the potential exposure of a given substance which could cause harm to staff members or members of the public. In most instances, this will include keeping hazardous or potentially hazardous substances locked away, where unauthorised persons cannot access them. However, it is also important to consider instances in which these substances should be used, and therefore when to provide employees or otherwise authorised persons with access to Personal Protective Equipment (PPE).

In order to ensure that, the above is observed, there should without exception be clear signage indicating that there are hazardous substances, and that access is for authorised persons only for the area in which they are stored.

WHERE DOES THE GYM INSTRUCTOR FIT IN?

Where does the fitness instructor fit in?

All gym instructors who are employees of a fitness facility should ensure that they are also adhering to these structures and processes, such that they are using the correct procedures and equipment (including PPE) to ensure their own safety when handling potentially hazardous substances.

In addition to this, when accessing the storage area(s) for any substances that are regulated by COSHH, then they should always ensure that they leave a given storage area secure and ready for the next person who might need to use it, paying particular attention to ensuring that any hazardous substances are stored correctly, and that they are not inadvertently increasing risk to another person.

If a gym instructor has had to use PPE to handle any substances, they should ensure that they have removed this and cleaned themselves adequately before carrying out other tasks in areas where they could contaminate items or surfaces.

In all instances, employees should seek to follow the plans and procedures set out by the employer to ensure that they are taking all reasonable safety precautions.

COSHH ASSESSMENT PROCESS

There are three key principles that should be followed when considering COSHH assessments:

1. Identifying Hazards
2. Determine who could be harmed, and how could they be harmed
3. Consider any risks that might be present and select adequate precautions

When **identifying hazards**, the first thing that should often be considered is which substances might be harmful, and this can usually be determined by consulting the manufacturer's label on a given product. If a substance is created as a byproduct of another process such as maintenance, then this should be factored into the relevant risk assessment.

When determining **who might be harmed** it is prudent to think of the person who has to come into contact with the substance primarily, usually because they are the one using it. An example of this could be a cleaner or a gym instructor accessing cleaning materials required to carry out their role. It is also crucial for this person to consider any harm that could come to any other people as a result of them accessing or using the substance. In considering **how they could be harmed** the fitness facility should consider firstly, how the substance might become exposed to people accidentally and take appropriate measures to prevent it. They should also however, consider how a person has to use the substance and for how long they will be exposed to it.

When **considering any risks that might be present** it is important to ensure that all possible risks are identified before **selecting adequate precautions** to put in place to ensure that the risk is minimised. Usually, this will involve either using a substance that is safer, and does not pose the same inherent risk as the initial substance, or developing the process of its use to mitigate any risk. If neither of these options are possible, then further measures such as enhancing the PPE employed should be undertaken.

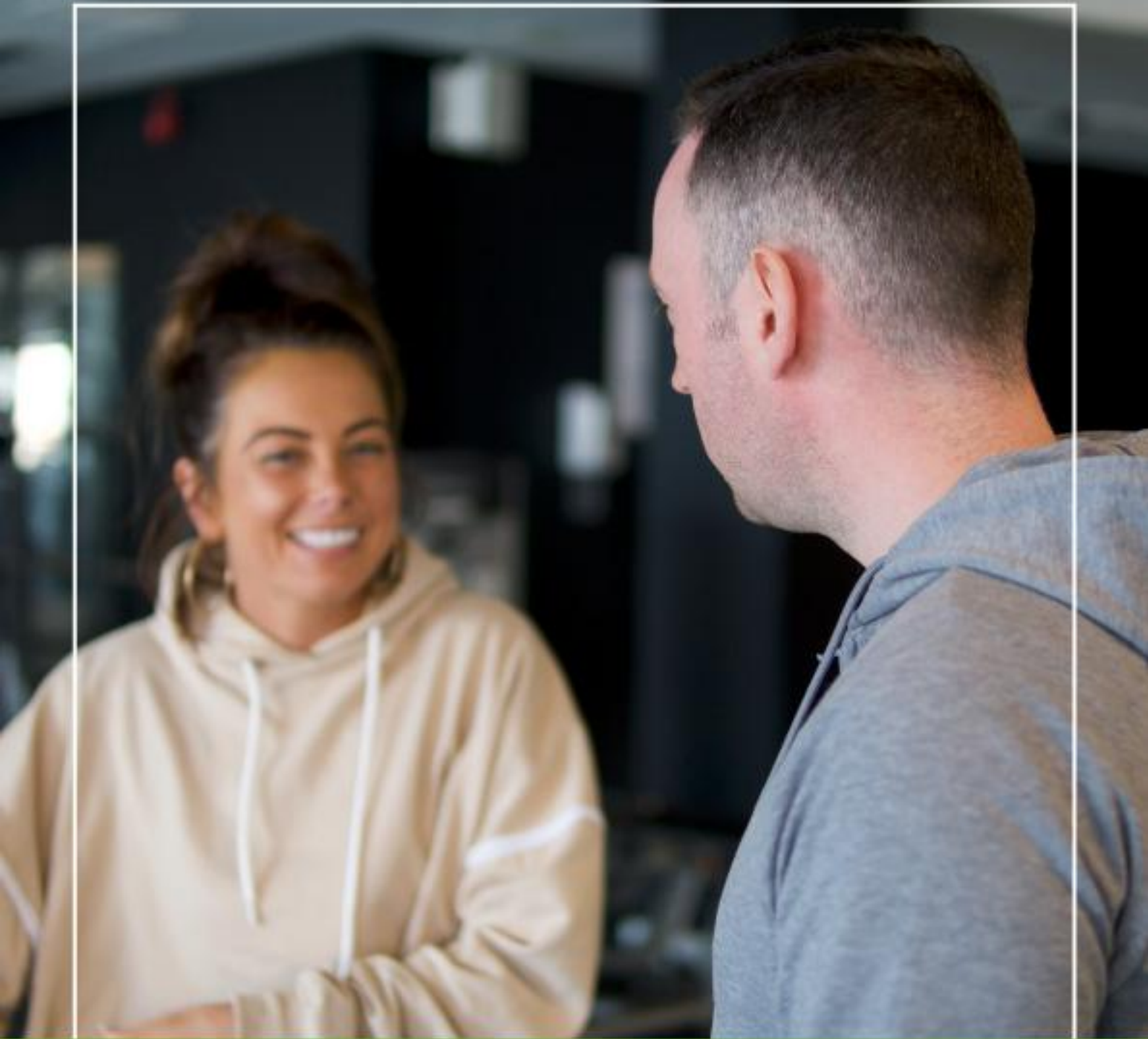




DEALING WITH SPILLAGES AND BREAKAGES

Spillages and breakages are common in fitness facilities, however a specific process should be followed to ensure that the risk to anyone in the area is reduced as far as is possible.

1. Check that no one has been injured or otherwise harmed by the initial incident and check that the area is safe.
2. Ensure that no one can enter the area by blocking off the affected area as appropriate. If necessary, a wet floor sign should also be placed down to warn anyone who might walk into the area.
3. Once the area has been blocked off, any equipment necessary to clear up the spillage or breakage should be gathered. However, if the area is unsafe, someone should remain to prevent anyone else coming into the area.
4. Ensure that the area has been cleaned and any cleaning equipment that has been used has been returned to the correct storage area



Unit 3 : Section 1

Client Consultations

THE FITNESS GROUP

COLLECTING INFORMATION

There are an array of reasons why a gym instructor may need to gather information from clients, these can range from there being a necessity to know and understand if the client has a medical condition or issue that might mean that they should exclude themselves from exercise, to more general information that helps us to understand how to best support them in achieving their aims.

METHODS OF COLLECTING CLIENT INFORMATION:

Questionnaires:

Questionnaires can be used to carry out information gathering such as health screening – a PAR-Q is a form of questionnaire.

There are several advantages to using questionnaires:

- Closed questioning allows for yes or no questions to be asked, which can provide useful data for comparison later, or explicit information where required
- Generally, a client can complete a questionnaire themselves and assistance is not required
- Provides clear and recorded evidence of information in case it is required at a later date

There are however several disadvantages for using questionnaires:

- Questionnaires often don't allow a client to expand on what they think
- All questionnaires, need to be read and checked by an instructor which is time consuming
- There could be a language barrier with clients

INTERVIEWS

An interview can take several forms from a loose discussion between a professional and a client, and a formal process with multiple steps.

Generally speaking, interviews in the fitness environment will be semi-structured in nature and will act as the main component during a consultation in which an instructor will attempt to determine:

- What the client wants to achieve
- What their preferences are as to how they reach that goal
- What barriers to achieving their goal the client faces
- What motivates them to do what they are wanting to do

Interviews can be advantageous because they allow information to be expanded upon, whether that information is volunteered by the client, or prompted by the instructor with follow up questioning. The interview process, when carried out correctly, can help to foster trust and begin to build a professional relationship between client and instructors.

Interviews are however time consuming, and so should be used appropriately. Interviews also require that the instructor has an aptitude for skills such as active listening and being able to record the results of the interview appropriately.

PHYSICAL ASSESSMENTS

There are several physical assessments that a fitness instructor could use to assist their client in their overall journey:

- **Health assessments** – heart rate, height and weight, Body Mass Index (BMI)
- **Fitness assessments** – strength tests (one rep maximum), flexibility tests (sit and reach test) and cardiovascular tests (rockport walking test)



INFORMED CONSENT

It is important to gain informed consent from a client before action of any kind is taken. Informed consent will generally be gathered by asking the client to fill out a form confirming that the instructor has explained specified information. This should be signed and dated by both parties and stored in accordance with GDPR.

SCREENING AND EXERCISE SAFETY

Prior to any exercise taking place, all clients should be thoroughly screened to ensure that they are at low risk of coming to harm when exercising.

Exercise should either not begin or be stopped immediately if a client states that they have a high-risk condition. If a condition is not an absolute contraindication, then it might still be possible for a client to exercise, and they should be referred to another professional if necessary. A gym instructor cannot at any point exceed the scope of practice of their role.

RISK STRATIFICATION

The term risk stratification refers to the process that a gym instructor can engage with to help them assess whether they can work with a client safely and within their scope of practice.

It may sometimes be the case that the gym instructor will encounter a client with whom they cannot work without stepping out with their professional capacity, which could therefore place the client at increased risk of harm.

RISK STRATIFICATION

A gym instructor would not be qualified to work with clients who are seeking physical training to complement injury rehabilitation or clients with certain medical conditions. For example, if a client presented themselves to a gym instructor looking for assistance with their recovery from a soft tissue injury, the gym instructor would not be qualified to work with them and should instead refer the client to their GP so that they can access physiotherapy. Similarly, if a client presented themselves to the gym instructor seeking support in training with a medical condition, they again would not be qualified to do so, and the client should be referred to supervised exercise sessions with a fitness professional who holds an exercise referral qualification.

In order to provide gym instructors and fitness professionals with support in doing this, there are several risk stratification tools available. The most common of which are the Irwin Morgan Risk Stratification System and the NQAF Patient Characteristics and Exercise Professional Expertise Pyramid. Please see the figures overleaf for reference.

It is common for individual fitness facilities and regional areas to utilise their own risk stratification tool and where this applies to the fitness facility in which a gym instructor works, it is critical that this is observed.

RISK STRATIFICATION PROCESS

In order to risk-stratify a client, a gym instructor should firstly follow any specific protocols put in place by the fitness facility that they work in, or that are relevant in their particular region.

The gym instructor should then apply a risk stratification tool, of which the Irwin-Morgan Risk Stratification Tool and the NQAF Patient Characteristics and Exercise Professional Expertise Pyramid are common and generally accepted.



RISK STRATIFICATION PROCESS

If during the risk stratification process, it is deemed that a client is not fit to exercise, then they should be referred to their GP for clearance to exercise. When referring a client to their GP, the gym instructor should give a clear reason for doing so and should then plan a follow up discussion with them once they have spoken with their GP.

IRWIN-MORGAN RISK STRATIFICATION TOOL

Low Risk*	
Overweight	The client presents with no additional health complications.
High Blood Pressure	Blood pressure reads between 130-139/85-89mmHg and is not using medication to control their blood pressure.
Deconditioned	Deconditioned due to age or because of an inactive lifestyle.
Type 2 Diabetes	Type 2 diabetes is diet-controlled, not controlled by medication.
Older People (over the age of 65)	No more than two risk factors of CHD (coronary heart disease) and not at an increased risk of falls due to other medical conditions.
Prenatal	No symptoms of pre-eclampsia or history of miscarriage.
Postnatal	Provided that 6/32 checks are completed and there are no other complications presenting.
Osteoarthritis	Where appropriate physical activity can relieve symptoms.
Mild Bone Density Changes	When BMD >150 and <2.5 SD below young adult mean.
Exercise-Induced Asthma	With no other symptoms presenting.
Smoker Status	So long as no more than one CHD risk factor is presented and respiratory function is not impaired.
Mild Anxiety/Stress	Asymptomatic
Seropositive HIV (also known as Detectable)	Asymptomatic

Medium Risk*	
Stage 1 Hypertension	Where blood pressure reads between 140-159/90-99mmHg and the condition is medication-controlled.
Type 2 Diabetes	Where the condition is medication-controlled.
Type 1 Diabetes	With adequate instructions regarding medication of insulin dosage depending on time of exercise and warning signs.
Physical Disabilities	No other risk factors presenting.
Moderate Osteoarthritis/Rheumatoid Arthritis	Where intermittent mobility issues present.
Clinical Diagnosis of Osteoporosis	BMD <2.5 at the spine, hip or forearm or greater than or equal to 4 on fracture index, with no history of previous low-trauma fracture.
Pre or Post Surgery	Where the surgery is general or orthopaedic and not cardiac in nature.
Intermittent Claudication	Not presenting with any symptoms of cardiac dysfunction.
Stroke/TIA	>1 year ago, stable CV symptoms, mobile - no assistance required.
Asthma	Mild (ventilatory limitation does not restrain submaximal exercise).
Chronic Obstructive Pulmonary Disease (COPD)	No ventilatory limitation, but where correction of physical deconditioning and optimisation of respiratory system mechanics would be beneficial.
Neurological Conditions	E.g. young-onset Parkinson's disease (stable), multiple sclerosis.
Early Symptomatic HIV	Moderately diminished CD4 cells, intermittent or persistent signs and symptoms, e.g. fatigue, weight loss, fever, lymphadenopathy.
Chronic Fatigue Syndrome	Significantly deconditioned as a result of long term symptoms.
Depression	Where mild or moderate.
Fibroglycemia	Associated impaired functional ability, poor physical fitness, social isolation, neuroendocrine and autonomic system regulation disorders.

High Risk	
Older people (older than 65 years old) who are at risk of falls and frail older people with osteoporosis and a history of fractures.	Refer directly to falls service (BMD >2.5 at the spine, hip or forearm in the presence of one or more documented low-trauma or fragility fractures).
Unstable and uncontrolled cardiac disease	
Claudication with Cardiac Dysfunction	

Orthostatic (postural) hypotension	Fall SBP <20mmHg within 3 minutes of standing.
Stroke/TIA	Recent (>3 months)
Severe Osteoarthritis/Rheumatoid Arthritis	With associated mobility.
Advanced Type 1 or Type 2 Diabetes	With accompanying autonomic, advanced retinopathy.
Moderate to Severe Asthma	Where submaximal exercise is restrained by ventilatory limitations.
COPD/emphysema	Where true ventilatory limitation is present.
AIDS	With accompanying neuromuscular complications, severe depletion of CD4 cells, malignancy or opportunistic infection.
Psychiatric Illness/Cognitive Impairment/Dementia	AMT score < 8

* for all risk categories, scope of practice still applies and all instructors should hold the necessary qualifications to work with a particular client or group of clients. For example a pre and postnatal instructor should hold evidence of an appropriate qualification allowing them to work with this special population.

NQAF PATIENT CHARACTERISTICS AND EXERCISE PROFESSIONAL EXPERTISE PYRAMID

EXAMPLES OF SETTINGS/ REFERRALS/REFERRAL ROUTES/SESSIONS

Tertiary/Secondary/PHC Settings Referral through to self-referral and all risk levels.
Programme management and training skills.

Referred patients, high-risk: assessment/test; secondary and tertiary health settings; hospital-based: medically supervised physical activity and/or specialist exercise sessions: 'phase III' cardiac rehab; 'phase III' osteoporosis; falls; claustrophobia, stroke, mental health and dementia care, palliative care, etc.

Referred patients, medium-risk: assessment/test; indoor and outdoor community leisure and PHC settings; multidisciplinary: physical activity and/or adapted exercise sessions: 'phase 1' cardiac rehab; osteoporosis and falls prevention; arthritis care; back care, stroke, Parkinson's, HIV, depression; anxiety (integrated); mental health/ dementia care (integrated), etc.

Referred patients, low risk: assessment; indoor and outdoor community leisure and PHC settings; physical activity and/or adapted exercise or dementia care (integrated), etc.
sport sessions for special populations; older people; pre and postnatal; people with disabilities; weight control, depression, mild anxiety, etc.

Recommended/ self-referred people; Indoor and outdoor community leisure settings; physical activity; sport and exercise; weights/circuits; exercise to music; aqua; step; walking.

PARTICIPANT RISK ACTIVITY MODIFICATION

EXPERTISE

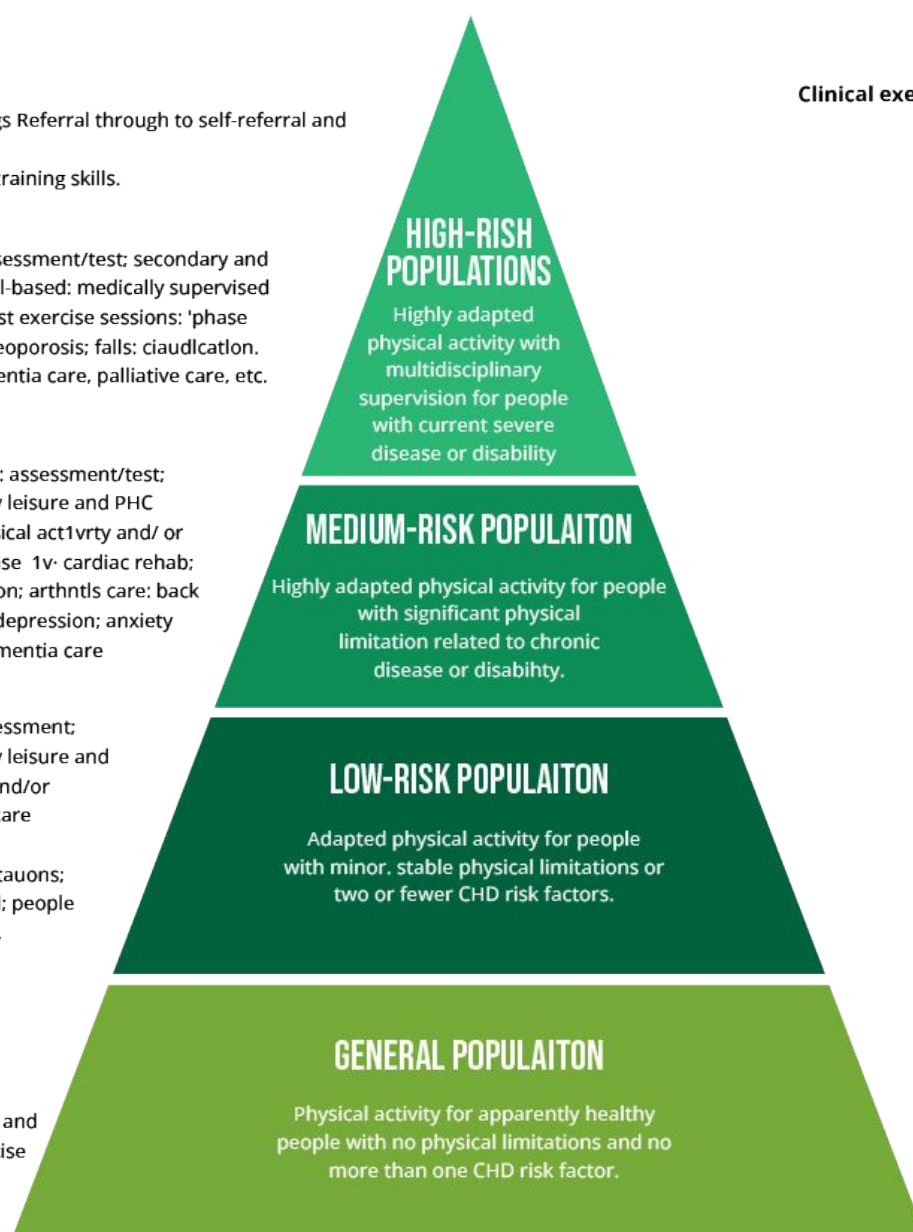
Clinical exercise programme director

Advanced instructor
(clinical exercise)

Advanced instructor
referred patients 2

Advanced instructor
referred patients 1

Exercise and fitness,
coach, teacher,
instructor



OTHER INFORMATION COLLECTED

During the consultation process, the instructor should also seek to gather information such as how active a client's lifestyle is generally and what they do for work as this often has a significant impact on their overall physical activity levels.

It is also important to understand what a client's likes and dislikes are when it comes to exercise as this can help an instructor to help create a plan for the client. It can also be an opportunity to correct incorrect perceptions about certain forms of exercise.

GOAL SETTING

SHORT-TERM GOALS

Short term goals are set over a period of one day to one month. This can relate to something that is achievable in this time frame such as increasing frequency of attendance at the gym.

MEDIUM-TERM GOALS

Medium term goals are set over a period of one to six months although goals being over a one month or three month plan are the most common.

LONG-TERM GOALS

Time frames for long term goals are considerably longer and can span from six months to several years. The majority of long term goals are set over the course of a year.



GOAL SETTING: SMART FORMULA

Specific

This means that the goal must pertain to something that is a clear objective within a broad goal. For example, if a person wanted to get fitter and this was their main goal, then it would not be specific enough to meet the SMART criteria. Instead, there should be focus on a particular element of fitness. For example, building strength, or losing weight.

Measurable

This component of SMART goals related to the specific goal being measurable, usually in numbers or in a quantifiable sense. Stating that a client would lift more, would not be quantitatively measurable, and so we would instead look to say that a client will lift for example 10kg more than they did before they set the goal.

Achievable

This component of the SMART goal is to assess whether it is possible for the client to achieve the goal. To do this, we should consider if the client has the time, energy and means to complete the goal and demonstrate this consideration as part of the goal.

Realistic

This refers to the goal fitting the client's needs wants and ability. Client participation is key to this component of the goal, and it is critical that they contribute to the development of the goal and that the goal is not simply stated by the instructor.

Time Bound

There should be a clear and defined timescale to the goal so that the client can measure their success with a clear deadline or target. For example, this component of the SMART goal will clearly state the time and/or date by which the goal will be met.

THE IMPORTANCE OF A HEALTHY LIFESTYLE, HEALTH EATING AND HYDRATION



Obesity

Obesity can generally be defined when a person has a body mass index (BMI) of over 30, with over 40 being morbid obesity.

The current prevalence of obesity in the UK is that 27% of adults in England are obese and on top of this a further 36% are overweight.

OBESITY

There are several key health risks associated with obesity:

- Joint problems and lower back pain
- High blood pressure
- Mental ill health such as depression and anxiety
- Coronary heart disease
- Type 2 diabetes



HEALTHY LIFESTYLE BEHAVIOURS

There are many benefits to living a healthy lifestyle, most notably, these include:

- Improved mood and self-esteem
- Improved life expectancy
- Weight loss and improved weight management

HOW DOES PHYSICAL ACTIVITY HELP?

Physical activity can help to maintain a healthy blood pressure, meaning that those who exercise regularly are less likely to have high blood pressure or hypertension.

People who take part in physical activity regularly are also less likely to develop or live with chronic conditions such as Type 2 Diabetes, or coronary heart disease.

Joint and bone issues such as osteoarthritis and osteoporosis are less likely to affect a person who exercises regularly.



WHERE TO FIND INFORMATION

Credible information can be found from public governing and public health bodies such as the NHS, the Department of Health, Public Health England and the British Nutritional Foundation. Every effort should be made to avoid questionable sources of information such as newspaper articles, or web sourced information that does not come from a credible source.

HEALTHY EATING

There are several benefits to eating a nutrient rich diet:

- Weight management
- Healthier skin and hair
- Improved exercise performance
- Improved mood
- Reduced risk of illness and disease
- A reduction in loss of bone density

THE EATWELL GUIDE



NUTRIENTS

There are three Macronutrients; carbohydrates, proteins and fats. Although there are many micronutrients, these usually fall into two broad categories: vitamins and minerals.

Carbohydrate is used as a fuel in the body in various forms; glucose is used by the brain and the working muscles use glycogen. Carbohydrates are broken down into simple and complex forms, examples of simple carbohydrates include sugar, fruit juice or honey. Examples of complex carbohydrates include pasta, rice, potatoes and certain vegetables. Fibre is the another form of carbohydrate which is not digestible by humans, but plays a key role in the smooth passing of food and bodily waste.

Protein serves several key functions in the body, including the transport of substances, growth and repair. Protein is particularly key in the recovery process that the body undergoes following intense physical training. Proteins are made of amino acids, and fall into two broad groups; animal sourced proteins and plant sourced proteins. Examples of animal sources of protein include, meat and poultry, fish and eggs while plant sources of protein include, grains, nuts, seeds, beans and pulses.

Fat plays several key roles in the body, including supporting the nervous system, providing insulation and protection for internal organs and as a form of stored energy. There are three basic categories of fats; **saturated fat, monounsaturated fat and polyunsaturated fat**. Although all three forms of fat are important for the body, it is generally recommend that men should consume no more than 30g of saturated fat per day and that women should consume no more than 20g of fat per day.

Examples of **saturated fat** include, meat, eggs and dairy produce and this type of fat is used by the body to support the nervous system and the structure of cells.]

Examples of **monounsaturated fat** include meat, poultry, olive oil and avocados. Monounsaturated fat helps the body protect itself against heart disease.

Examples of **Polyunsaturated fat** include oily fish, sunflower seeds, flaxseed oil, soybean oil and it is important for cells and proper brain function.

HYDRATION

Hydration is critical in facilitating the biological functions that support life, and as such adequate hydration is crucial to healthy living.

Generally speaking, water will constitute around two thirds of the body's weight, however the amount of water required can vary depending on the environmental temperature, the levels of humidity and the physical activity level of a given person. Water mass can be lost through breathing, sweating and urination.

Dehydration can cause headaches, a feeling of lightheadedness, lack of concentration and urine that is a darker colour. In order to prevent dehydration setting in, humans should aim to have at least 1.2 litres of water per day, although 2 litres is the generally accepted recommended daily intake. Fluid consumption should also rise proportionately with any physical activities or increases in perspiration (sweating).

MICRONUTRIENTS: VITAMINS AND MINERALS

Vitamins and minerals play a crucial role in facilitating and supporting a lot of the body's functions including growth and repair. It is therefore important to ensure that the diet should be rich in fruit and vegetables to ensure that a broad range of vitamins and minerals are consumed.

Vitamins and minerals can be found in both plant and animal sources and it is generally recommended to eat a broad range of fruit and vegetables, nuts and whole grain cereals to ensure that adequate levels are consumed. It is also recommended to eat a variety of colours as green vegetables, berries and root vegetables will contain differing levels of nutrients contained within them.

Animal sources of vitamins and minerals such as meat, eggs and dairy produce can provide fat soluble vitamins (A, D, E and K), Vitamin B12 and folic acid in addition to minerals such as zinc, iron and calcium.



CALORIE AND ENERGY REQUIREMENTS

Generally speaking, the three main macronutrients the following proportions of Kilocalories:

- Carbohydrate – 4kcal per gram consumed
- Protein – 4Kcal per gram consumed
- Fats – 9kcal per gram consumed

Generally speaking, it is recommended that **men consume 2,500** calories per day and **women consume 2,000 calories per day**. This does however vary depending on a person's lifestyle, physical activity level, age and height.

THE ENERGY BALANCE EQUATION

- If a client's energy intake is higher than energy output, they will gain weight
- If a client's energy intake is less than energy output, they will lose weight
- If a client's energy intake is the same as energy output, their weight will stay the same

HEALTH RISKS OF POOR NUTRITION

There are various health risks associated with poor nutrition:

- Obesity
- Type 2 Diabetes
- Coronary heart disease
- Hypertension (high blood pressure)
- Stroke
- Osteoporosis

BENEFITS OF A NUTRIENT RICH DIET

There are numerous, wide ranging benefits to maintaining a diet that is rich in nutrients. Consuming a diet that is rich in nutrients will allow the body to carry out the biological functions that support life and quality of life.

In the short term, these can include a person experiencing an improved mood, increased energy levels and healthier skin and hair.

In the long term, a person can see an improvement in their exercise performance, improved weight management, stronger bones and teeth and a reduced risk of illness and disease occurring.

THE BENEFITS OF A HEALTHY LIFESTYLE

There are many benefits to having a lifestyle that is generally healthy and that incorporates a healthy range of physical activity and exercise carried out on a regular basis, healthy eating with consumption of all food groups in moderation and ensuring that sleep and recovery are maintained to a healthy degree.

These benefits can include improved mood and self-esteem both during exercise and other lifestyle activities, a reduced risk of both minor and chronic illness and injury, improved weight management and increased independence in older age.

These benefits can culminate to provide a person with a higher overall quality of life and an increase to overall life expectancy.

CREDIBLE SOURCES OF INFORMATION

There are several credible and reliable sources of information around nutrition and healthy eating and these include, The British Nutrition Foundation, Food Standards Agency, The NHS and the Department of Health.

It is recommended to avoid sources such as newspaper articles or fitness websites, as the information is often unpublished and is at a higher risk of being incorrect or potentially unsafe.

SCOPE OF PRACTICE

There is a clear limit to the scope of practice that a gym instructor can operate under in their role. Specifically, they should refrain in all instances from advising that a client should consume only a specific diet, or take particular supplements, as this can lead to a case of negligence being built against them. Instead, they should seek to make general recommendations in line with the UK Government advice, and the eat well guide.





Unit 3 : Section 2

Working with Clients to Make
Positive Behaviour Changes

WORKING WITH CLIENTS TO MAKE POSITIVE BEHAVIOUR CHANGES

When a gym instructor works with a client, it is likely that the client has joined a fitness facility with the aim of improving their physical fitness, losing weight, or just feeling better about themselves.

Although giving clients information of how to exercise and eat in a healthy way is the main practical key to helping them reach their goals, often this in itself is not successful. Instead, a broader approach needs to be taken, with gym instructors also considering how to help their clients with longer-term behavioural changes.

There is a vast number of valid methods with which to influence client behaviours positively, however there are three widely accepted and common methods that can help with this: Motivational Interviewing, Cognitive Reframing and Rewards Systems.

Motivational Interviewing:

Motivational interviewing can be used to gather information about what the client actually wants to achieve before exploring this further with them and ascertaining their levels of motivation and how ready they are to begin working on the changes required to achieve their goals. The gym instructor and the client can then go on to work together in developing specific SMART goals that the client can work towards achieving.

In motivational interviews, gym instructors should seek to build a rapport with their client, before setting an agenda for the meeting and allowing the client to revise this before beginning so as to make clear that the meeting is about them and their goals and that they have freedom of choice at all times.

The gym instructor should then assist the client with assessing their readiness for exercise. Once a client's readiness to exercise is ascertained, the gym instructor can tailor an intervention to the client's needs by engaging in one or more motivational interview strategies such as asking open-ended questions or idea showers.

WORKING WITH CLIENTS TO MAKE POSITIVE BEHAVIOUR CHANGES

Cognitive Reframing

Cognitive reframing refers to converting perceptions of experiences that are negative in nature to more positive perceptions through rational thinking.

Cognitive reframing seeks to build better and more positive thoughts about a given issue, idea or event in which a client is challenged to consider the positive side to things in order to combat a negative narrative.

Cognitive reframing can be used when a client presents a goal, aim or objective that is negative in nature. For example if a client says that they feel self conscious or uncomfortable because they are unfit then the gym instructor can respond to this by asking what they would do differently once their goal had been achieved.

They would likely respond with lifestyle activities or other significant things that they feel as though they are not able to do. This gives the gym instructor an opportunity to use those desired outcomes to promote positive thought throughout the client's journey.

Rewards:

Rewards are a basic and often convenient way in which gym instructors can help to positively influence a client's long term approach to behaviour change. Reward systems and incentives can help to reinforce a client's motivation and commitment.

Rewards can include small gestures from either a gym instructor or a fitness facility with promotional offers such as offering a client a free water bottle or t-shirt for signing up, or for having their first gym session with an instructor. It is also common for fitness facilities to have wider rewards and loyalty systems such as offering a free training or review session once the client has booked and paid for a certain number of sessions.

Although rewards systems can in some way assist with helping a client maintain positive exercise and health behaviours, methods such as this are more likely to enhance a client's retention with a particular fitness facility.

WORKING WITH CLIENTS TO MAKE POSITIVE BEHAVIOUR CHANGES

Therefore in order to assist a client with positive behaviour change, a gym instructor can seek to make rewarding more personal to the client or link their rewards to factors that have been shown to promote long term participation such as social inclusion.

For example, a gym instructor who is working with multiple clients in a fitness facility could introduce a client of the month competition in order to promote social interaction and inclusion in the fitness facility and offer an incentive for winning at the end of the month. With this approach however, the gym instructor should focus the competition on healthy behaviours such as regular attendance and achieving goals.

Care must be taken however to ensure that competitions do not promote unhealthy behaviours such as over training.

Another example of this would be if gym instructor was working with a client for a longer period of time, they could make an effort to ensure that they are positively reinforcing what the client has achieved. It is easy for a client to lose perspective of how far they have come on their journey and a gym instructor highlighting this to them can go a long way to encourage them to maintain and enhance their positive behaviours.





Unit 3 : Section 3

Referral to Other Professionals

REFERRAL TO OTHER PROFESSIONALS

It may, in some instances, be necessary for a gym instructor to refer a client to another professional.

Most commonly, the gym instructor will refer their client to their GP (General Practitioner) if they find a concern or a contraindication to exercise during the health screening and/or risk stratification processes.

Health Screening Form:

If during the health screening process, the client indicates an affirmative answer to one or more of the questions on the health screening form, which is often referred to as a PAR-Q, then it is advised that the client should be referred to their GP. This is because they have indicated the presence of a condition or medical event that could place them at heightened risk of experiencing a major medical event.

Accrued Risk Factors:

If a client presents themselves to an instructor with several risk factors for CVD (cardiovascular disease), then it is advisable for them to be referred to their GP. CVD risk factors include sedentary behaviour, high blood pressure, smoking status, age, diabetes, obesity, high cholesterol and a family history of CVD.

Existing Injuries:

If a client has minor soft tissue or orthopaedic injuries, they should be advised to get clearance from their GP prior to beginning exercise, as they will be at a heightened risk of making the injury worse, or becoming injured in a different way.

Age:

If a client is older than 65, and they are not used to exercise, they should first seek clearance from their GP before engaging in any new form of exercise.

REFERRAL TO OTHER PROFESSIONALS

Doubt:

If either the instructor or the client are in any doubt or uncertainty, then the instructor should actively encourage the client to seek medical clearance with their GP prior to beginning exercise. It is better for a client to delay beginning exercise for a short period of time than to become injured or experiencing illness. Similarly, a gym instructor should seek to protect themselves and their clients at all times from harm, and recommend GP clearance if they are in any way unsure of whether or not a client is fit to exercise.

Other Professionals:

It is also possible for a gym instructor to refer their client to other professionals such as a physiotherapist in the event that a client is looking for assistance with recovery following a soft tissue injury, or to a sports massage therapist that could assist a client with general aches and pains, or minor muscular discomforts.

In all instances, it is important for a gym instructor to be aware of their scope of practice and to always refer a client onto a more qualified professional if they are either aware that they are not qualified to work with the given client, or in the event that they are in any way unsure whether or not they are qualified to work with the client safely.

It is advised to be familiar with both the screening process and the risk stratification process that can be found in in Unit 3, Section 1 prior to working with clients in the consultation phase.

How Should Referral Take Place:

If the gym instructor is referring their client to their GP, then they should in the first instance let the client know that they cannot support them with exercise safely until such time that they have been cleared to do so by their GP, or until they are able to work with a more qualified fitness professional.

They should then let them know exactly why they are unable to work with them in a professional and clear way. For example, if a client indicates that they have multiple CVD risk factors, then they should be informed that due to the presence of these factors that they could be at an increased risk of a medical event and that to ensure they are safe when exercising that they should speak with their GP prior to beginning.

REFERRAL TO OTHER PROFESSIONALS

Storage of Client Data

In order to adhere to data protection law, it is critical that gym instructors ensure that they handle and share client information appropriately.

In all instances in which records are kept, they should be stored securely in locked cabinets if the information has been recorded on paper, and password protected if they are kept electronically before being disposed of appropriately in line with the law.

Communicating With Other Professionals

There are some instances in which a gym instructor will have to communicate directly with another professional and share client information.

It is important that this is only done with the client's consent or if the client or others are at a direct risk of harm.

An example of a situation in which information might have to be shared with another professional is a client requires complex dietary advice and is being referred to an in house dietician. Another example of this could be if the instructor has concerns for the client's welfare or the welfare of someone else in relation to the client. In this instance, the instructor should contact an appropriate professional such as the emergency services or the fitness facilities safeguarding officer.





Unit 3 : Section 4

Health and Fitness Testing

THE FITNESS GROUP

HEALTH AND FITNESS TESTING

Fitness and health tests are an important part of the consultation and planning stages of a client's journey as they will dictate the baseline from which the client works and from which the instructor is able to help them plan their next steps.

Selecting an Appropriate Test:

There are a vast number of physical fitness and health tests that can be carried out, and it would be neither efficient nor appropriate to carry out every test on every client. Therefore an appropriate selection must be used.

In some circumstances, it may be inappropriate to carry out a test because the client is not comfortable with it, this is especially common with physical measurements such as hip and waist circumferences and skin fold tests. In this instance, it is important that the client does not feel pressured into undergoing the test and should instead be presented with an alternative choice.

It may also be unsafe for a client to undertake a test. For example, a client could have a joint injury which would make it inappropriate to carry out a test that requires tension to cross the joint. Again, where possible an alternative test should be offered.

Getting Accurate and Reliable Results:

In order to get accurate and reliable results, tests should be scheduled at consistent times. For example if a test is carried out early in the morning, the follow up test should also be carried out in the early morning. This is to ensure that the results are not influenced by factors of daily living that could make the test results better or worse.

The client should perform the tests in an environment that is as consistent as possible. This should take into account environmental factors such as temperature and humidity.

The gym instructor should take time to explain the protocol of the test to the client clearly before each test to ensure that the correct protocol is followed at all times.

HEALTH AND FITNESS TESTING

Getting your Client Ready for Tests:

Pre-test information should always be given to clients several days before the tests are due to take place, this will allow them adequate time to ensure that they are as prepared as possible.

Please review the below table for the general guidelines for readiness for health and fitness assessments:

Pre-Test Advice for Clients	
Category	Advice
Consumption	- Avoid the consumption of heavy meals at least three hours before the test
	- Avoid excessive consumption of alcohol the day before and the test and completely avoid alcohol on the day of the test
	- Avoid caffeinated drinks such as coffee or energy drinks for at least two hours before the test
	- Avoid smoking for at least two hours before the test is due to start
Action	- Avoid strenuous exercise of physical activity on the day of the test
	- Have a good sleep the night prior to the test
	- Avoid using spa facilities such as saunas, sunbeds or steam rooms for at least two hours before the test
Medical	- The test should not be carried out if you are in any way unwell
	- If medications such as inhalers are required, please ensure that you have them with you on the day of the test
Readiness	- Ensure that you have appropriate clothing and footwear
	- Ensure that you have water and food with you if necessary

HEALTH AND FITNESS TESTING

Carrying out the Tests:

As with any information gathering protocol or exercise, the gym instructor should seek to gain informed consent from their client prior to carrying out any tests; this will involve the instructor clearly explaining the test protocol and what will be expected of the client, how this information will be gathered and how this information will be used to help them.

When Should Tests be Stopped?

There are several circumstances under which an instructor should end a test on the grounds of health and safety.

In emergency circumstances, such as a client experiencing chest pains, or other symptoms of a cardiac event, the instructor should stop the test immediately and contact the emergency services.

In serious circumstances, which can include, injury or suspected injury, a client experiencing and excessive change in blood pressure, either increasing or decreasing, excessive shortness of breath or wheezing, the instructor should stop the test and refer the client to their GP for medical clearance before further exercise is carried out.

In circumstances when a client appears to be fatigued to the point where it might be dangerous for them to continue, or the client requests to stop, the instructor should also stop the test immediately and check on the client's wellbeing.



HEALTH TESTS

Weight and Height Measurements

Weight and height are important tests for determining BMI (Body Mass Index), and ascertaining an approximate healthy weight for a client based on normative tables.

Height and weight do not assess body fat or muscle mass, but can be a generally acceptable way to assess general members of the population. If a client holds more muscle mass, a waist and hip measurement can be taken to assist with body composition analysis.

When carrying out height and weight tests, calibrated scales should be used and the client should ensure that any heavy clothing such as shoes and coats are removed. When measuring height, the instructor should ensure that the client is standing straight and measures from the highest point of the head to the bottom of the heels

Body Mass Index (BMI)

BMI is a standardised measurement that can be used to provide an indicator of healthy weights and unhealthy weights. However, it is not an accurate or reliable test for athletes and those with more muscle mass as even when carrying very low masses of body fat, these sub-populations can be classed as obese.

Calculating BMI:

BMI is calculated using this equation:

$$\text{BMI (kg/m}^2\text{)} = \text{Weight (kg)} \div \text{Height (m)}^2$$

Example BMI calculation:

If a 70kg man (2.2lbs = 1kg) is 1.72m tall

(2.54cm

1 inch) then:

$$\text{BMI} = 70 \div (1.72 \times 1.72)$$

$$= 70 \div 2.96$$

$$= 23.6 \text{ kg/m}^2$$

HEALTH TESTS

The below table covers each classification of BMI Results:

BMI (KG/M2)	Description
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30-34.9	Obese Class 1
35-39.9	Obese Class 2
>40	Obese Class 3

Resting Heart Rate:

The term resting heart rate (RHR) refers to the number of beats that the heart completes per minute. The measurement for this is beats per minute (BPM). This is an indicator for cardiovascular fitness however, RHR can be influenced by many factors including stress levels, sleep and physical activity carried out before the test takes place.

There are two specific categories of resting heart rate to represent very slow or very fast resting heart rates; bradycardia and Tachycardia respectively.

Bradycardia is a RHR of less than 60BPM and could be a result of high levels of cardiovascular fitness, low body temperature, myocardial infarction or prescriptive drugs.

Tachycardia is a RHR of more than 100BPM and could be caused by poor cardiovascular fitness coupled with sedentary behaviour, alcohol or drug consumption and the client having a temperature or a fever. In extreme cases, tachycardia can be a sign of heart failure.

HEALTH TESTS

The below table covers each classification of Resting Heart Rate:

Normative Data: Resting Heart Rate		
	Men	Women
Normal	60-80bpm	60-80bpm
Average	70bpm	75bpm
Special Attention	90bpm	90bpm
Medical Referral	100bpm	100bpm

CARDIOVASCULAR TESTS

Cardiovascular fitness tests assess the ability of the lungs, blood, heart and vascular system to transport oxygen and the ability of the receiving tissues to extract and use the oxygen. This is referred to as Vo2 Max and is a good indicator of aerobic fitness.

Vo2 Max testing needs to be carried out in a lab and takes a client to the point of maximal exertion. This is not always appropriate or convenient for those looking to understand their fitness levels. There are therefore, several sub-maximal tests that can allow an estimated Vo2 Max to be derived.

The Rockport walking test is such a sub-maximal test that can be easily carried out on a treadmill or a predetermined route outdoors. The results of the test allow a calculation to be carried out that will give the client an estimate of their current VO2 Max.

Protocol:

To begin the test, the client will walk as quickly as is safely possible for 1.6km. The instructor should time this.

Their heart rate is taken as soon as they have completed the walk.

The time taken to complete the test should be recorded and the client's estimated Vo2 Max can be calculated with the below formula:

CARDIOVASCULAR TESTS

Rockport Walking Test Calculation

$$\text{Vo2 Max} = 132.853 - (0.0796 \times \text{body weight}) - (0.3877 \times \text{age}) + (6.315 \times \text{gender}) - (3.2649 \times \text{time}) - (0.1565 \times \text{heart rate})$$

This equation assumes that weight is in pounds, male = 1 and female = 0, time is expressed as minutes and 100ths of minutes, heart rate is in bpm and age is in years.

Interpreting the Results:

Once the calculation has been carried out, the instructor should then compare the result against the normative data below to work out what category the client fits into.

Male Vo2 Max Categories						
Age	Very Poor	Poor	Fair	Good	Excellent	Superior
20-29	29	40.1	40.8	55.2	61.8	66.3
30-39	27.2	35.9	42.4	49.2	56.5	59.8
40-49	24.2	31.9	37.8	45	52.1	55.6
50-59	20.9	27.1	32.6	39.7	45.6	50.7
60-69	17.4	23.7	28.2	34.5	40.3	43

Female Vo2 Max Categories						
Age	Very Poor	Poor	Fair	Good	Excellent	Superior
20-29	21.7	30.5	37.6	44.7	51.3	56
30-39	19	25.3	30.2	36.1	41.4	45.8
40-49	16	19.9	23.4	27.6	32	35.9
50-59	16	19.9	23.4	27.6	32	35.9
60-69	13.4	17.2	20	23.8	27	29.4

MUSCULAR ENDURANCE TESTS

As with all components of fitness, there are a multitude of tests available for assessing muscular endurance.

The particular battery of tests that the gym instructor should select should be determined by the perceived level of fitness that the client has. For example, a beginner or a reconditioned client should not be assessed to the point of failure, or for maximal reps.

In some instances, this can put clients off any further resistance training. The client could also experience more significant delayed onset muscle soreness (DOMS) in the days following the tests.

There is also a greater likelihood of a client injuring themselves if they push themselves to maximal exertion; this can be due to either a loss of form as the client fatigues, or due to the fact that their tendons and ligaments might not be as capable of absorbing force as their skeletal muscle tissue is.

Press-Up Test

Client begins in normal press-up position; the body should be rigid, straight and arms should be shoulder width apart.

The client should then lower themselves until their elbows reach a 90 degree flexion, maintaining straightness and rigidity throughout.

The results of the test can be recorded as the maximum number of complete and flaw free reps that are completed.

The test can be adapted to allow clients to do press-ups from their knees if they are unable or unconfident in completing a full press up. The protocol of the test can also be amended to allow the client to complete as many reps as are possible in a given time frame, usually 1 or 2 minutes.

Please review the table overleaf for further information on normative data for pressup tests.

MUSCULAR ENDURANCE TESTS

Press-up Reps by Age and Biological Sex										
Age	20-29		30-39		40-49		50-59		60-69	
Biological Sex	M	F	M	F	M	F	M	F	M	F
Excellent	36	30	30	27	25	24	21	21	18	17
Very Good	35	29	29	26	24	23	20	20	17	16
	29	21	22	20	17	15	13	11	11	12
Good	28	20	21	19	16	14	12	10	10	11
	22	15	17	13	13	11	10	7	8	5
Fair	21	14	16	12	12	10	9	6	7	4
	17	10	12	10	10	5	7	2	5	2
Needs Improvement	16	9	11	9	9	4	6	1	4	1

FLEXIBILITY TESTS

Sit and Reach Test

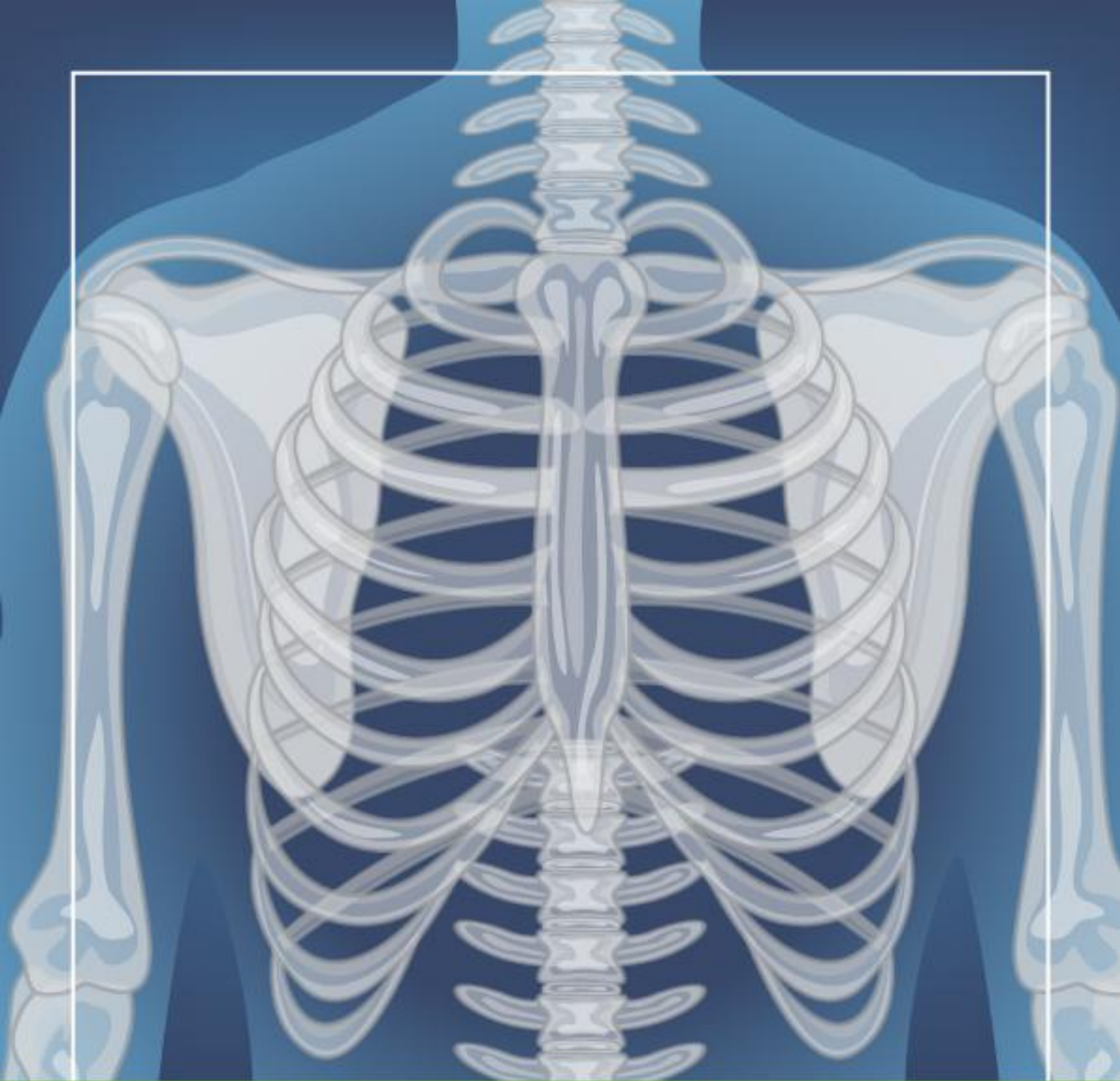
The sit and reach test helps an instructor to assess their client's flexibility in the hamstring muscles and in the lower back. So long as the client does not present themselves with any contraindications, the test is relatively safe to carry out, care should however be taken to ensure that the client is suitably warmed up.

Protocol:

The client should remove their shoes and any restrictive items of clothes, they should then place their feet flat against the board with their legs extended straight and their back straight upright.

The client should then reach forward, hinging from the lower back and reaching forward with their arms, smoothly and at a consistent pace.

When the client reached the end of their range of motion, the instructor should measure the score displayed on the measured.



Unit 4 : Section 1
Anatomy & Physiology - The Skeletal System

SECTION 1: THE SKELETAL SYSTEM

What makes up the skeletal system?

The skeleton gives the human body a frame, or a structure that helps us with protection of vital systems and to allow locomotion/movement.

There are two overarching components of the skeleton; bone and cartilage.

Bone

Calcified connective tissue that forms most of the adult skeleton. There are around 206 bones in the body and they are connected via a series of different types of joint.

Cartilage

Dense, durable, tough fibrous connective tissue that is able to withstand compression forces. There are three types of cartilage found in the body, each fulfilling a separate function.

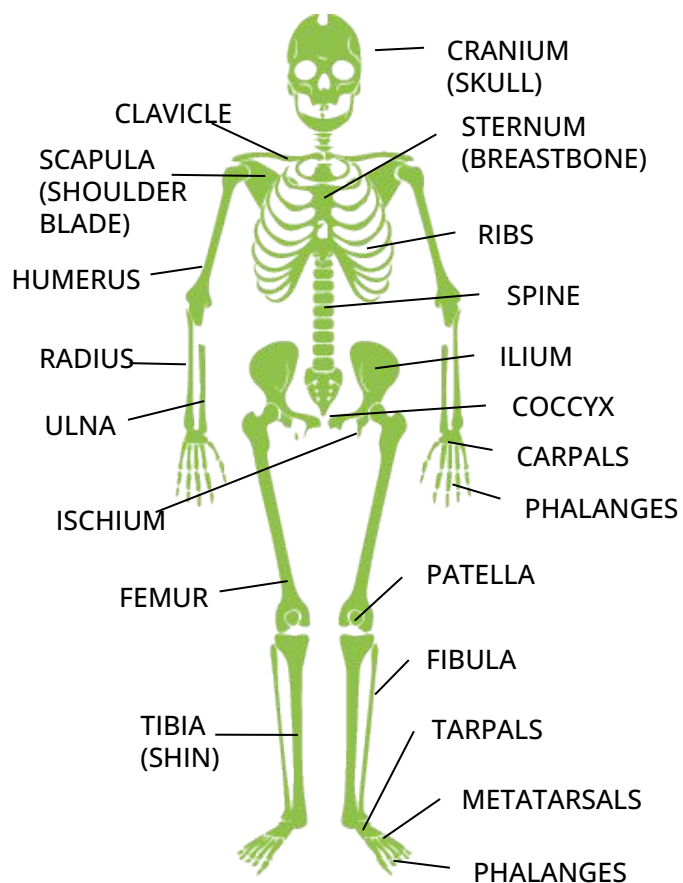
THE SKELETON

Axial Skeleton

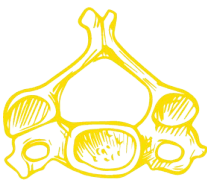
Bones that form the main frame or axis: the spine, ribs and skull

Appendicular skeleton

Bones that form the main frame (the appendages): the upper and lower limbs, the pelvic and shoulder girdles



CLASSIFICATION OF BONES

Classification		Description	Examples
Long bones		• Have a greater length than width. • Consist of a main shaft (diaphysis) and usually two extremities (epiphysis). • Principally act as levers . • Contain mostly compact bone in their diaphysis. • Contain more cancellous bone in their epiphyses.	Humerus, femur, fibula, tibia, ulna, radius, metacarpals, metatarsal and phalanges.
Short Bones		• Normally about as long as they are wide (cube-shape). • Usually highly cancellous, which gives them strength with reduced weight.	Carpals and tarsals.
Flat Bones		• Thin layer of cancellous bone sandwiched between two plate-like layers of compact bone. • Provide protection and large areas for muscle attachment.	Scapula, cranial bones, costals (ribs), sternum and ilium.
Irregular Bones		• From very complex shapes and cannot be classified within the previous groups.	Vertebrae and calcaneus (heel bone).
Sesamoid ('seed-like')		• Develop within particular tendons at a site of considerable friction or tension. • serve to improve leverage and protect the joint from damage.	Patella (kneecap).

FUNCTIONS OF THE SKELETAL SYSTEM

Shape	The skeletal bones give the body its basic shape.
Protection	For example, the skull protects the brain and the ribs protect the heart and lungs.
Attachment	Ligaments, tendons and muscles attach to bones to create stability and movement.
Movement	Muscles pull on long bones to create movement, e.g. the tibia and fibula are pulled backwards to flex the knee.
Production	Some bones produce red (to carry oxygen) and white (to fight infection) blood cells from their marrow.
Storage	Bones store important minerals, such as calcium and phosphorus, which support growth and development.

JOINT CLASSIFICATION

Joint name	Movement range	Examples
Fibrous.	Fixed/immovable.	Cranium (skull).
Cartilaginous.	Fixed/Slightly moveable.	Vertebrae.
Synovial.	Freely moveable	Ankle, knee, hip, elbow, shoulder, neck and wrist.

STRUCTURE OF SYNOVIAL JOINTS

Synovial, freely moveable joints are the most commonly found in the human body; each one has the same physical characteristics to allow it to function efficiently. These characteristics are:

Hyaline/articular cartilage: This covers the ends of the bones to absorb shock and prevent friction.

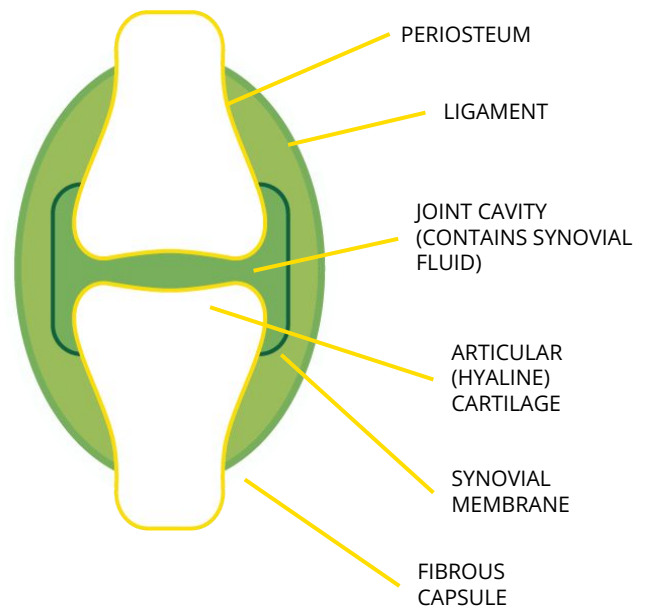
Ligaments: These connect bone to bone to stabilise joints and align bones.

Synovial membrane: This stores and secretes synovial fluid when required.

Synovial fluid: This lubricates the joint during movement.

Joint capsule: This holds all of the properties of the synovial joint in place.

Joint cavity: This is the space inside the synovial joint.
Tendons: These connect muscle to bone to create movement.



CARTILAGE, LIGAMENTS AND TENDONS

Cartilage

There are 2 types of Cartilage:

- Articular/Hyaline cartilage
- Fibrocartilage

Cartilage can be worn and torn. It is also dependent on regular activity for health.

Ligaments

Ligaments are tough, white, non elastic fibrous tissue which is strung together in a cord like formation. These fibres can be damaged by prolonged tension - eg repetitive incorrect movements.

Ligaments have 4 mains functions:

- Attaching and connecting bone to bone in all joints
- Enhancing joint stability
- Guiding joint movement
- Preventing unwanted motion in the joint

Tendons

Tendons attach muscle to bone across the joint. They also transmit force produced by the muscle. For example, the Achilles tendon attaches the calf to the heel bone.

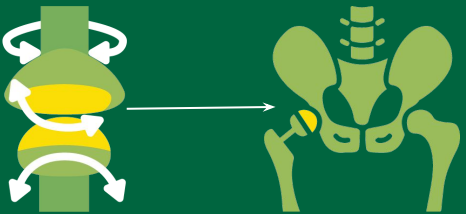
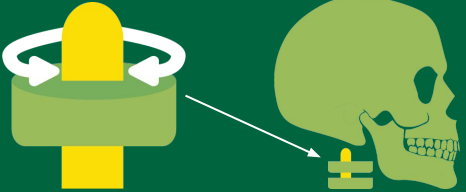
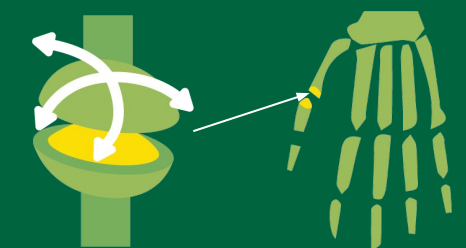
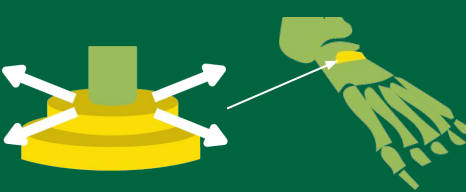
Injury and healing

Because there is a continuous blood supply to the muscles and bone they heal fairly quickly. Ligaments, cartilage and tendons don't have a good enough blood supply and limit healing.

Fibrocartilage may need surgically removed when torn.



TYPES OF SYNOVIAL JOINTS

Joint Type	Range of Motion (ROM), example and actions
	ROM: Allows for movement in almost any direction. Examples: The shoulder and hip joint. Actions: Flexion, extension, horizontal flexion and extension, internal (medial) and external (lateral) rotation, circumduction, adduction and abduction.
	ROM: Allows flexion and extension of an appendage. Examples: The knee and elbow joint. Actions: Flexion and extension.
	ROM: Allows rotation around an axis. Examples: In the neck, the atlas (the uppermost cervical vertebra - C1) rotates around the axis (second cervical vertebra - C2). In the forearms, the radius and ulna twist around each other. Action: Rotation.
	ROM: Allows movement back and forth and side-to-side. Example: The carpometacarpal joint (thumb). Action: Adduction and abduction, flexion and extension.
	ROM: Allows two bones to slide past each other. Examples: The acromioclavicular joint. The mid-carpal and mid-tarsal joints of the wrist and ankle. Action: Elevation and depression of the shoulder girdle.
	ROM: Similar to a ball-and-socket joint - it allows the same type of movement but to a lesser magnitude. Example: The metacarpophalangeal joints (knuckles). Action: Flexion, extension, adduction, abduction and circumduction but no rotation.

JOINT MOVEMENT

Movement terminology	
Normal terms (general)	Description
Flexion	The angle of the joint decreases, or the return from extension (e.g. bending the knee or elbow).
Extension	The angle of the joint increases, or the return from flexion (e.g. straightening the elbow or knee).
Rotation	A bone rotating on its own long axis - this may be internal or external (e.g. twisting the neck or trunk to the right or left).
Abduction	Away from the midline of the body (e.g. taking the leg or arm out to the side).
Adduction	Towards the midline of the body (e.g. drawing the leg or arm in towards and across the front of the body).
Specific terms (regional)	Description
Horizontal flexion	Moving the upper arm towards the midline of the body in the horizontal plane (e.g. bringing the arms in front of the body - a hugging action).
Horizontal Moving	Moving the upper arm away from the midline of the body in the horizontal plane (e.g. drawing the arms backward in a horizontal position).
Lateral flexion	Bending to the side (e.g. bending the spine or neck to the right or left).
Circumduction	A circular or cone-shaped movement that occurs at ball-and-socket joints (e.g. moving the arm in a full circle, like a cricket bowling action).
Elevation	Upward movement of the shoulder girdle (e.g. lifting the shoulder girdle towards the ears).
Depression	Downward movement of the shoulder girdle (e.g. lowering the shoulder girdle down and further away from the ears).
Protraction	Forward movement of the shoulder girdle (e.g. rounding the shoulder girdle forward).
Retraction	Backward movement of the shoulder girdle (e.g. squeezing the shoulder blades together).
Pronation	Turning the palm of the hand to face downward. This action occurs between the radius and ulna (e.g. turning the palm down).
Supination	Turning the palm of the hand to face upward. This action occurs between the radius and ulna (e.g. turning the palm up to hold something in the hand).
Dorsiflexion	When the foot moves towards the shin. This action only occurs at the ankle (e.g. lifting the toes towards the knees).
Plantarflexion	Moving the foot away from the shin (tiptoe action). This only occurs at the ankle (e.g. pointing the toes away from the knees or rising onto the balls of the feet).
Inversion	When the sole of the foot faces the midline (e.g. turning the foot inward)
Eversion	When the sole of the foot faces away from the midline (e.g. turning the foot outwards).

STRUCTURE OF THE SPINE

The spine is the central attachment that allows movement and stability.

Injury and healing

An adult spine has four natural curves: two convex (thoracic and sacral) and two concave (lumbar and cervical). These are formed over time from birth to support posture and balance during movement.

The spine is comprised of **33 irregular bones (vertebrae)**, which make up the vertebral column. Each region of the spine has a different number of bones and the bones are shaped differently to allow different ranges of motion and absorb various levels of shock, as identified in the diagram below:

Cervical: 7 vertebrae

This region allows large movements of rotation, lateral flexion/extension and flexion/extension. The skull sits on top of the atlas bone to enable flexion/extension (nodding the head) and lateral flexion, while the axis bone sits underneath to create a pivot joint with the atlas bone to enable rotation (shaking the head).

Thoracic: 12 vertebrae

This region allows the same movements as the cervical vertebrae but in smaller ranges (upper thoracic bones are limited to flexion and extension).

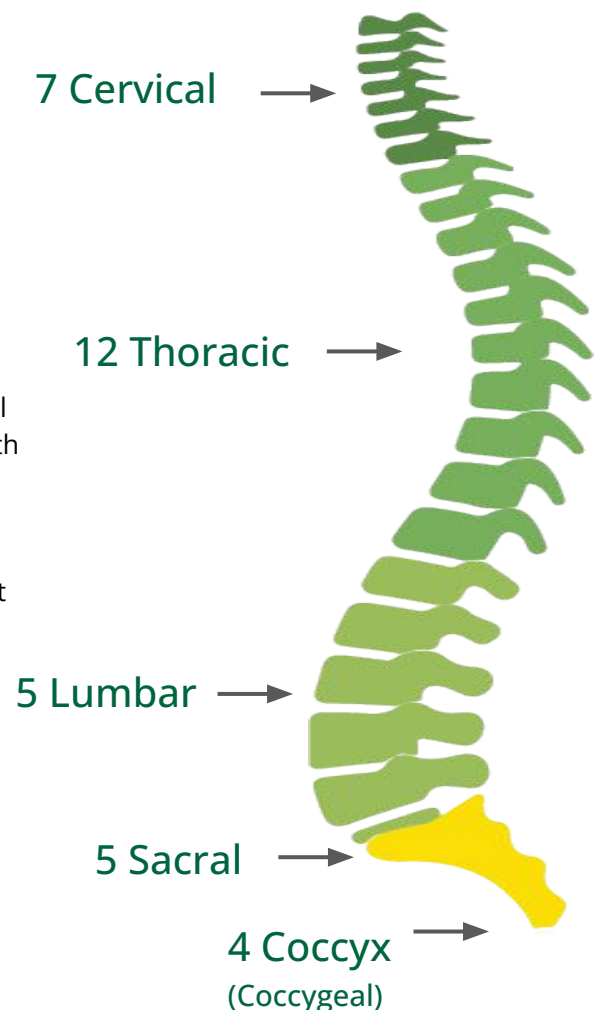
Lumbar: 5 vertebrae

This region allows the same movements as the cervical and thoracic vertebrae but they are very limited. The lumbar vertebrae are the largest as they absorb the most shock through the spine.

Sacral: 5 vertebrae

Coccyx: 4 vertebrae

The bottom two sections are fused together and allow no movement.



NEUTRAL SPINE

The spine is naturally S shaped. When the spine is in this position, it has very little stress so therefore very little risk of injury. This position is ideal to maintain during exercise and daily activities.

POSTURAL ABNORMALITIES

- ❖ Sustained poor posture
 - Sitting at a desk hunched over
- ❖ Age related conditions
 - Osteoporosis
- ❖ Medical conditions
 - Spina Bifida
- ❖ Exercise imbalances
 - Golfers training pecs and biceps

Hyperkyphosis

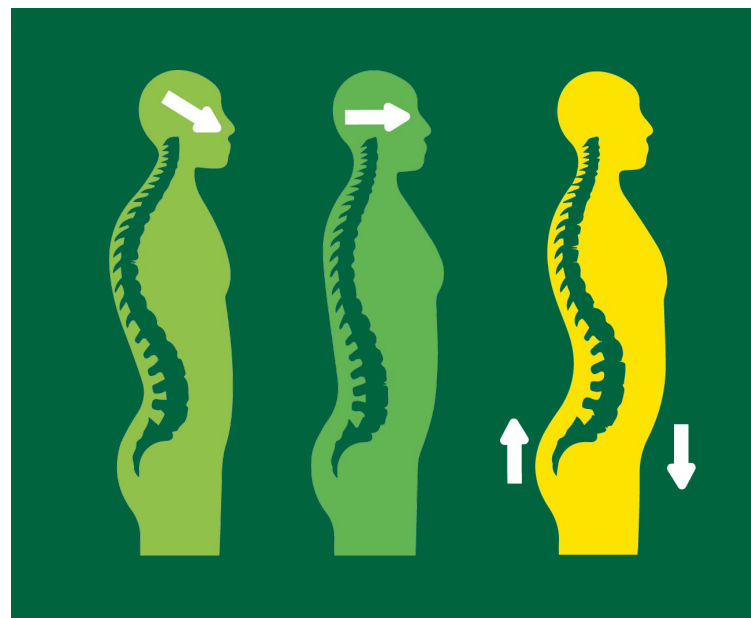
The muscles at the front of the chest (pectorals) and upper back (upper trapezius) are shortened and the muscles of the mid back (rhomboids and lower trapezius) are lengthened. This gives a hunched back appearance.

Hyperlordosis

The abdominal muscles (rectus abdominis) and trunk stabilising muscles (transversus abdominis) are lengthened and the back extensor muscles (erector spinae) are shortened. This gives a hollow back appearance.

Scoliosis

Scoliosis refers to a sideways or lateral curving of the spine which often occurs simultaneously with a laterally altered pelvic position and/or uneven shoulder girdle position. A spinal bend to the left side is often compensated for elsewhere in the spine with a bend to the right side or vice versa. Alterations in muscle length will occur throughout the body to control and stabilise this spinal position.



OSSIFICATION

This is a process by which bone is formed in the body from the activity of osteoblasts and osteoclasts.

Osteoblasts	Cells that deposit calcium to help form bone.
Osteoclasts	Cells that help to eat away old bone.
Osteocytes	Mature osteoblasts that have ended their bone-forming role.

OSSIFICATION STAGES OF BONE GROWTH

Foetal stage

In the foetus, most of the skeleton is made up of cartilage: a tough, flexible connective tissue containing no minerals or salts. As the foetus grows, osteoblasts and osteoclasts slowly replace cartilage cells and ossification begins. Many of the bones have been at least partly formed (ossified) by the time we are born.

Birth to adulthood

In long bones, the growth and elongation (lengthening) continue from birth through adolescence.

Bone lengthening is achieved through the activity of two cartilage plates (called epiphyseal plates) located between the shaft (the diaphysis) and the heads (epiphyses) of the bones. The epiphyseal plates expand, forming new cells and enabling the diaphysis to lengthen. The length of the diaphysis increases at both ends and the heads of the bone move progressively apart.

As growth continues, the thickness of the epiphyseal plates gradually decreases and the bone lengthening process ends. Different bones stop lengthening at different ages, but ossification is fully complete between the ages of 18 and 30. During this lengthening period, the stresses of physical activity result in the strengthening of bone tissue.

Bone thickness and strength must be continually maintained. Old bone must be replaced by new bone to maintain strength and mass.

Adulthood to later life

Calcium is progressively lost from the bones as the skeleton ages; this happens earlier in women. Loss of calcium and bone mass can lead to osteoporosis. Osteoporosis increases the risk

FACTORS AFFECTING BONE FORMATION

The following are factors that affect bone formation:

- ❖ Nutrition
- ❖ Exposure to Sunlight
- ❖ Exercise
- ❖ Hormonal secretions

NUTRITION

- ❖ Calcium rich foods such as:
 - ❖ Dairy Products
 - Milk and cheese
 - ❖ Oily Fish
 - Sardines
 - ❖ Green leafy vegetables
 - Kale and spinach
- ❖ Avoid things like carbonated drinks and caffeine as they can hinder calcium absorption.



SUNLIGHT

Spending time in sunlight, helps the body to produce it's own Vitamin D which is necessary for proper absorption of calcium and other minerals in the small intestine. Vitamin D, alongside the correct calcium consumption and load-bearing exercise helps to contribute to the growth and development of bones in addition to preventing the loss of bone mass density, especially in women.

HORMONAL SECRETIONS

Hormones produced by the endocrine systems play a role influencing bone formation.

Oestrogen and testosterone play a role in bone reformation in adulthood.



SHORT AND LONG TERM EFFECTS OF EXERCISE ON THE SKELETAL SYSTEM

Short-term, immediate effects

- Increased secretion of synovial fluid in joints, which reduces wear-and-tear.
- Increase in blood flow and nutrients to bones and joints.
- Muscles pull on bones to increase ROM.

Long-term, Benefits

- Increased bone density and bone strength.
- Increased joint stability due to stronger ligaments and tendons.
- Improved posture.
- Improved cartilage health.
- Increased ROM, leading to improved flexibility.
- Reduced risk of osteoporosis (brittle bone disease).
- Reduced risk of fractures.



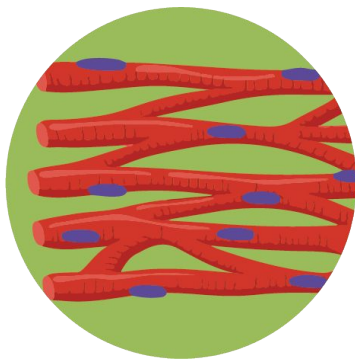


Unit 4: Section 2

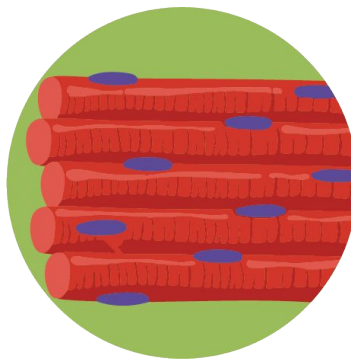
Physiology and Fitness

THE NEUROMUSCULAR SYSTEM

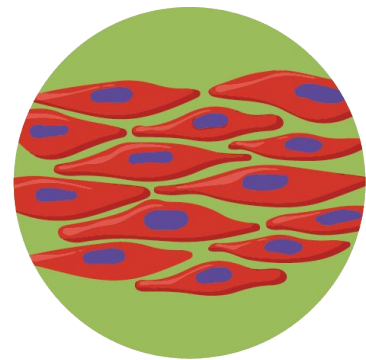
- ❖ There are over 600 muscles in the human body. There are 3 main types of muscles in the body:
- ❖
- ❖ Cardiac (Myocardium)
 - The heart
- ❖ Smooth muscle
 - Walls of the small intestine
- ❖ Skeletal muscle
 - Biceps and hamstrings



Cardiac Muscle cells



Skeletal Muscle cells



Smooth Muscle cells

	Cardiac	Smooth	Skeletal
Control	Involuntary, not under conscious control (autonomic nervous system).	Involuntary, not under conscious control (autonomic nervous system).	Voluntary, under conscious control (autonomic nervous system).
Appearance	Striated (striped or streaked)	Smooth, spindle-shaped	Striated (striped or streaked).
Location example and functions	The heart, to ensure continuous rhythmic beating in order to push oxygen around the body.	The digestive system, to break down ingested food and drink. The walls of blood vessels, to control the volume of blood flow.	Biceps, triceps, quadriceps, etc. to create bodily movement. Some muscles contract to stabilise the body and prevent unwanted movement.

CHARACTERISTICS OF MUSCLE TISSUE

Contractility	Ability to shorten.
Extensibility	Ability to stretch and lengthen.
Elasticity	Ability to return to its original size and shape
Excitability	Ability to respond to stimuli from nervous system.

The heart contracts and that leads to blood being pumped around the body. Muscle contraction occurs in response to stimulus:

- Neurotransmission
- Hormones
- Reactions

Skeletal muscle is controlled by the somatic nervous system. Smooth muscle is controlled by the autonomic nervous system. The heart muscle contraction is controlled by the SAN.

Muscles are elastic, they can stretch and then recoil to their original shape. Skeletal muscles are similar to elastic bands: pulled too far and it will tear.

STRUCTURE OF A SKELETAL MUSCLE

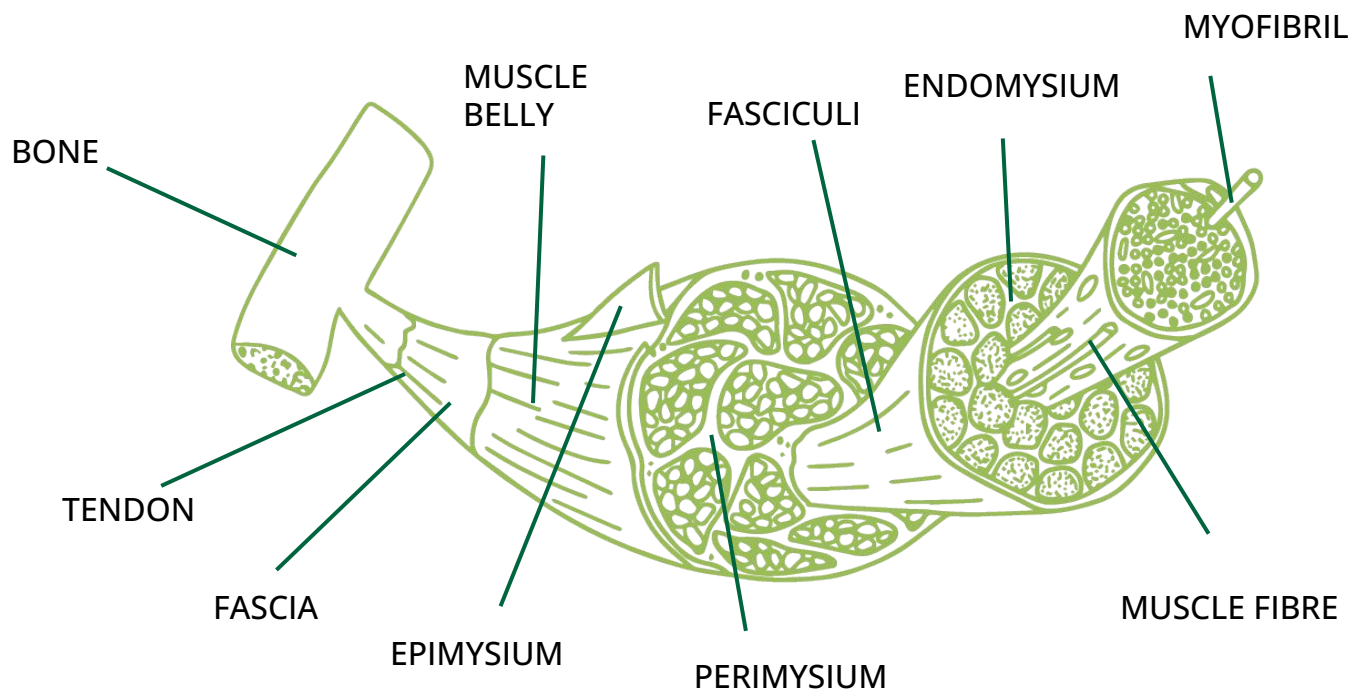
Each bundle of individual muscle fibres (fasciculi) is wrapped in connective tissue called perimysium, with each singular fibre with this bundle wrapped around a connective tissue is called endomysium.

In the individual fibres, there are smaller myofibril and with each of these myofibril are strands of myofilaments which are called:

- Actin
- Myosin

They work together to bring movement.

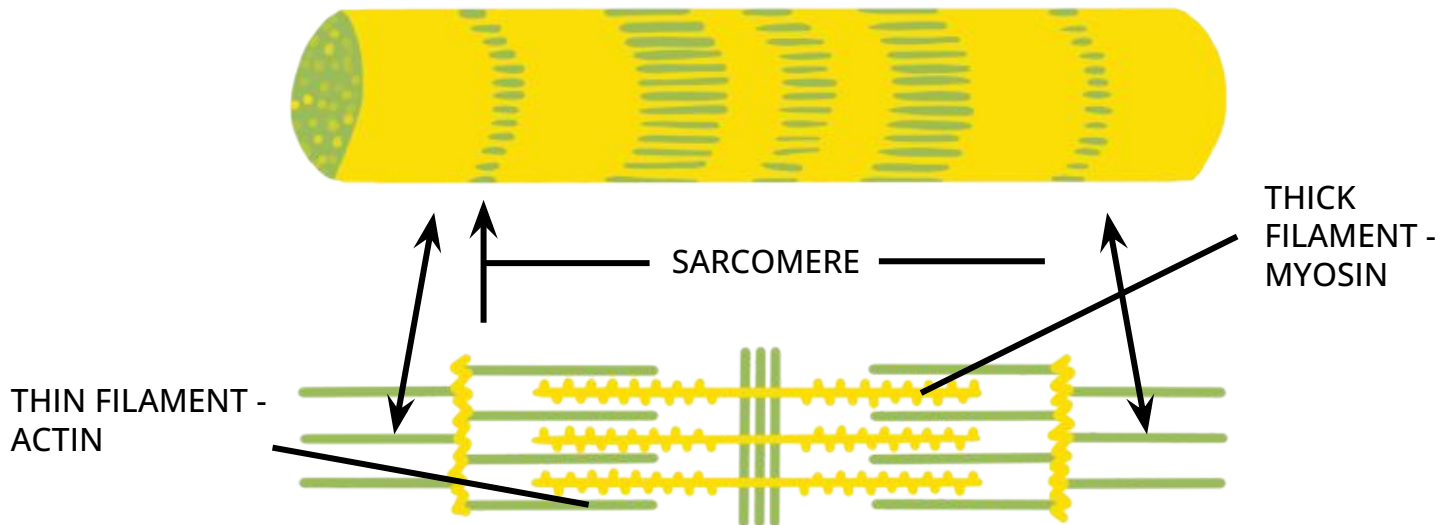
The numerous connective tissue and fibres continue throughout the length of the muscle. Layers of connective tissue converge to create tendons, which are strong inelastic and strap-like. The tendons attach to the periosteum, which is the sheath that surrounds the bones.



To summarise:

- ❖ Whole muscle is wrapped in epimysium.
- ❖ Bundles of fibres, or fasciculi, are wrapped in perimysium.
- ❖ Single muscle fibres are wrapped in endomysium.
- ❖ Myofibrils are located inside single fibres.
- ❖ Myofilaments - myosin and actin - are located inside sarcomeres.





SLIDING FILAMENT THEORY

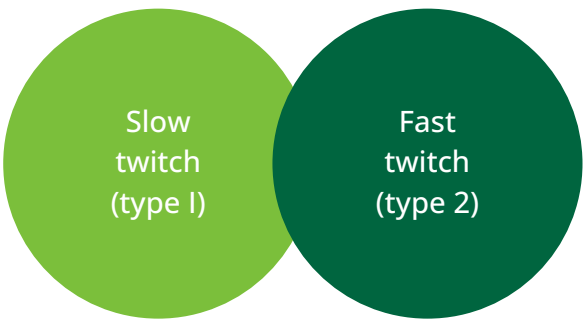
The sliding filament theory was proposed by Huxley in 1954 to explain the contraction of skeletal muscle. The theory states that the myofilaments, actin (a thin protein strand) and myosin (a thick protein strand) slide over each other, creating a shortening of the sarcomere (the contractile units in the muscle where myosin and actin are found), which causes the shortening or lengthening of the entire muscle. The myofilaments do not decrease in length themselves.

This proposed action is accomplished by the unique structure of the protein, myosin. The myosin filaments are shaped like golf clubs and form cross bridges with the actin filaments. Each myosin molecule (there are many) has two projecting heads. These heads attach to the actin filaments and pull them in closer.

Stimulus from the nervous system and the release of adenosine triphosphate (ATP) - the high-energy molecule stored on the myosin head - provide the impetus for the head to 'nod' in what is termed the 'power stroke'. It is this nodding action which 'slides' the thin actin filaments over the thick myosin filaments. The myosin head then binds with another ATP molecule, causing it to detach from the actin-binding site, which is known as the 'recovery stroke'. It is then able to attach to the next binding site and perform the same routine.

SKELETAL MUSCLE FIBRES

There are 2 types of fibres:



Fiber Type	Structural features	Functional features	Activities
Slow twitch or type I.	• Smaller diameter. • Large myoglobin content. • Many mitochondria (cells where aerobic energy is produced). • Many capillaries to deliver blood and oxygen. • Red in colour.	• Increase oxygen delivery. • Produce less force. • Long-term contractions. • Resistant to fatigue. • Aerobic.	• Maintaining posture, i.e. stabilisation. • Endurance-based activities. • Lower-intensity aerobic activities.
Fast twitch or type II.	• Large diameter. • Smaller myoglobin content. • Fewer mitochondria. • Fewer capillaries. • White (pale) in colour.	• Decreased oxygen delivery. • Generate more force. • Short-term contractions. • Less resistance to fatigue • Anaerobic	• Rapid, intense movements. • Strength training. • Sprinting. • Anaerobic training.

MUSCLE FIBRE CONSIDERATIONS

Most people have a different mixture of fibres in their skeletal muscles. The actual percentage of fibre types for each person is determined by heredity and genetics.
This means that different people may have more of one variety in a region or specific area

Marathon runners have more slow twitch than fast twitch muscle fibres whereas sprinters have more fast than slow twitch.

The role of a muscle also determines the percentage of slow and fast twitch fibres. Your neck and back, because of posture control, have more slow twitch muscles fibres. Arms and shoulders, because of force generation, have more fast twitch fibres. Leg muscles have a mixture of both because of their role in movement and supporting the body.

EFFECTS OF EXERCISE ON MUSCLE FIBRES

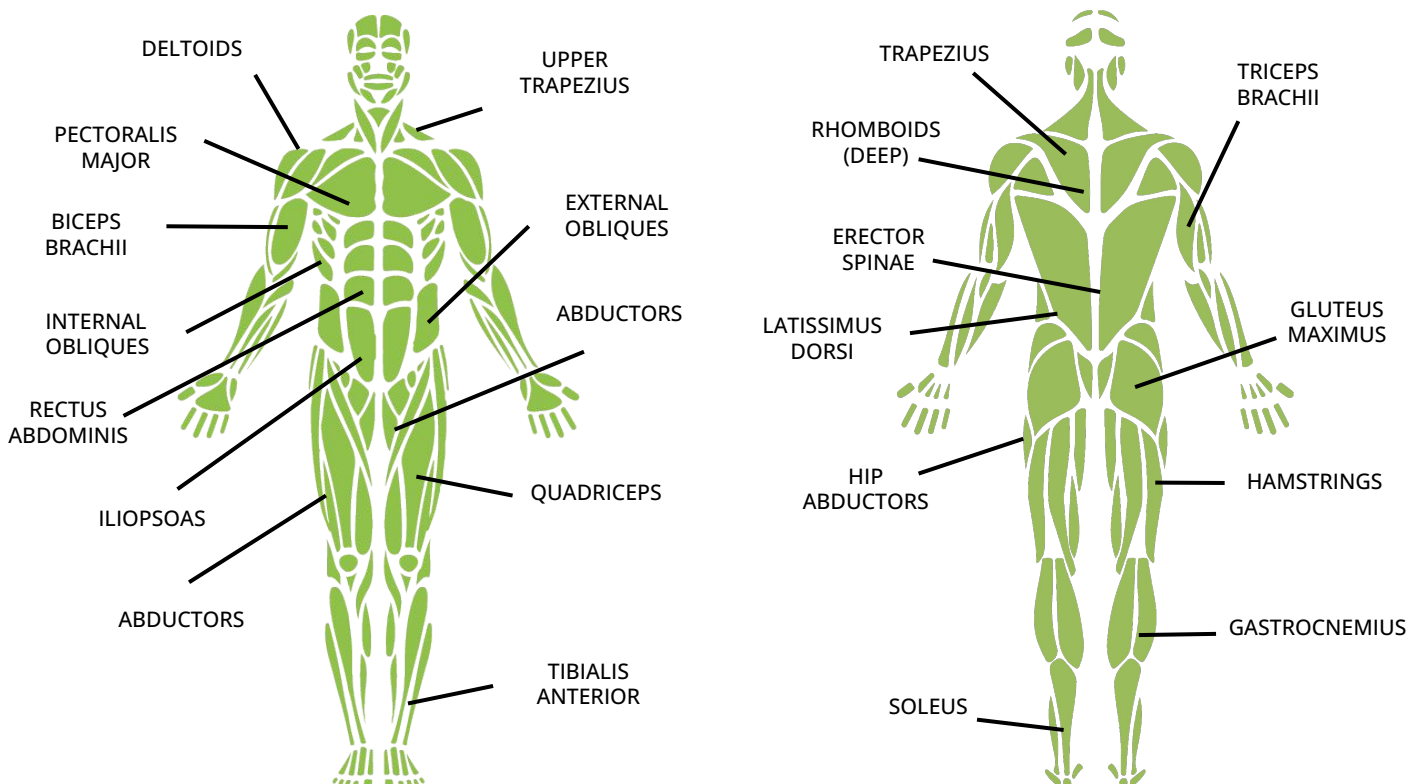
Specific types of training will affect muscle fibres. They will increase in size due to:

- ❖ Intense exercise that brings anaerobic metabolism will boost muscular strength and mass, and increase the size of fast twitch fibres.
- ❖ Aerobic endurance exercise with increased blood and oxygen volume to the muscle will develop the aerobic capacity of the slow twitch fibres.

INTERMEDIATE FIBRES

These fibres are a mixture of both muscle fibres which act as slow twitch when cardiovascular training is done, and act like fast twitch when resistance training is done.

LOCATION OF THE SKELETAL MUSCLES



ORIGINS

The muscle attachment site on the bone(s) that serve a fixed anchor point. The end is called the origin of a muscle and is described as the proximal attachment. Muscles may have more than one origin e.g. quadriceps and triceps.

INSERTION

The end of the muscle attached to the bone that usually moves during contractions is called the muscle insertion. The insertion is described as the distal attachment. Muscles typically have a single insertion.

TYPE OF MUSCLE

Muscles contract in different ways. They can shorten and contract, contract and lengthen or stay the same. They are known as:

Isotonic

Muscles move under tension by either shortening or lengthening. These are known as:

- Concentric contraction: the muscle shortens under tension, i.e. the insertion moves towards the origin, for example the curling/upward phase of the bicep curl.
- Eccentric contraction: the muscle lengthens under tension, i.e. the insertion moves away from the origin, for example the straightening/downward phase of the bicep curl.

Isometric

The muscle remains the same length under tension, for example, holding a squat at the bottom of the movement.

MUSCLE ACTION AND MOVEMENT

When standing upright, a range of skeletal muscles are in a state of continuous tone and/or tension. Muscles are contracting, resisting the force of gravity and stopping the body from falling over. Your neck stops your head from falling to the front!

HOW MUSCLES CREATE MOVEMENT

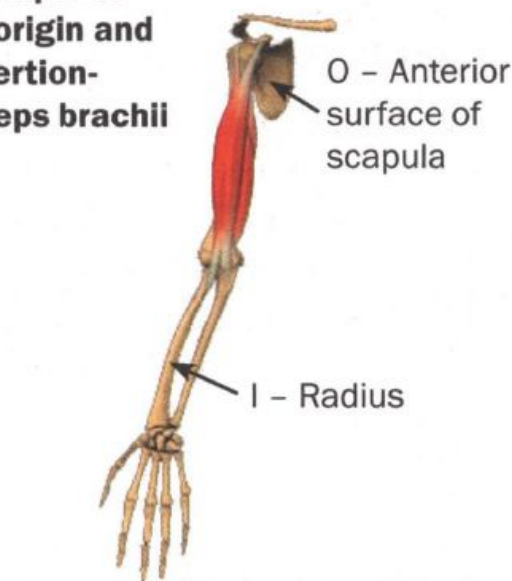
In order to create a specific movement, the joints must:

- The muscles need to receive a signal from the brain
 - In order to shorten
- Muscles exert a force and pull on the bones
- As one muscle contracts and shortens, it works in pairs with another opposing muscle then relaxes.

ORIGINS AND INSERTIONS

There is a start point and end point known as the origin and insertion.

**Example of
an origin and
insertion-
biceps brachii**



ROLES OF DIFFERENT MUSCLE DURING MOVEMENT

Efficient human movement is dependent on the coordinated use of the whole regions of muscles and will involve combinations of different muscles action happening simultaneously. During any movement, muscles can be working in the following ways:

- ❖ Agonist or prime mover
 - Biceps brachii contract during a bicep curl
- ❖ Antagonist
 - Tricep brachii during a bicep curl
- ❖ Synergist
 - During hip extension the hamstring act as synergists or the gluteus maximus
- ❖ Fixators
 - Shoulder girdle muscle stabilises the scapula to allow for efficient movement at the shoulder joint when the arm moves

JOINT MOVEMENTS CAUSED BY CONCENTRIC CONTRACTIONS

When muscles contract and shorten (concentric muscle work) they pull on the bones to create an action or movement at the joints they cross. The table below shows different joint actions and movements that are brought about when specific muscles contract and shorten (concentric muscle work) while working as a primer mover.

Muscle	Location	Origin	Insertion	Primary concentric actions
Deltoids.	Shoulders	Clavicle and upper body scapula	Upper humerus.	Abduction, flexion and extension, horizontal flexion and extension and internal and external rotation of the shoulder joint
Biceps Brachii	Front of the upper arm	Anterior surface of the scapula	Upper radius	Flexion of the elbow and supination of the forearm
Latissimus dorsi.	Sides of the back	Lower seven thoracic vertebrae, inferior angle of the scapula, thoracolumbar fascia and the iliac crest.	Anterior upper humerus	Adduction, extension and internal rotation of the shoulder joint
Trapezius	Upper back.	Base of skull and spinous processes of C7-T12	Lateral clavicle and upper surface of the scapula	elevation , retraction and depression of the shoulder girdle; extension, lateral flexion and rotation of the neck
Rhomboids	Mid-back	Spinous process of C7-T5	Medial border of the scapula	elevation , retraction and depression of the shoulder girdle; extension, lateral flexion and rotation of the neck
Pectoralis major	Chest	Medial clavicle and sternum	Upper humerus	Flexion, horizontal flexion, adduction and internal rotation of the shoulder joint
Erector spinae	Either side of spine	Sacrum, ilium ribs and vertebrae	Ribs, vertebrae and base of the skull	Extension and lateral flexion of the spine
Rectus abdominis	Along the centre of the abdomen	Pubis	Cartilage of the 5th-7th ribs and based of the sternum	Extension and lateral flexion of the spine
Internal obliques	Sides of the abdomen deeper to the external obliques	Iliac crest and thoracolumbar fascia	Lower three ribs, pubic crest and the fascial connection to the linea alba	Rotation and lateral flexion of the spine
External obliques	Sides of the abdomen, closer to the surface - superficial	Outer surface of the 5th-12th ribs.	Iliac crest, the pubis and the fascial connection to the linea alba.	Rotation and lateral flexion of the spine
Transversus abdominis	Abdomen	Iliac crest, thoracolumbar fascia and lower six ribs	Pubis and fascial connection to the linea alba	Compressing and support the abdominal contents. Deep stabiliser of the spine
Diaphragm	Beneath the rib cage	Bases of the sternum, inner surface of the lower six ribs and upper three lumbar vertebrae	Central tendon of the diaphragm	Drawing the central diaphragmatic tendon downwards and increasing volume of the thorax

Muscle	Location	Origin	Insertion	Primary concentric actions
Intercostals	Between ribs	Inferior border of the ribs and costal cartilages	Superior border of the rib below	Elevate the ribs to aid inspiration and draw the ribs down to aid expiration
Hip flexors	Through the pelvis and onto the femur	Iliac fossa and all lumbar vertebrae	Superior border of the rib below	Flexion and external rotation of the hip
Gluteus maximus	Bottom - buttocks	Coccyx, sacrum and Iliac crest	Upper femur and iliotibial band (ITB)	Extension, external rotation of the hip
Abductor group. Gluteus medius and minimus	Outside of the upper thigh/hip	Outer surface of the Iliac	Upper femur and upper tibia (via the ITB)	Abduction of the hip
Adductor group	Inner thigh	The pubis and ischium	Upper, mid and lower femur	Adduction and internal rotation of the hip
Quadriceps groups	Front of the thigh	Anterior inferior iliac spine (AIIS) and the femur	Anterior, upper tibia via the patella	Flexion of the hip and extension of the knee
Hamstrings group	Back of the thigh	Ischium and posterior surface of the femur	Head of the fibula and upper, medial surface of the tibia	Extension of the hip, flexion of the knee and tilting the pelvis posteriorly
Gastrocnemius	Calf	Posterior, lower femur	Calcaneus	Plantarflexion of the ankle and flexion of the knee
Soleus	Calf	Upper, posterior tibia	Calcaneus	Plantarflexion of the ankle
Tibialis anterior	Front of the lower leg	Lateral, upper tibia	1st metatarsal and medial tarsal	Dorsiflexion and inversion of the ankle

THE NERVOUS SYSTEM

The nervous system is the main highway for the body's internal communication and controls its internal environment. This is known as homeostasis - the body is in an equilibrium.

HOW THE NERVOUS SYSTEM FUNCTIONS

The role of the nervous system is to:

1. Gather information (sensation)
2. Analyse the gathered information (integration)
3. Respond to the information (response)

HOW THE NERVOUS SYSTEM FUNCTIONS

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SENSATION

There is a vast array of sensory receptors in the body e.g. eyes, ears and tongue.

- ❖ Baroreceptors
 - Detect changes in the pressure
- ❖ Proprioceptors
 - Detects changes in muscle length and tension
- ❖ Chemoreceptors
 - Detects changes in chemicals e.g. taste and smell
- ❖ Thermoreceptors
 - Detects changes in temperature

INTEGRATION (INTERPRETATION AND ANALYSIS)

The nervous system interprets and analyses information from the sensors and decides action. Many of these actions are involuntary e.g. digestion and metabolism.

RESPONSE

The nervous system will then respond to the information. The response is to get the body back to homeostasis. For example shivering to bring the body temperature back up to normal.

STRUCTURE OF THE NERVOUS SYSTEM

There are 2 types of nervous systems:

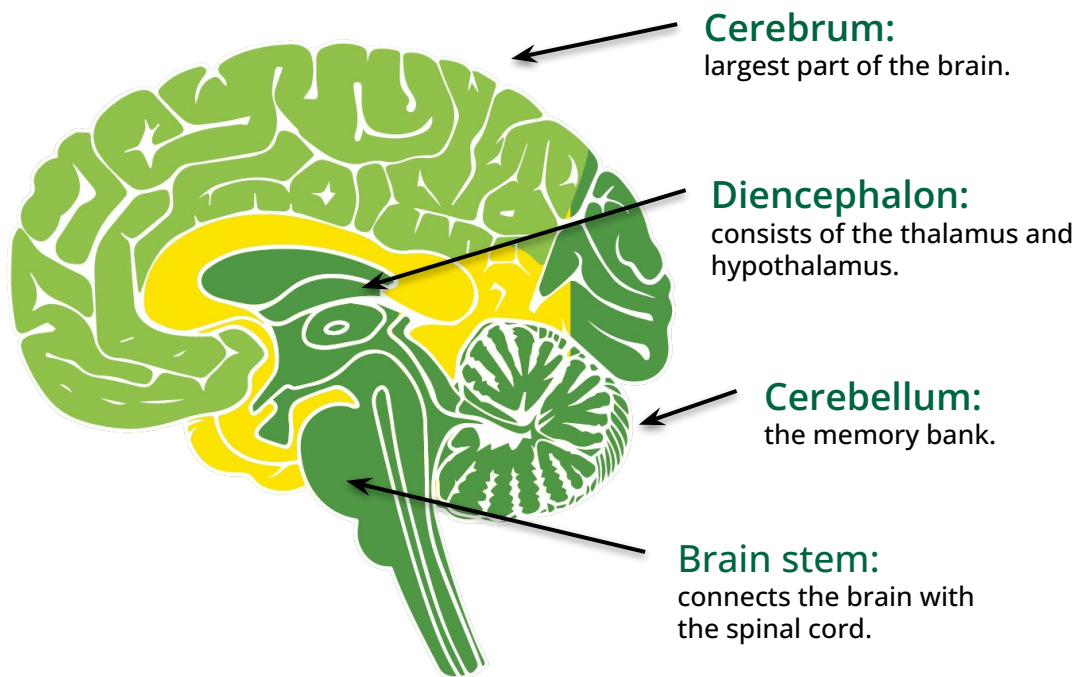
- Central nervous system (CNS)
- Peripheral nervous system (PNS)

CENTRAL NERVOUS SYSTEM

The CNS is the control centre for the body. The brain is the epicentre of the CNS which is also connected to the spinal cord.

THE BRAIN

The nervous system interprets and analyses information from the sensors and decides action. Many of these actions are involuntary e.g. digestion and metabolism.



The spinal cord is the communication link between the brain and the PNS.

PERIPHERAL NERVOUS SYSTEM (PNS)

The PNS consists of all the branches of nerves that lie outside the spinal cord. It transports all the signals to the part of the body which the signal needs a response to.

The PNS subdivided into the:

- Somatic nervous system
 - Controls conscious movements
 - Walking and talking
- Autonomic system
 - Controls unconscious actions
 - Heart rate and digestion

NEURONS

Neurons are responsible for transmitting electrical messages.

Spinal nerves are divided into motor and sensory neurons.

Sensory neurons

- These carry messages to the CNS from the sensory organs.
- Sensory nerves arrive on the posterior side of the spinal cord from a variety of sensory receptors spread throughout the body. For example, sensory receptors in the muscles are called proprioceptors; these relay information concerning the position of the body to the CNS, and this in turn helps improve movement efficiency and reduce the risk of injury by preventing overstretching.

Motor neurons

- These transmit impulses from the CNS to muscles and glands with specific instructions, such as causing muscles to contract and glands to secrete hormones.
- These exit on the anterior side of the spinal cord.

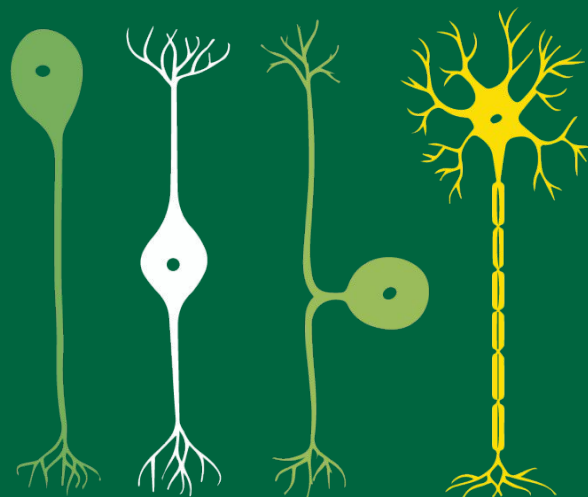
STRUCTURE OF A NEURONS

SENSORY NEURONS:

carry messages from the PNS to the CNS.

MOTOR NEURONS:

carry messages from the CNS to the PNS.



THE COMBINED WORK OF THE MUSCULAR AND NERVOUS SYSTEMS

To lift a weight, for example:

- ❖ The eyes gather information
 - Estimates the weight of the object
- ❖ The brain sends information on how to position the body, which muscles to contract and the number of motor units to recruit to do the lift
- ❖ Once they are stimulated to contract, the muscles pull on the bones and create the movement of the joints, through sliding of the actin and myosin.

MOTOR UNIT RECRUITMENT AND THE “ALL OR NONE” LAW

One motor unit equals one motor neuron and all the fibres it innervates. A neuron may be responsible for innervating lots of fibres, depending on the function and location. This is known as the innervation ratio.

When an impulse is sent to a neuron, all the fibres within the unit are innervated. The unit activates all of it or none at all. This is the all or none law.

Key Point

The 'all or none' law applies to individual motor units, not the entire muscle. Only the muscle fibres stimulated by the motor unit(s) recruited will contract.

NUMBER AND SIZE OF MOTOR UNITS

The number and size of the motor units in specific areas of the body depend on their function.

Muscles responsible for large force generation such as the quadriceps, tend to have motor units with larger innervation ratio e.g 1:2000. Fingers will have a lower innervation ratio 1:50.

Hands have small motor units and these supply fewer fibres to enable finer actions.

Legs and muscles involved in maintaining posture have fewer neurons but these are larger and supply more muscle fibres.

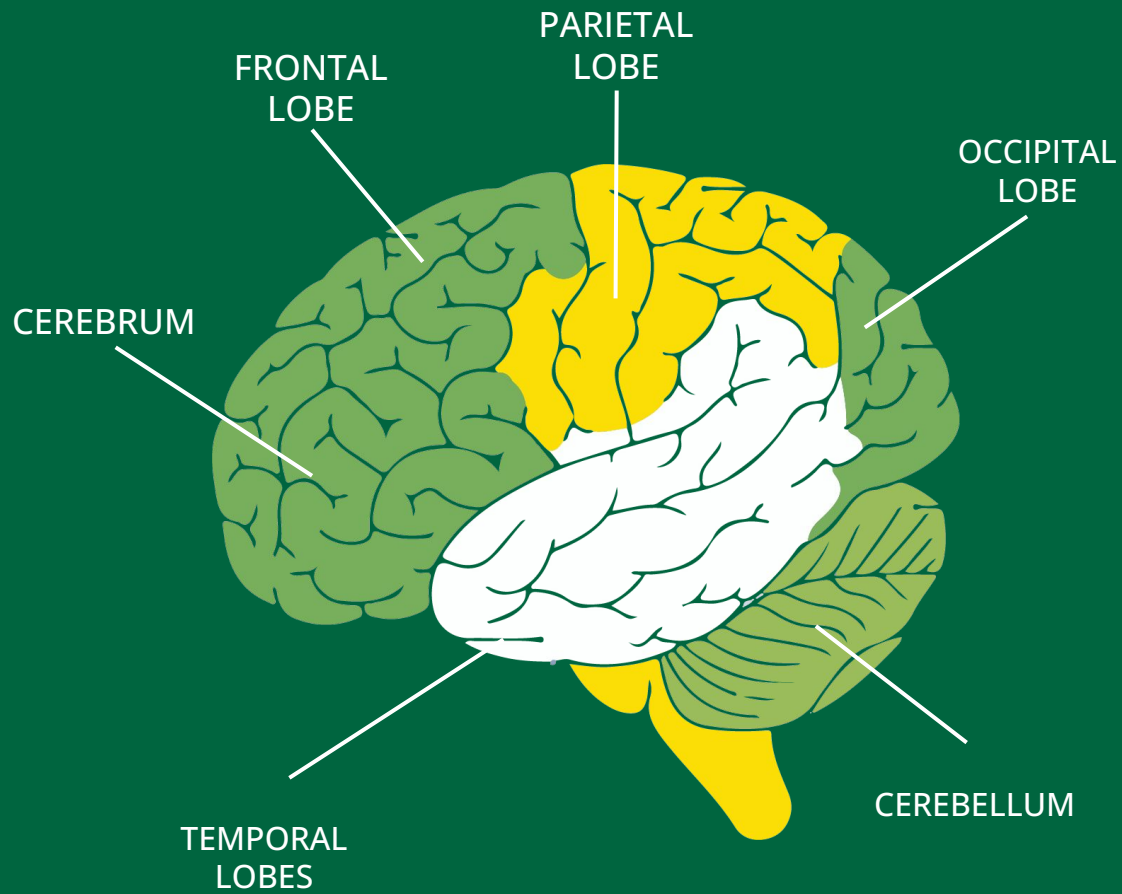
A motor unit is typically made up of one type of muscle fibre (slow or fast twitch) spread throughout the muscle:

- Tasks that require less effort, smaller neurons controlling slow twitch fibres are recruited
- Tasks that require more effort, larger neurons controlling fast twitch fibres are recruited

NEUROMUSCULAR SENSORY ORGANS

- ❖ Joint receptors
 - Found in ligaments and joint capsules. They tell the brain about the position of a joint.
- ❖ Muscle spindles
 - Found in the muscle belly and tell the brain about the length of a surrounding muscle fibre
 - Prevents muscle damage
- ❖ Golgi tendon organs (GTOs)
 - Found in tendons and tells the brain how much tension a muscle is under.
 - In extreme cases, the GTOs will cause the muscle to relax to avoid injury.

THE LIFE CYCLE OF THE NEUROMUSCULAR SYSTEM.



SHORT TERM EFFECTS AND LONG TERM BENEFITS OF EXERCISE ON THE NEUROMUSCULAR SYSTEM

Short-term, immediate effects

- Increased muscle temperature.
- Increased muscle pliability (ability to stretch further).
- Increased power output from muscles.
- Increased nerve-to-muscle link.
- Increased recruitment of muscle fibres.

Long-term, Benefits

- Increased muscular endurance /hypertrophy/ strength (depending on the intensity of training).
- Increased stores of glycogen and creatine phosphate in muscle.
- Increase in contractile proteins, actin and myosin.
- Increased basal metabolic rate (ability to burn calories at rest).
- Improved posture.
- Increase in the size and number of capillaries surrounding muscle fibres.
- Increased neuromuscular connections, leading to improvements in skill- and motor related fitness (coordination, reaction time, agility, power, balance and speed).
- Increased recruitment of motor units, leading to a stronger force generation.





Unit 4 : Section 3

The Energy Systems

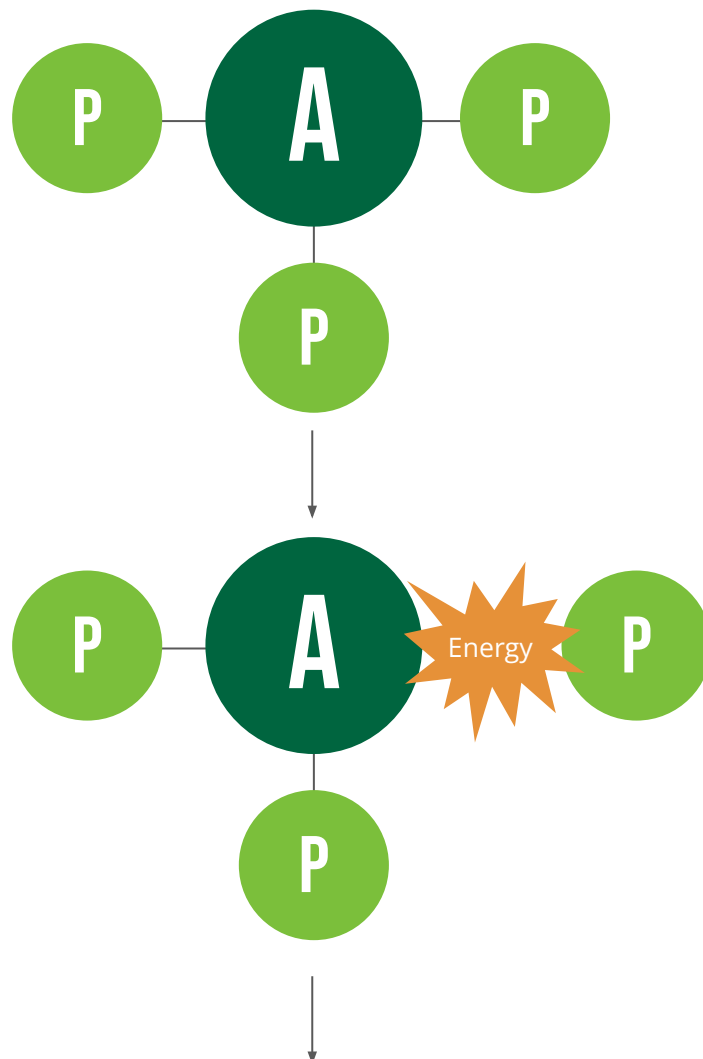
THE ENERGY SYSTEMS

The body requires a constant supply of energy. From blinking to sprinting up a hill, these require energy. This energy is produced on a cellular level.

ADENOSINE TRIPHOSPHATE

Adenosine Triphosphate (ATP) is the molecule we use for energy, like what petrol is to cars.

ATPs role in the body is to supply the body with energy, via chemical energy.



THE STRUCTURE OF ATP

ATP is made up of one Adenosine and 3 Phosphates. ATP releases its energy when one of the high energy phosphate bonds is broken. Once this bond is broken, it creates Adenosine Diphosphate.

Within muscles, there is limited storage of ATP as it only lasts 1 to 2 seconds. Once the limited store of ATP has been used up, it has to be remade. Re-synthesis of ATP can come from the breakdown of either phosphocreatine or from carbs, protein and fats.

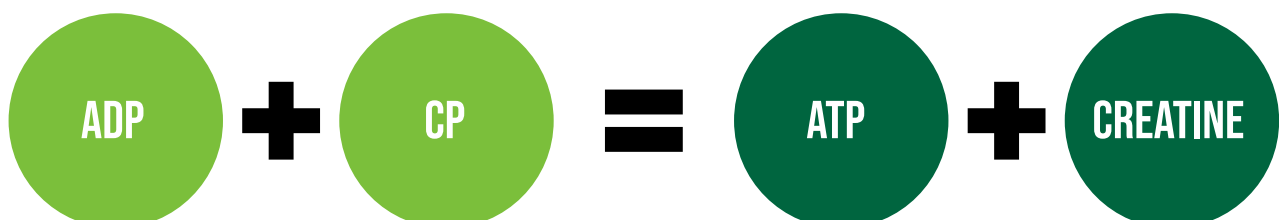
THE DIFFERENT ENERGY SYSTEMS

There are 3 ways for ADP to ATP:

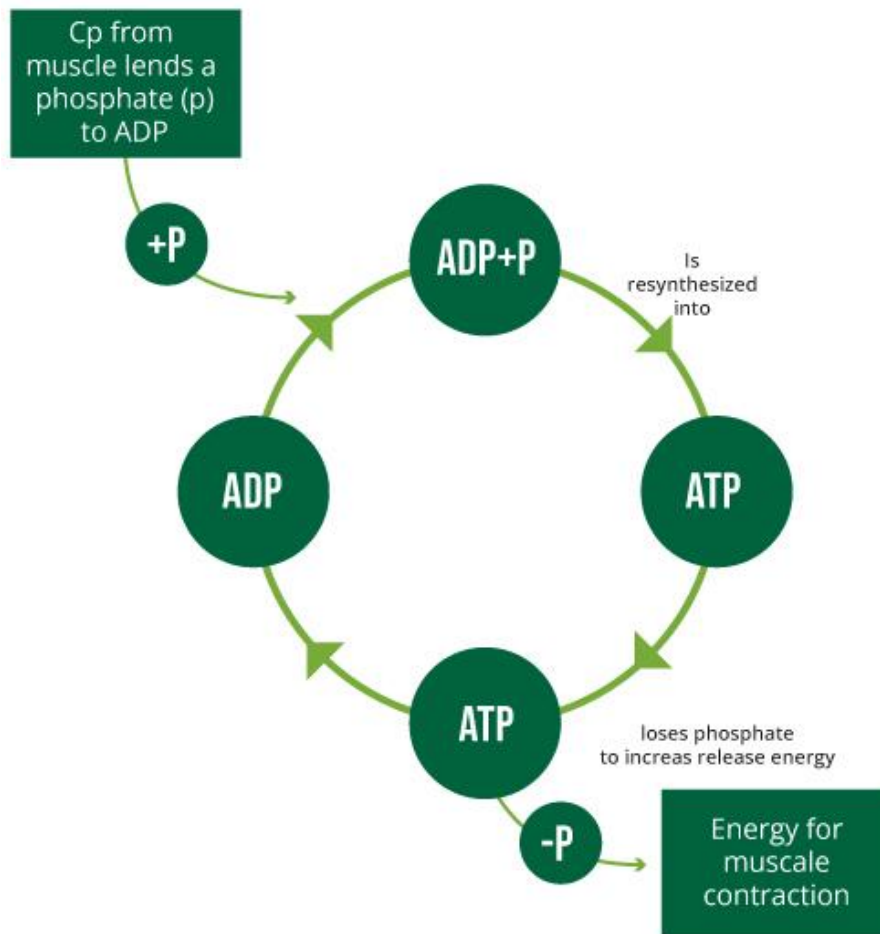
- Phosphocreatine (creatine phosphate or CP) system
- Aerobic system
- Lactate system

CREATINE PHOSPHATE (CP) OR PHOSPHOCREATINE SYSTEM

The CP system provides ATP to primarily fuel high intensity movements. It can assist with most movement as it is readily available to the muscles. The CP system can only last up to 10 seconds.

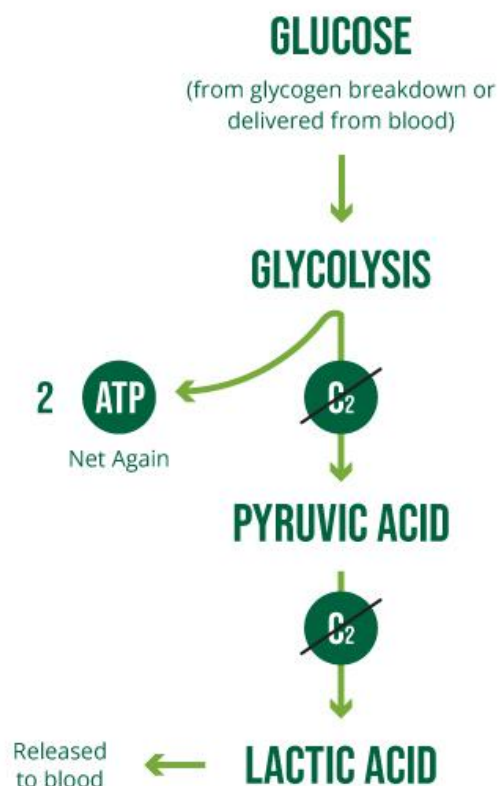


LACTATE SYSTEM



The lactate cycle is used for high intensity actions that last longer than 10 seconds. 400m races for example. It is involved in low to moderate intensity exercise when the demand for oxygen and glycogen in the liver cannot be met.

The lactate system taps in the store of glycogen in the muscles. This storage supply is used to produce ATP. It turns glycogen into glucose. Then in turn glucose to lactic acid. If lactic acid builds up, this is not ideal. If the lactic acid exceeds the muscles and lungs ability to disperse it, this will cause activity to stop. This is known as OBLA (onset of blood lactate accumulation). This causes breathlessness, heavy feeling limbs and the need to "slow down" or "stop".



Interval training can improve the body's ability to remove the build up of lactic acid and/or the ability to withstand the accumulation.

Anaerobic training uses up the stored glycogen quickly and requires short rest periods of strenuous activity followed by periods of recovery. Recovery should be active (walking or light jogging) which will aid the return of blood to the liver. Ineffective recovery will lead to lactic acid not being removed and disrupt performance.

AEROBIC SYSTEM

Aerobic means “with oxygen” whereas anaerobic means “without oxygen”.

ATP is produced via fats and carbs and proteins in the presence of oxygen.

This system is dominant in actions such as when the body is in rest or low to moderate activity. This is so oxygen can be delivered via the circulatory system.

Fatty Acids and carbohydrates are two of the main macronutrients that supply energy in the form of ATP on a cellular aerobic level.

The aerobic system produces ATP, heat, CO_2 and H_2O from carbs and fatty acids. The waste products can be easily removed:

- CO_2 from breathing
- H_2O from sweating

USING METS TO MEASURE CARDIOVASCULAR AND RESPIRATORY FITNESS

The use of oxygen by the cells of the body is known as oxygen uptake or consumption. When an average sized individual is at rest, the volume of oxygen uptake (V_{O_2}) is approximately 3.5 millilitres of oxygen per kilogram of bodyweight per minute (ml/kg/min). This value of oxygen uptake is also known as one metabolic equivalent (or MET). Activities can therefore be categorised as light-, moderate- or strenuous-intensity, depending on the amount of oxygen uptake required, or the METs.

The maximal amount of oxygen a person can take in (respiratory), transport (cardiovascular) and utilise (muscular) provides an indication of their fitness.

The more oxygen taken in and used by the muscles, the higher the intensity the person could work at and the fitter they would be. This maximal oxygen uptake (or $\text{V}_{\text{O}_2 \text{ max}}$) is generally accepted as the best way to measure someone's aerobic fitness levels and can be directly measured or estimated using various fitness tests.

LOCATION OF ATP PRODUCTION

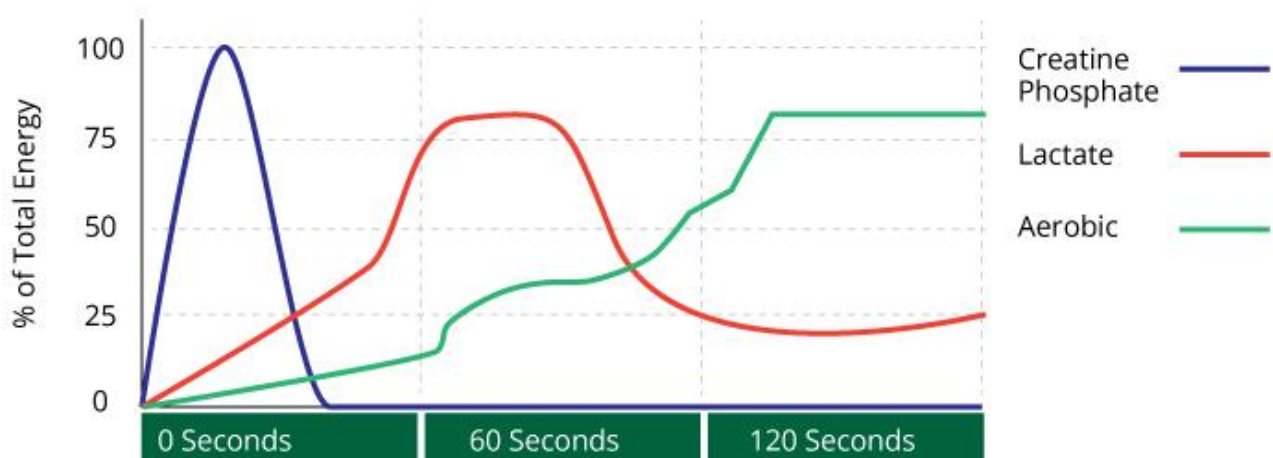
All three of these systems produce energy at different parts of the cell.

Aerobic energy is produced in the Mitochondria (the powerhouse of a cell). The larger the mitochondria, the more potential for energy production. Meaning more energy for longer actions etc.

Anaerobic energy production, CP and lactate systems) occurs within muscle cells, in the fluid matrix outside the mitochondria.

THE INTERACTION OF ENERGY SYSTEMS DURING EXERCISE

- A golf swing or shot put throw would use the CP system
- A 300 or 400 m sprint, squash rally would use the lactate system
- A long distance marathon race would use the aerobic system



SUMMARY OF ENERGY SYSTEMS

Energy systems			
	CP system	Lactate system	Aerobic system
Oxygen Dependency	Anaerobic	Anaerobic	Anaerobic
Speed of energy production	Very Rapid	Rapid	Slow
Substrate needed (energy source)	Stored chemical energy (phosphocreatine)	Glycogen	Glycogen and fat
Amount of energy produced	Very limited ATP	limited ATP	Unlimited ATP
By-products of energy production	No fatiguing waste product	Lactic acid	No fatiguing waste product (only carbon dioxide and water)
Duration of energy production	Short duration (0-10 seconds)	1-3 minutes of intense activity	Long duration
Intensity of activity	Very high intensity (95-100% max effort)	high intensity (60-95 max effort)	Low to moderate intensity (up to 60% max effort)
Recovery required	Quick recovery (30 seconds-5 minutes)	20 minutes-2 hours (recovery from lactic acid exposure)	Time to eat & drink (to replenish fuel stores)
Predominant fiber types	Type IIb	Type IIa	Type I





Unit 4: Section 4

The Digestive System

THE DIGESTIVE SYSTEM

The digestive system is responsible for intake, breakdown and absorption, use and removal of food and drink. It tells us when we are hungry and thirsty by sending us messages from the brain.

Ingestion Ingestion

Food entering the body through the mouth and being chewed.

Digestion

Breaking down of food through mechanical (smooth muscle action) and chemical (release of enzymes) processes.

Absorption

The passing of food into the bloodstream to be used by the body's tissues.

Elimination

The removal of waste.

JOURNEY THROUGH THE DIGESTIVE TRACT

Mouth

This is the entry point of food and where it begins to be broken down through the process of mastication (chewing) into a ball, or bolus.

Oesophagus (gullet)

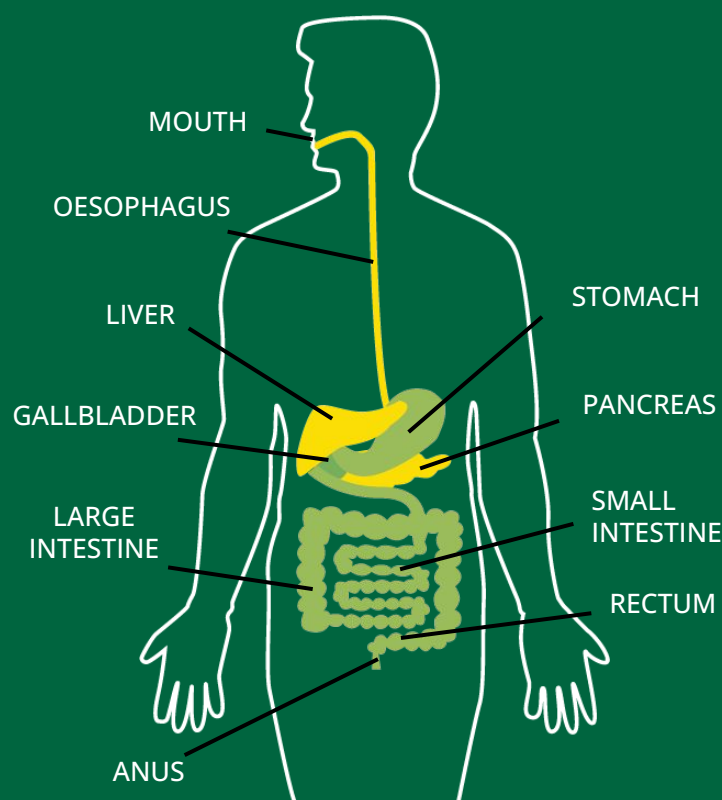
This is a thick-walled, muscular tube that carries broken down food from the mouth to the stomach.

Stomach

The stomach is a muscular bag located on the left side of the upper abdomen. It breaks down food further by releasing enzymes, and also kills bacteria.

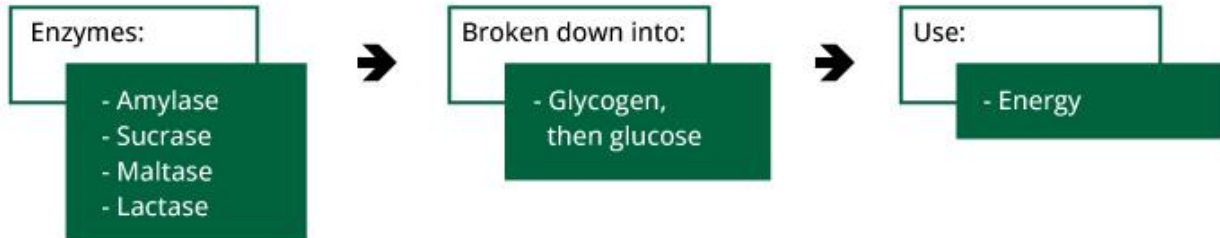
Small intestine

The small intestine is a small, tightly folded tube that receives food from the stomach. It is the major site of digestion within the alimentary canal. Its role is to absorb important nutrients into the bloodstream to be passed to the body's tissues and used for energy. The small intestine is divided into three sections: the duodenum, jejunum and ileum.

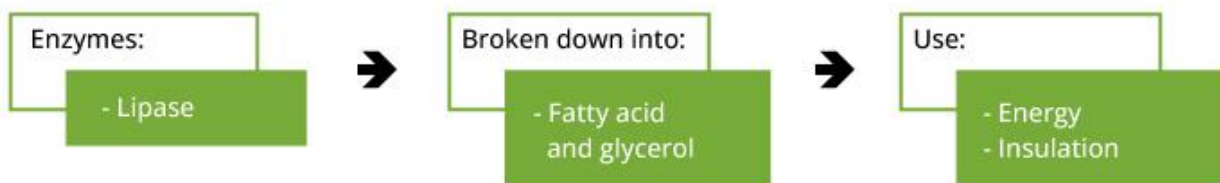


BREAKDOWN AND ABSORPTION OF FOOD

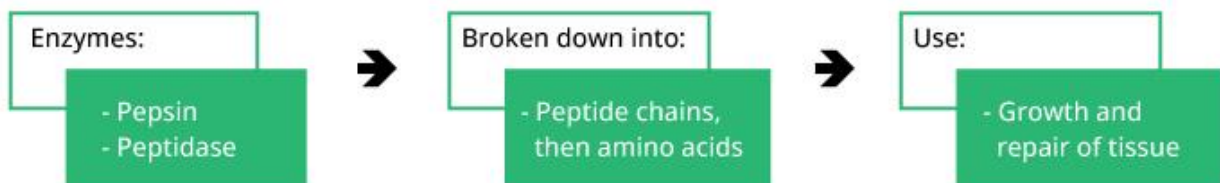
CARBOHYDRATES



FATS



PROTEIN



THE ROLE OF DIETARY FIBRE IN MAINTAINING EFFECTIVE GUT FUNCTION

Dietary fibre is a type of carb that cannot be digested by the human body. It is found in fruits and vegetables mostly and in some cereals. 30g a day on average should be consumed.

Fibre helps by:

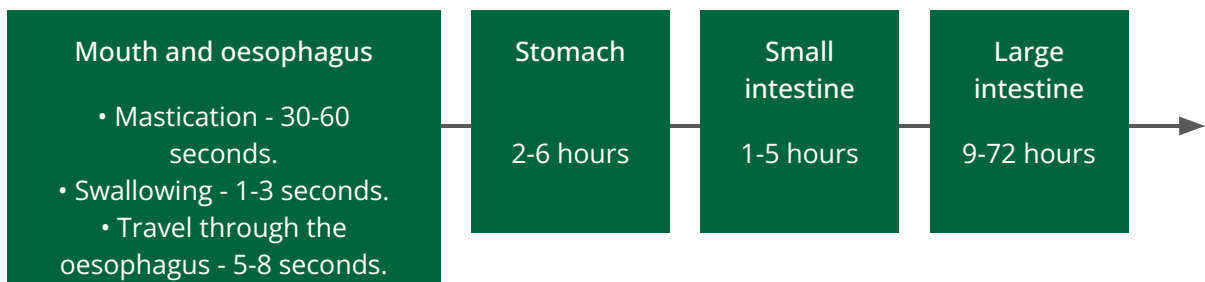
- ❖ Ensuring the smooth passing of waste
- ❖ Helping to increase the amount of "good bacteria in the gut"
- ❖ Help you feel fuller
 - Reducing snacking on food high in sugar

For fibre to be effective, hydration levels should be maintained.

THE ROLE OF THE LIVER AND PANCREAS IN ASSISTING DIGESTION

- ❖ Bile secretion
 - Breaking down fats in the small intestine
- ❖ Storage of vitamins and minerals
- ❖ Removal of bacteria from the blood
- ❖ Detoxifying harmful substances in the blood
 - Alcohol
- ❖ Removal of glucose from blood
 - Converts to glycogen
- ❖ The pancreas secretes enzymes to assist the liver and small intestines

TIMESCALES OF DIGESTION





Unit 4: Section 5

Health and Wellbeing

In 1948 the **World Health Organization (WHO)** defined 'health' as:

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

This definition remains unchanged.

TOTAL FITNESS

Being “Healthy” isn’t being in a state of decent physical fitness. Total Fitness is:

Physical fitness	The wellbeing of the body systems, including the heart, lungs, muscles, bones and joints. It covers health-related and skill-related components.
Mental and emotional fitness	The wellbeing of the mind; a positive mental state and harmony between the mind and emotions. It includes a person's ability to manage stress.
Medical fitness	Being free from injury, chronic disease and illness.
Nutritional fitness	Having access to healthy food; eating a healthy diet with a balanced nutritional intake for fuel, growth and repair.
Social fitness	Having healthy interactions and relationships with others.

FACTORS THAT AFFECT HEALTH AND WELLBEING

Some things in life can be controlled and, unfortunately, can be out of our control.

Non-controlled factors:

- ❖ Genetics
 - Some are more likely than others to get certain illnesses
- ❖ Gender
 - Men and women suffer different illnesses at different stages in life
- ❖ Age
 - Immune systems change at different times in our lives

Controlled factors:

- ❖ Smoking, Alcohol and Drug
 - Includes carcinogens (cancer causing)
 - Mental health issues
- ❖ Activity levels
 - Sedentary lifestyles means less active, meaning more risk with certain illnesses (Diabetes, hypertension, heart disease)
- ❖ Diet
 - Balanced diet is the key
 - Poor diet leads to increased risk in certain comorbidities



DETERMINANTS OF HEALTH

The WHO suggests that, although we may have control over our lifestyle behaviours, there are environmental factors that strongly influence the likelihood of an individual leading a healthy or unhealthy lifestyle. These are:

Income and Social Status	Higher income and social status are linked to better health.
Education	Low education levels are linked to poor health, higher stress levels and lower self-confidence.
Physical Environment	Living and working conditions, such as safe water, clean air and the impact of a person's job, affect health.
Social Support Networks	Levels of support from families, friends and the local community all affect health.
Health Services	Access and use of services that prevent and treat disease influence health status.

Adopting poor lifestyle behaviours, such as inactivity, eating a poor diet and excessive alcohol consumption, can increase the risk of illnesses and diseases, such as:

Coronary heart Disease (CHD)

Cancer

Depression and anxiety

Type 2 diabetes

Obesity

Osteoarthritis

Stroke

Osteoporosis

Respiratory conditions, such as COPD

THE ROLE OF PHYSICAL ACTIVITY IN HEALTH AND WELLBEING

Physical activity is defined by the WHO as:

'Any bodily movement produced by skeletal muscles that requires energy expenditure'.

Physical activity doesn't necessarily mean sports. It can be anything that gets the body moving!

- Dancing
- Washing cars
- Walking pets
- Cycling
- Swimming
- Cleaning the house
- Stairs rather than lifts

The Chief Medical Officer states:

- Inactive: less than 30 mins a week
- Fairly active: 30 to 149 mins a week
- Active: at least 150 or more per week

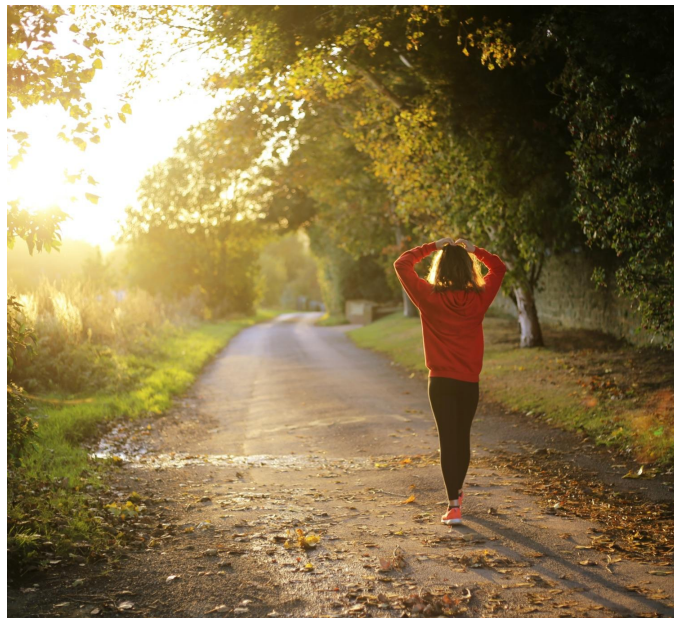
Must be at moderate intensity, whereas vigorous intensity exercises count as double.



HEALTH BENEFITS OF PHYSICAL ACTIVITY

Physical activity has a various range of health benefits:

- Generally improving health and wellbeing
- Improving weight loss and weight management
- Increasing bone density
- Reducing the risk of back pain
- Reducing the risk of CHD, stroke and certain cancers
- Improving functionality
- Increasing independence for older people
- Reducing stress
- Less likely to fall when older
- Improving psychological well being
- Gaining friendships
- Decrease the risk of depression and anxiety





Unit 4: Section 6
Components of fitness and
special populations

COMPONENTS OF FITNESS AND SPECIAL POPULATIONS

The previous section defines physical activity and looks at its impact on health and wellbeing. In this section, we will look closer at exercise and physical fitness

Exercise

Exercise differs from physical activity in that it is:

'Structured or planned activity that requires physical effort, with the aim of sustaining or improving physical fitness.'

(Ekkekakis and Lind, 2006)

Structured exercise includes a wide variety of gym, studio, pool and outdoor activities. The volume of exercise needed to achieve specific fitness goals and improve or maintain specific components of fitness (health- or skill related) is described in terms of frequency, intensity, time and type (FITT).

Physical Fitness

Physical fitness can be defined as:

'A state of wellbeing that provides optimal performance.'

(Robergs and Roberts, 1997)

Physical fitness is a potential outcome from taking part in regular physical activity and exercise. Being physically fit defines an individual's ability to perform activities or exercises that train different components of fitness, which may be:

Health-related

- Cardiovascular (CV) fitness
 - Muscular endurance
 - Muscular strength
 - Flexibility
 - Body composition

Skill-related

- Speed
- Power
- Reaction time
 - Agility
 - Balance
- Coordination

CARDIOVASCULAR (CV) FITNESS

CV is defined as:

- ❖ The ability of the heart, lungs and muscles to take in, transport and utilise oxygen during exercise.
 - Also known as CV fitness, stamina and aerobic fitness

CV exercise increases heart and breathing rate. This aims to speed up blood flow and delivers more oxygen around the body to produce energy aerobically. When the pulse quickens and breathing gets deeper the CV system gets to work.

Exercise that will improve the efficiency of the heart, lungs and circulatory system, and increase CV fitness, are those that use large muscles of the body in a continuous way, and which elevate the heart rate to an appropriate intensity. Running, cycling and swimming are examples.

MUSCULAR ENDURANCE (HIGH REPS, LOW RESISTANCE)

The ability of the muscles to work continuously under low or moderate intensity resistance.

Climbing stairs, shopping, gardening are examples.

MUSCULAR STRENGTH

The ability of the muscles to exert maximal force against a high resistance.

Weight training is a strength focussed activity. Lower number of repetitions (less than 10) with a higher weight, examples are weightlifting training and lifting heavy objects (moving furniture).

Muscular strength is useful for 2 reasons: enabling people to produce a greater maximal force when required and minimising the amount of effort required to perform everyday tasks by enhancing the individual's level of strength.

FLEXIBILITY

The range of movement at a joint or series of joints.

Flexibility is determined by the shape of the bones and cartilage. It is also determined by the length of the muscle and connective tissue that cross over the joint. The amount of muscle tension is also affected by the nervous system, which determines muscle tone.

Flexibility can differ from each individual. It is important to maintain and develop flexibility to ensure an appropriate range of motion of all joints.

IMMOBILITY

A lack of flexibility can affect posture and force production at a joint. It can impair performance and daily functionality. Inactivity can lead to muscle shortening and loss of flexibility, such as sitting at a desk for a job.

Certain sports can lead to reduced flexibility. Sports like running, football, hockey and boxing. These sports involve movements where muscles are not worked through their full range of motion. This can lead to muscle tightness and shortening of the muscle. Over developing certain prime movers while neglecting the antagonists can also cause muscle imbalances that affect flexibility.

HYPERMOBILITY

A high degree of flexibility (hypermobility) can lead to reduced joint stability and increase likelihood of injury.

Yoga, dance and gymnastics are examples of sports that require good flexibility.

BODY COMPOSITION

Body composition is the proportion of fat and fat free mass.

Body composition is measured as a percentage of fat, which serves as an effective indicator of health.

Two people of equal height and weight can have different body compositions.

Key Point

Women naturally carry more body fat than men due to hormonal responses in puberty that prepare them for childbearing. Men have higher levels of testosterone, which increases lean muscle tissue, thereby affecting body composition and lowering body fat percentage.

SKILL-RELATED COMPONENTS OF FITNESS (MOTOR SKILLS)

Speed	'Speed' defines how quickly a movement can be performed in a short space of time. Speed is required for many sporting events, including sprinting and throwing.
Power	Power is the ability to exert maximum muscular contraction instantly in an explosive burst of movement (within a short time frame). The two sub-components of power are strength-based and speed-based power. Sporting activities requiring power include jumping (high jump or long jump), throwing (shot put or javelin) and sprinting out of the starting blocks (a sprint start).
Reaction time	Reaction time is the ability to respond quickly to a stimulus. It is important in many sports and day-to-day activities. 'Simple reaction time' is the time taken between a stimulus and movement, e.g. a sprint start.
Agility	Agility is the ability to change the position of the body and move in different directions quickly, e.g. zigzag running and moving through and around a field of players in team sports.
Balance	Balance is the ability to control the body's centre of gravity when stationary (e.g. a handstand or a yoga posture) or during movement (e.g. a spring board diver during take-off).
Coordination	Coordination is the ability to smoothly move two or more body parts under control, accurately and efficiently. It involves use of the senses (eyes and ears). Most activities require some form of coordination; these include performing choreographed dance or gymnastic routines, throwing, catching (eye-to-ball coordination), kicking and hitting (e.g. golf swings or kicking a football).

FACTORS THAT AFFECT HEALTH AND SKILL-RELATED FITNESS

Age

The body changes throughout a lifetime. During formative years, when the body is growing, consideration will need to be given to the effects of exercise on the developing bones, muscles and other body systems.

A person's fitness is generally greatest during their 20s and declines with age. For older adults, the changes to the body systems - which progressively result in weaker muscles, lighter bones, stiff joints, slower reflexes and an increase in body fat - will reduce training potential. Benefits can still be achieved, but the rate at which developments occur will be slightly slower. Age-related changes generally begin to occur at the age of 50 and make their mark at around 65. The onset of the ageing process and the rate of decline are influenced (and can be offset) by regular physical activity and exercise.

Flexibility: People are usually more flexible when they are younger. Babies and infants are very flexible and start to lose this natural flexibility as soon as they start to walk (when the joints become weight-bearing and need more support, resulting in tighter, stiffer muscles. This may also be influenced by activity levels, which tend to decrease as people get older.

Activity levels and age: Activity levels also reduce progressively with age in both men and women. An estimated 30% of people aged over 65 are classed as being inactive (less than 30 minutes of physical activity per week), compared to 15% of 6-24-year-olds. By the age of 75, it is estimated that only 36% meet the recommended activity guidelines (Sport England, 2016). Reduced activity levels can lead to a loss of mobility and independence, and to increased isolation.

Gender

There are a number of anatomical and physiological differences between men and women that influence their training potential. Throughout childhood and up to adolescence, males and females tend to have equal levels of general fitness. Specific gender-related changes occur at puberty.

Hormones: Increased levels of testosterone during puberty mean that active males grow stronger due to their greater muscle mass.

Cardiovascular potential: Men are generally larger than women. They have longer bones, larger muscles, larger hearts and larger lungs which give them greater potential for transporting oxygen and developing their cardiovascular fitness.

Body composition: Males generally have a lower percentage of body fat and higher levels of muscle mass than females. Females need higher levels of body fat to equip them for pregnancy and childbirth. Reducing body fat below recommended levels would diminish levels of the female hormone (oestrogen) and may cause the cessation of the menstrual cycle. This in turn would contribute to lower levels of calcium in the bones and may increase the risk of osteoporosis in later life.

Skeletal frame: The female pelvis is wider and deeper in order to support pregnancy and childbirth. The Q angle (quadriceps angle) of the female pelvis is also greater, which gives women a biomechanical disadvantage when running or squatting. It also leads to an inward rotation of the knees. These differences may also influence running speed; females have to move their legs through a wider angle, which potentially reduces speed.

Flexibility: Females of all ages tend to be more flexible than males. This may be due

Heredity

An individual's health, physical appearance and training potential are all influenced largely by genetic characteristics inherited from their parents.

Physically inherited characteristics may include eye colour, skin colour and hair texture. They may also include things like body type and muscle fibre type, which will have a greater influence on training potential. An individual who inherits an ectomorphic (tall and thin) body type and a larger percentage of slow twitch muscle fibres will be more suited to long-distance endurance activities than an individual who inherits a mesomorphic (lean, muscular) body type and a greater percentage of fast twitch muscle fibres. Training potential and goals need to be considerate of inherited characteristics.

Various health conditions are believed to have a genetic (family) risk component (e.g. CVD).

Flexibility: Some people are born with a naturally greater (sometimes excessive) ROM known as hypermobility. Hypermobility can increase the potential for injury (i.e. joint dislocation) and it may be necessary to concentrate on strengthening the muscles acting over the joint to increase stability.

Progression: Each individual has a genetic potential that defines how far their fitness could progress if training, nutrition and recovery were optimised.

The deconditioned novice has a large potential because they are starting from a point far below their genetic limits. As a result of this and their unfamiliarity with the exercise stimulus, almost any programme will work for an untrained individual (Fleck and Kraemer, 1997). This adaptation potential enables beginners to make rapid progress in the early stages of their training. Over time, and as they get closer to their genetic potential, the rate of progress will slow down.

Physique or body type

An individual's body type has a significant impact on their ability to perform various physical tasks successfully, e.g. a tall, thin person may be more suited to basketball than rugby.

A simple system for visually assessing body type is the system of somatotyping. The somatotyping system suggests that there are three distinct body types: ectomorph, endomorph and mesomorph.

Ectomorphs are naturally thin with little body fat or muscle mass. They find it difficult to gain weight (either muscle or fat). They have long levers and light body frames, which make them more suited to weight-bearing aerobic activities, such as long-distance running. Their light body frame means that their joints will bear comparatively less body weight.

Mesomorphs tend to be naturally lean and muscular with broad shoulders and a narrow waist and hips. Mesomorphs are naturally athletic and tend to be suited to a wide variety of sporting activities, especially those requiring a good power-to-weight ratio, e.g. sprinting, hurdling and jumping.

Endomorphs are naturally predisposed to fat storage. They tend to be apple- or pear shaped and carry larger amounts of body fat. Endomorphs also tend to possess a reasonable degree of muscle mass, but this is often overlooked due to the predisposition for fat storage. Higher levels of body fat increase their potential to float in water, but also place additional stress on the weight-bearing joints during high-impact and weight bearing activities. Endomorphs may be suited to activities such as the shot put or hammer throwing.

Awareness of body types may be useful when discussing client objectives. An endomorph with a goal of becoming a competitive marathon runner, for example, may need to re-evaluate this objective as they are not structurally suited to this type of activity. Similarly, ectomorphs are unlikely to succeed in competitive bodybuilding, as they have difficulty gaining muscular size. Any discussions about the suitability of certain activities should always be conducted with sensitivity.

Body type

Most individuals are not exclusively one body type but a combination, usually with a bias towards two types, e.g. ectomorph/mesomorph (taller, lean and muscular) or endomorph/mesomorph (shorter, rounder and muscular).

Activity level

Inactivity and sedentary living pose an increased risk of poor health. Regular non-structured physical activities, such as walking the dog, cycling and gardening can make significant improvements in maintaining health if performed on a daily basis. The key message from the Department of Health (2011) is to sit down less and move more often.

Active people and people who exercise regularly generally have greater mobility and flexibility than sedentary individuals. This may depend on the type of exercise and activity they perform, e.g. performing lots of resistance training exercises with a limited ROM and higher loads may actually decrease ROM.

Diet

The body needs specific nutrients for energy, growth and repair. These nutrients are provided by the food eaten in the diet. A healthy, balanced diet will help to ensure that the body is functioning optimally. An unhealthy or imbalanced diet may negatively affect health and increase the risk of cardiovascular disease, diabetes, obesity and other chronic health conditions.

Physical disabilities

People with disabilities are able to exercise and do not have to be inactive. A physical impairment may prevent a specific part of the body from functioning or moving in a certain way, but exercise can be adapted and modified to enable participation, promote inclusion and improve health and fitness. Many disabled people are first-class athletes.

Illness & fatigue

During temporary illness (colds or flu) the recommendation is to rest the body rather than exercise. Exercising with a fever (febrile illness) is contraindicated and places stress on the body systems. All clinical symptoms should have passed before returning to exercise and it may be necessary to start at a lower level before building up.

When the body is tired (through working too hard or insufficient rest between sessions) performance diminishes and this may hinder potential training gains. It may be necessary to review training plans and also eating behaviour to balance energy requirements.

Chronic health conditions also affect exercise potential and require exercises to be modified prior to participation. A client who is obese, for example, may need to perform low-impact or non-weight-bearing activities, e.g. swimming or cycling. A client with high blood pressure may need to exercise at a lower intensity.

N.B. Clients with chronic health conditions should be supervised by an appropriately qualified (Level 3 Exercise Referral) instructor.

Drugs

Prescribed and recreational drugs (alcohol, nicotine, caffeine and illegal substances) will affect exercise and fitness potential.

Prescribed medications used to treat chronic health conditions often have side effects that influence the exercise response. Clients using prescribed medication should be supervised by an appropriately qualified instructor.

Recreational drugs (alcohol, nicotine and caffeine) all have negative effects on health and may impact on exercise performance.

Cigarettes contain carbon monoxide, which reduces the potential to take in and use oxygen. Alcohol affects the nervous system, disrupting balance and coordination, which reduces the safety of exercise, especially if the person is using equipment. Caffeine is a stimulant and may offer a short-term boost to performance. However, in the long term, excess caffeine can contribute to health conditions including increased blood pressure, anxiety, depression and osteoporosis.

Stress

High levels of prolonged stress can lead to many other chronic health conditions including high blood pressure, coronary heart disease and depression. It will have a negative impact on the person's overall wellbeing and enjoyment of life.

Exercise and activity can assist with stress management. They provide an outlet for managing the physical tension caused by stress and a distraction for the mind, which can reduce mental strain. Exercise in the outdoors and in natural environments can have further positive effects on mood and wellbeing.

Environment & weather

Exercise safety can be affected by the environment. The quality of the air taken in will determine the amount of oxygen that can be utilised. Aerobic fitness can be significantly influenced by:

- Fumes from traffic and factories.
- Altitude, i.e. air is thinner at high altitudes and individuals need to breathe harder to get enough oxygen.
- Weather, i.e. temperature and humidity.

The weather and temperature may also affect exercise patterns. Some people may use poor weather conditions (e.g. snow, rain or heat) as a reason not to exercise. In most weather conditions and temperatures, exercise may need to be modified; in hot temperatures intensity may need to be reduced. In cold environments it may be necessary to lengthen the warm-up and wear additional clothing to prevent heat loss or wind chill.

Stress

During both the pre and postnatal periods, there are significant changes to the female body that affect exercise potential. During pregnancy, women produce excess amounts of a hormone called relaxin to assist the birth process. Relaxin affects a number of ligaments, including those in the pelvis, allowing greater flexibility than normal and potentially reducing joint stability. There are also changes to centre of gravity, blood volume and pressure and respiration, which can all affect health and skill related fitness.

PRINCIPLES OF TRAINING

The key principles of training are:



SPECIFICITY

SPECIFIC
ADAPTATION TO
IMPOSED
DEMAND

Any adaptation in the body's muscles, organs and systems will be very specific to the type of training undertaken.

Exercises that develop and improve each component of fitness bring about specific changes:

- Stretching exercises improves flexibility; they won't develop CV fitness.
- Aerobic endurance exercises will improve CV but not muscular strength
- Strength training improves muscular strength but not CV fitness or flexibility.

Different types of exercise that improve the same component of fitness also have specific effects:

- Doing leg based strength training will not improve upper body strength.
- Stretching the hamstrings make them more flexible, but won't increase flexibility elsewhere
- Swimming will give a general improvement to CV fitness but not running or other sport based fitness.

The training goals of an individual are essential when considering appropriateness of specific types of exercise. If fitness goals are specific, it is important to think about:

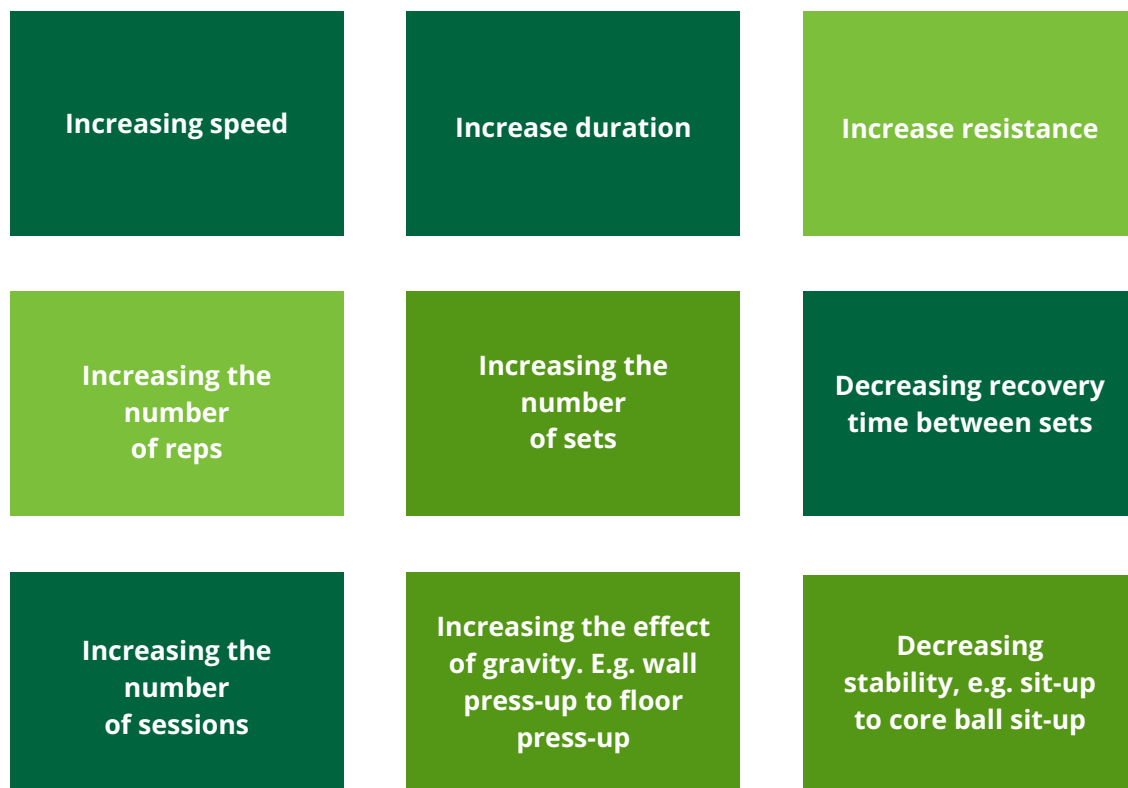
- The energy system and muscle fibre type used for the sport
- The main prime mover recruited and joint actions required
- The joint angle and range of motion used
- The type of muscle contraction (concentric and eccentric) and speed of movement

PROGRESSIVE OVERLOAD

To bring about any changes in the body, the body will have to work a little bit harder than it is used to. One of the biggest reasons for people dropping out of their fitness journey is the lack of progression and challenge over the sustained period of time:

- A previously inactive client joins a gym and gets a new exercise programme
- The client comes to the gym for 4 to 6 weeks regularly and make progress on their goals
- The client continues with the SAME programme for another few weeks, making little progress (known as plateau)
- The client eventually turns up at the gym less regularly as little progress has been made and stops exercising.

Progressive overload can be achieved in many ways:



Progressive overload must not be too great of a jump at each stage as it will be too difficult to maintain. However, progressive overload must not be too small of a jump between stages as this can slow progress.

REVERSIBILITY - “USE IT OR LOSE IT”

Training must be kept up in order to keep the level of desired fitness. If training is stopped, then fitness levels drop.

The rate of decline is dependent on the level of training reduction - total cessation or reduced - and the length of time of which training is reduced. Total cessation of training will bring about a greater decline than say going from playing full 90 mins of football to gentle jogs. Rest and recovery are planned around this also.

ADAPTABILITY

The body will react and adapt to the overload training:

- High resistance and low repetition exercise can lead to an increase in muscular strength.
- Intense exercise like sprints and maximal strength training can cause adaptations in the ATP/CP systems making them more efficient.
- Lower intensity CV training can help with aerobic endurance.

Adaptability can only happen if progressive overload is factored into the exercise sessions and recovery is also adequate.

RECOVERY AND REST

Physiological adaptations occur over time. Resting and recovery sessions and time frames can also help improve these physiological changes. These can include rest blocks or adding an extra minute to rest between sets.

Rest and recovery is essential to avoid overtraining. The quality of recovery and diet of the individual can also affect rest and recovery.

OVERTRAINING

The balance of overloading training and recovery is essential. If you overload too much (over and above the body's ability to adapt) it can result in injury.

To avoid overtraining, you can:

- Increase rest period between sets
- Reduce frequency of session
- Reduce weight or resistance of certain exercises
- Reduction in over all session time
- Change to a lower impact exercise
- Change exercise complexity (preacher curl machine to dumbbell bicep curl)

SIGNS AND SYMPTOMS OF OVERTRAINING

- Reduction of performance
- Loss of coordination
- Can't concentrate
- Oversensitivity to criticism
- Disrupted sleeping
- General tiredness
- Increased likelihood of being ill

INDIVIDUALITY

Things such as ROM, current strength, CV fitness, age, body type, schedule and gender all contribute to some fitness individuality.

If a client is overweight and deconditioned then lower impact exercises are best suited rather than higher impact exercise.

If a client has restricted hip ROM, adding stretches in that region will benefit the client.

A pilates beginner will require modifications to many exercises to enable them to perform safely.

THE FITT PRINCIPLES

F	Frequency of training (how often the activity will be performed).
I	Intensity of training (how hard the activities will be).
T	Time or duration (how long the activities will be performed).
T	Type of training (the specific activities that will be performed, e.g. strength, endurance, walking, running or Pilates).

FREQUENCY

Frequency is the number of sessions carried out per week. The client's commitments and schedule should always be taken into consideration.

An untrained, inactive individual can start with 2 to 3 days a week, gradually increasing to 5 days per week.

Competitive athletes may train 12 times per week with morning and evening sessions. Each session may work different muscle groups and fitness types.

The components of fitness being trained needs to be considered. It is safe to stretch every day if the muscles are warm, but for muscular strength, 48 hours rest is required before reworking the same muscle group. Planning, in terms of frequency, is an excellent way to get the maximum out of a client.

Vigorous exercise should not be performed regularly as it can increase the risk of injury.

INTENSITY

There are many different factors that can contribute to intensity:

- Resistance
 - Lower length
 - Gravity
 - Body weight
- ROM
- Repetitions
- Sets
- Rate of speed
- Rest

The intensity of CV training is monitored by heart rate or rate of perceived exertion (RPE).

The intensity of flexibility is monitored by measuring ROM.

Muscle strength is measured by the resistance lifted and number of repetitions.

TIME

Certain training sessions require different amounts of time.

CV fitness sessions should be a minimum of 20 minutes, excluding warm ups and cool downs.

For muscular strength training, it is recommended that whatever muscle group being trained is given allocated time.

Adequate stretching time should be allocated and incorporated into the exercise session.

Group sessions should be between 45 to 90 minutes - including warm ups and cool downs.

Gym based sessions should be planned before the session begins. They should be between 45 to 120 minutes - including warm up and cool down slots. CV and muscular based gym based sessions will make a circuit based session. So the CV elements may be longer than the muscular training elements.

TYPE

Gym based exercise tend to involve:

- CV machines
- Fixed resistance machines
- Free weights
- Portable equipment
- Body weight

Group based exercise tends to involve:

- Mats
- Light free weights
- Body weight
- Specialised equipment
 - Aqua based class may use floatation aids
- Portable equipment

SPECIAL POPULATIONS

Working with special populations requires understanding of their specific needs.

Further qualifications may be needed in order to train these individuals.

A comprehensive pre screening process will need to be completed prior to participation to check for any medical issues that require signposting and clearance form a GP Any client responding yes to the PAR-Q questions should be signposted to a GP prior to participation.

Populations that are specialist include:

- Pre and Post Natal
- Older Adults
- Young people (aged 14 to 16)
- Disabled people

OLDER ADULTS

The American College of Sports Medicine (ACSM) defines anyone over the age of 65 as an Older Adult, or anyone over the age of 55 with one clinically significant health condition.

The ageing process is characterised by progressive loss and the decline in the functioning of the skeletal muscles, CV systems and neuromuscular systems. This loss can affect physical activity and require adaptations to exercise.

Ageing is completely natural and starts around the age of 50 with signs becoming more noticeable nearer the age of 65. This decline in functioning can lead to loss of independence, increased fragility and reduced mobility.

There are certain elements in the ageing process can affect exercise and activity levels:

- Uncontrolled or unstable medical conditions
 - Angina, asthma or diabetes
- Resting blood pressure of more than 180/110mmHg
- Tachycardic (resting heart rate over 100 bpm)
- Unexplained dizziness
- Joint conditions

Effects of ageing	Fitness potential considerations
- Weaker and smaller muscle fibres. - Fewer fast twitch muscle fibres. Reduced muscular strength . -Reduced motor neurons. -Reduced neuromuscular transmission (fewer nerves sending messages -Reduced capillaries in the muscle . -Increased levels of connective tissue . - Sensory decline (loss of hearing and vision) . -Cognitive decline .	-Reduced muscular strength . -Reduced muscle power -Reduced coordination . -Reduced movement speed . -Reduced flexibility and ROM . -Reduced balance and coordination . -Reduced postural stability . -Reduced short-term memory .
-Loss of bone mass and reduced bone density. -Increased risk of osteoporosis . -Reduced availability of synovial fluid . -Calcification of the joints (calcium laid down in the cartilage.	-Bones become less resilient to stress and more susceptible to fracture -Stiffer, less mobile joints . -Reduced shock absorption in the joints .
-Reduced stroke volume and cardiac output. . -Less efficient heart and circulatory system. -Increased blood pressure. -Fewer capillaries . -Less elastic vessels. -Reduced intake, uptake and utilisation of oxygen.	-Lower maximal heart rate . -Lower training heart rate . -Slower recovery rate . -Decreased tolerance to fatigue. -Tendency to tire quicker . -Lower anaerobic threshold . -Lower tolerance of high-intensity exercise .



SAFETY CONSIDERATIONS AND GUIDELINES FOR OLDER ADULTS

Component	Adaption
Warm-up and preparation	• Use a longer, more gradual warm-up (around 15 minutes). • Use lots of mobility exercises. • Build ROM of mobility exercises gradually. Begin with moderate-range mobility exercise (e.g. small shoulder circles) before increasing the shoulder ROM and progressing to arm circles. • Use slower controlled movements. • Focus on posture, alignment and correct technique.
Cardiovascular training	• Build intensity more gradually. • Lower working intensity. • Use less impact. • Use less choreography (group exercise to music). • Use a longer, more gradual cool-down. • Emphasise correct technique. • Layer information (impart it in stages rather than all at once).



Component	Adaption
Muscular training	• Use less resistance and shorter leverage for some exercises. • Use fewer repetitions and sets, and more rest. • Use more stable and balanced positions. • Allow transition time to get down and up from the floor. • Use a slower pace. • Allow more time to change exercises or positions. • Emphasise correct technique. • Supine lying may be contraindicated (osteoporosis); extreme spinal flexion (i.e. full or half curl-ups from supine position) may also be contraindicated (consider alternatives). • Strengthen postural muscles, pelvic floor muscles and areas around potential fracture sites for osteoporosis (wrist, hip and spine).
Cool-down and closing	• Use a longer duration. • Consider using more stretches for specific muscles. • Use more stable positions. • Use a smaller ROM.

PRE AND POST-NATAL WOMEN

Benefits of exercise during pregnancy:

- Prevention of excessive gestational weight gain.
- Prevention of gestational diabetes.
- Decreased risk of preeclampsia.
- Decreased incidence/symptoms of low back pain.
- Decreased risk of urinary incontinence.
- Prevention/improvement of depressive symptoms.
- Maintenance of fitness.
- Prevention of postpartum (postnatal) weight retention.

(ACSM, 2017)

The PARmedX for pregnancy screening tool should be completed prior to participation to identify any contraindications and reasons for exclusion.

THE EFFECTS OF PREGNANCY

Some general effects of pregnancy include:

- Increased:
 - Heart rate
 - Stroke Volume
 - Cardiac output
 - Laxity of joints
 - Oxygen uptake

Relative contraindications can include (exercise is possible but with precaution):

- Anaemia
- Irregular heartbeat
- Chronic bronchitis
- Poorly controlled type 1 diabetes
- Morbid obesity
- Underweight
- Sedentary lifestyles
- Growth restrictions during pregnancy
- Orthopaedic limitation
- Seizures
- Hyperthyroidism
- Heavy smoking and alcohol usage

Absolute contraindications to exercise include (Those requiring direct referral back to the GP):

- Severe anaemia
- Lung disease
- Heart disease
- Incomplete cervix
- Risk of premature birth
- Persistent 2nd or 3rd trimester bleeding
- Placenta previa (low lying placenta) after 26 weeks' gestation (into pregnancy)
- Preeclampsia (pregnancy induced hypertension)
- Ruptured membranes

Specific stage related changes are identified in the table below:

Trimester 1 (0-3 months)	Trimester 2 (3-6 months)	Trimester 3 (6-9 months)	Post Birth
- Increase in weight by 1-3kg. - Breast and uterus start to enlarge. - Hormonal changes commence, e.g. increase relaxin affects ligaments and joint stability - Morning sickness	- Increase in weight by 6-8kg. - Postural changes (shoulder girdle protraction, thoracic hyperkyphosis, long upper back extensors and short tight pectoral muscles). - Possible low back pain and neck or shoulder pain. - Abdominal muscles start to lengthen and stretch as the baby grows. - Change in centre of gravity.	- Increase in weight by 3-4kg. - Tendency to become tired more easily. - Venous return may be reduced. - Weight of baby presses on the pelvic floor. - Pelvic girdle less stable (effect of relaxin). - Weight of baby places stress on the lower spine (increased lordotic curve). - Centre of gravity changes, affecting balance.	- Avoid physical stress for two weeks. - Return to activity 6 weeks after normal birth or 12 weeks after caesarean birth. - Hormone levels are still high (up to one year). - Weaker pelvic floor. - Pelvic girdle less stable. - Check for diastasis recti (abdominal separation). - Rectus abdominis is mechanically weaker for at least 12 months.

The physiological and postural changes of pregnancy persist for several months after birth, making women vulnerable to injury and long-term physical health problems, such as pelvic floor dysfunction. This has particular significance for exercise involving impact, twisting and rapid, ballistic or aggressive movements, which should be avoided for at least six months and introduced progressively.

Warning signs to stop exercise during pregnancy:

- Vaginal bleeding or amniotic fluid leakage.
- Shortness of breath prior to exertion.
- Dizziness, feeling faint or headache.
- Chest pain.
- Muscle weakness.
- Calf pain or swelling.
- Decreased foetal movement.
- Preterm (premature) labour.

(ACSM, 2017)

PRENATAL ADAPTATIONS TO SESSION STRUCTURE AND CONTENT

Pregnant women should avoid:

- Exercise in the supine position after 16 weeks
- Exercising to the point of exhaustion (the goal is to maintain activity, rather than improve fitness)
- Prone lying exercises
- Prolonged motionless standing
- Heavy, uncontrolled isometric or prolonged resistance work above the head
- Leg adduction and abduction against a resistance
- Isometric exercises
- Loaded forward flexion
- Rapid changes of direction or position
- Uncontrolled twisting
- Exercise with a risk of falling
- Excessive and uncontrolled destabilisation techniques
- Abdominal exercises

POSTNATAL ADAPTATIONS TO SESSION STRUCTURE AND CONTENT

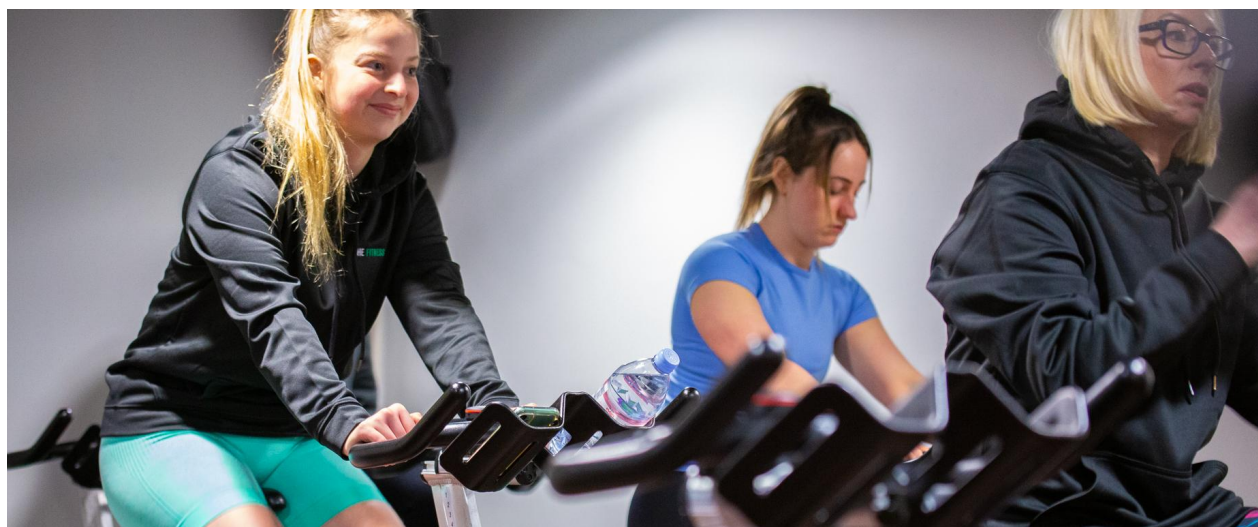
Women should not begin exercising post birth until they have received permission from their healthcare professional, usually after 6 to 8 weeks post birth.

After birth the focus should be to re-educate posture and joint alignment, address muscle imbalances, improve stability and encourage transversus abdominis recruitment and pelvic floor function.

A woman should be referred to a health professional if she is experiencing any of the following symptoms post birth:

- Stress incontinence or pelvic floor muscle weakness
- “Dragging” pain in the pelvic floor area
- Groin pain, low back pain or difficulty walking
- Abdominal weakness

Component	Adaption
Warm-up and preparation	• Emphasise correct posture at the start and throughout the session. • Make movements slower and more controlled . • Increase the number of mobility exercises . • Use full ROM mobility exercises to warm the muscles . • Build up intensity of movements much more gradually to avoid sudden increases in blood pressure. • Support stretch positions and take care not to exceed a comfortable ROM .
Cardiovascular training	• Use low-to-moderate intensity. • Use low impact. • Use a more gradual build-up and lowering of intensity . • Use less choreography (group exercise to music) . • Use a slower tempo. • Women who are unused to exercise should start with shorter durations (begin with 15 minutes and increase gradually to 30 minutes). • Maintain adequate hydration . • Avoid exercising in very hot or humid conditions n. • Avoid heart rate monitoring -use verbal & visual methods of monitoring intensity.
Muscular fitness	• Include exercises for the pelvic floor muscles . • Avoid supine and prone lying (prenatal) . • Select comfortable starting positions . • Avoid exercises which may place too much pressure on the pelvic girdle . • Use movements related to everyday life . • Perform fewer repetitions . • Use lower-intensity exercises . • Do not use heavy abdominal exercises; sit-up, crunch or oblique cross-over type exercises are not an appropriate choice for abdominal muscle re-education post birth.
Cool-down and closing	• Include specific relaxation work. • Avoid positions which may over-stretch the ligaments . • Select balanced and comfortable positions for passive stretching . • Use shorter-hold stretches to maintain rather than develop flexibility .



PEOPLE WITH DISABILITIES

Any of the following can constitute a disability that a person can live with:

- Stroke
- Down's syndrome
- Obesity
- HIV
- Cancer
- Full or partial deafness
- Full or partial blindness
- Arthritic conditions
- Limb amputations
- Mental health issues
- Cerebral palsy
- Fibromyalgia

BENEFITS AND BARRIERS TO ACTIVITY

Regular physical exercise in a safe and supportive environment offers a lot of benefits in terms of health for isabled people.

Disabled people as a population are identified as not meeting the recommended levels of physical activity. This is likely caused by physical barriers like mobility issues.

Legislation

Service providers must anticipate the needs of disabled clients and make reasonable changes to accommodate these.

Equality Act (2010)

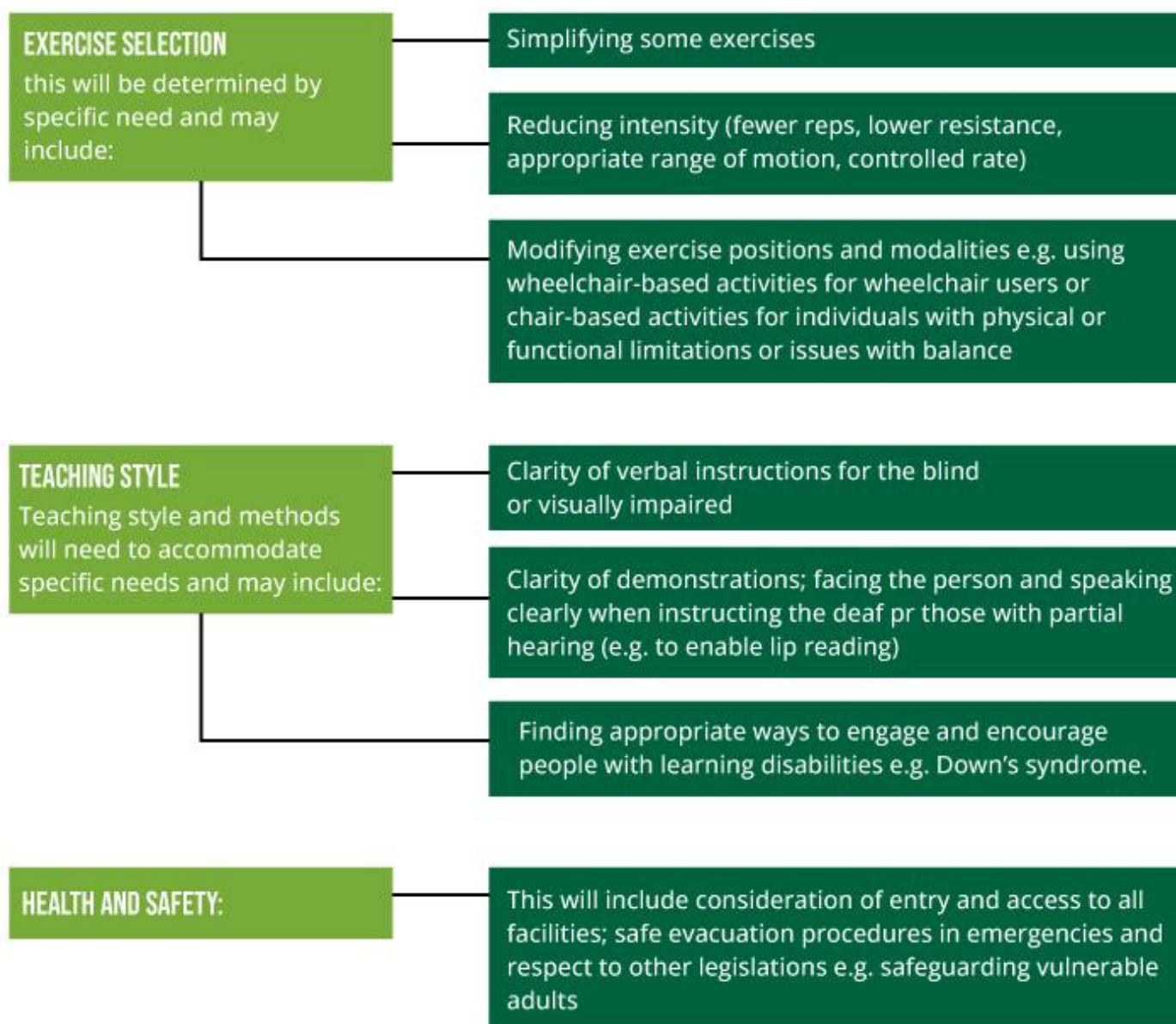
THE INCLUSIVE FITNESS INITIATIVE (IFI)

The IFI provides guidance and support to operators interested in welcoming disabled people into their facilities, and to disabled people who wish to become active.

CONTRAINDICATIONS AND SAFETY CONSIDERATIONS

It is essential to prescreen (PAR-Q) and check for any contraindications such as stage 3 hypertension.

To enable participation, the following must be considered for adaptation in relation to the needs of the individual:



Progressive disorders	These conditions worsen over time, e.g. multiple sclerosis. Careful monitoring is required to ensure that the exercise programme does not cause the condition to worsen (exacerbation).
Asymmetrical weaknesses	These conditions result in a difference in strength between the left and right sides of the body, e.g. stroke and cerebral palsy. The aim should be to improve the affected side as much as possible without neglecting the unaffected side. If the nerves controlling the affected side have been partially or completely damaged, the opportunity for improvement in the local muscles is greatly reduced.
Spasticity	Many physical disabilities present with spastic muscles that are very tight or rigid. Flexibility training is important. However, before they incorporate any flexibility into a programme, the instructor must seek advice from a suitably trained medical authority on how to stretch a spastic muscle without causing injury.
Neuromuscular disorders	These affect the central nervous system (CNS), e.g. muscular dystrophy. Muscles can become progressively weaker as a result of the decline in CNS functioning; this can be offset in the programme by working on general fitness levels. Any rapid decline in function would necessitate immediate referral to the GP for guidance.
Sensory nerve damage	Damage to sensory nerves occurs with many types of physical disability. An inability to detect pressure against the skin can result in a pressure sore. Using a wheelchair increases the risk of developing pressure sores and clients will usually be aware of the importance of frequent checks. The use of gym equipment may bring similar risks, so additional checks should be advised.
Depression	This is a disabling condition in its own right. It can sometimes be a secondary condition resulting from the physical and psychological challenges of living with a disability. Depression reduces motivation and energy levels, and can contribute to drop-out from the programme. Medications used to treat depression have many negative side effects, including weight gain and suicide risk.

YOUNG PEOPLE (AGED 14 - 16)

Most healthy 14 to 16 years can be accommodated within a regular exercise session with basic modifications. As young people are still developing, pre screening is recommended.

GROWTH PLATE FRACTURES

The growth plate is the weakest area of the growing skeleton. Growth plate fractures account for 15% of childhood fractures.

Preventative measures to avoid growth related injuries include:

- Avoiding excessive training
- Considering gender differences and differing stages of development
- Avoiding inappropriate size matching in pair activities
- Avoiding too much static, high impact activity
- Warming up and cooling down effectively
- Using appropriate equipment for activity

FLEXIBILITY

During a growth spurt, there is increased risk of injury. This is because the soft tissue around the joints is already stretched, as muscle growth does not keep up with bone growth.

Caution should be taken when teaching any stretching techniques. Avoid over stretching.

LIMB LENGTH

During the growth spurt, young people have disproportionate leg length, meaning that they are biomechanically out of balance and are potentially less coordinated.

TECHNIQUE

Young adults have not generally developed their complete “body awareness” and coordination that comes alongside full biological, neurological and psychological development. They require closer supervision to ensure correct alignment and sequencing of movement. Start with non complex, low resistance exercises. Progression should only be applied when technique is correct and consistent across multiple reps.

All techniques should be correctly demonstrated in the first instance, with further demonstrations throughout the teaching sequence, and if the instructor notices that their client is performing a movement incorrectly.

GYMNASIUM EQUIPMENT

The resistance machines in gyms are designed for adults. The weight increments are generally too great for young people. Free weights are a better choice as they allow smaller weight increases. Care should be taken to ensure correct technique.



CARDIOVASCULAR AND CARDIORESPIRATORY CONSIDERATIONS

Young people have smaller heart chambers and lower heart volumes. This results in a lower stroke volume at rest and during exercise. Chamber size and blood volume gradually increase with body growth. The lower stroke volume is counterbalanced by higher maximal heart rates. However, higher heart rates cannot fully compensate for the lower stroke volume and so cardiac output is lower.

Young adults have lower blood pressure than adults. This is because they haven't been exposed to elements that affect blood pressure.

Lung volume and peak flow rate increase until full growth. As a young person it is roughly 40L/min and as an adult it is roughly 110L/min.

The measure of the amount of ventilation required for each litre of oxygen consumed (VE/VO_2) is also higher in young people, which means children have inferior pulmonary functions.

Children and young people's arterial/venous oxygen differences are greater and this suggests that a higher percentage of the cardiac output goes to the muscles than for an adult.

Aerobic capacity in young people is higher in absolute terms; VO_2 max increases from the ages of 6 - 18 for boys and 6 - 14 for girls. By contrast, VO_2 max increases for boys during puberty.

ANAEROBIC EXERCISE

The anaerobic capacity for boys and girls increases with age. Young people have less glycogen stored per gram of muscle and have few stores of creatine phosphate. Avoid powering lifting, bodybuilding and max resistance lifts.

BODY TEMPERATURE AND DEHYDRATION

Young people cannot cool their body down effectively like adults can. They can also run the risk of dehydration due to overheating.

SUMMARY OF THE KEY SAFETY CONSIDERATIONS

- **Growth-related issues and injuries:** Lower impact and intensity (fewer repetitions, less resistance) and avoid overtraining.
- **Flexibility:** Modify stretch positions, stretch to the point of mild tension (without overstretching), modify ROM and focus on correct technique. Avoid ballistic stretching.
- **Temperature:** Maintain hydration, lower intensity and avoid exercise in humid conditions.
- **Self-esteem and confidence:** Be mindful of any lack of confidence and low self-esteem, and how this may affect behaviour and motivation. Body image issues may be apparent (eating disorders would constitute a contraindication for exercise).
- **Medical conditions:** The presence of any medical conditions would necessitate signposting to a GP prior to participation.
- **Obesity:** This may present with other CVD risk factors (inactivity, hypertension, high cholesterol or diabetes) that negatively affect health. Sufferers need to be signposted to a GP prior to participation.
- **Immaturity:** This may affect behaviour and regard for safety.
- **Reduced coordination and motor skills:** Simpler and non-complex activities with less technical demand would be recommended. Focus on exercise technique and adapt your teaching style to meet the client's needs.

Frequency	Aerobic: every day. Strength: three days a week. Bone strengthening: three days a week.
Intensity	Moderate-to-vigorous-intensity aerobic exercise.
Time	60 Minutes.
Type	CV: swimming, dancing, cycling, running or walking. Strength: climbing trees, games (e.g. tug of war) and resistance exercises. Bone strengthening: jumping, running, skipping, hop scotch and games (basketball, tennis, etc.).



Unit 4: Section 7
The Cardiovascular and
Respiratory Systems

THE CARDIOVASCULAR SYSTEM

The cardiovascular and respiratory systems are responsible for bringing oxygen into the body and transporting it to tissues that need it. So too does it facilitate the removal of waste products such as carbon dioxide from the tissues before removing it from the body.

What is the Cardiovascular System?

The cardiovascular system is also referred to as the circulatory system.

The key components of the cardiovascular system are:

- The heart
- Blood Vessels
- Blood

The cardiovascular system is responsible for the transportation of oxygen, waste and key nutrients around the body including working muscles, organs and vital systems. In effect, the cardiovascular system is the body's transportation highway.

Structure and Function of the Heart:

The heart is a key structure within the cardiovascular system and operates as a pump which is responsible for pushing oxygen and nutrients around the body.

The heart is positioned behind the sternum and just left of the centre line, sitting between each lung.

The heart is made of cardiac muscle tissue, and is the only place in the body where **cardiac muscle is present**.

How is the Heart Structured?

The heart is split into two halves; the left which receives blood from the lungs and pumps it to the rest of the body, which is referred to as systemic circulation, and the right hand side which receives blood from the body and pumps it to the lungs.

THE CARDIOVASCULAR SYSTEM

There are a total of four chambers in the heart; the upper two chambers which are called the left and right atria, and the lower two chambers which are called the left and right ventricles.

Comprises:

- Two sides – right and left.
- Four muscular chambers.

Upper: Atria
Lower: Ventricles

Blood always flows from A to V:
Atria to Ventricles.

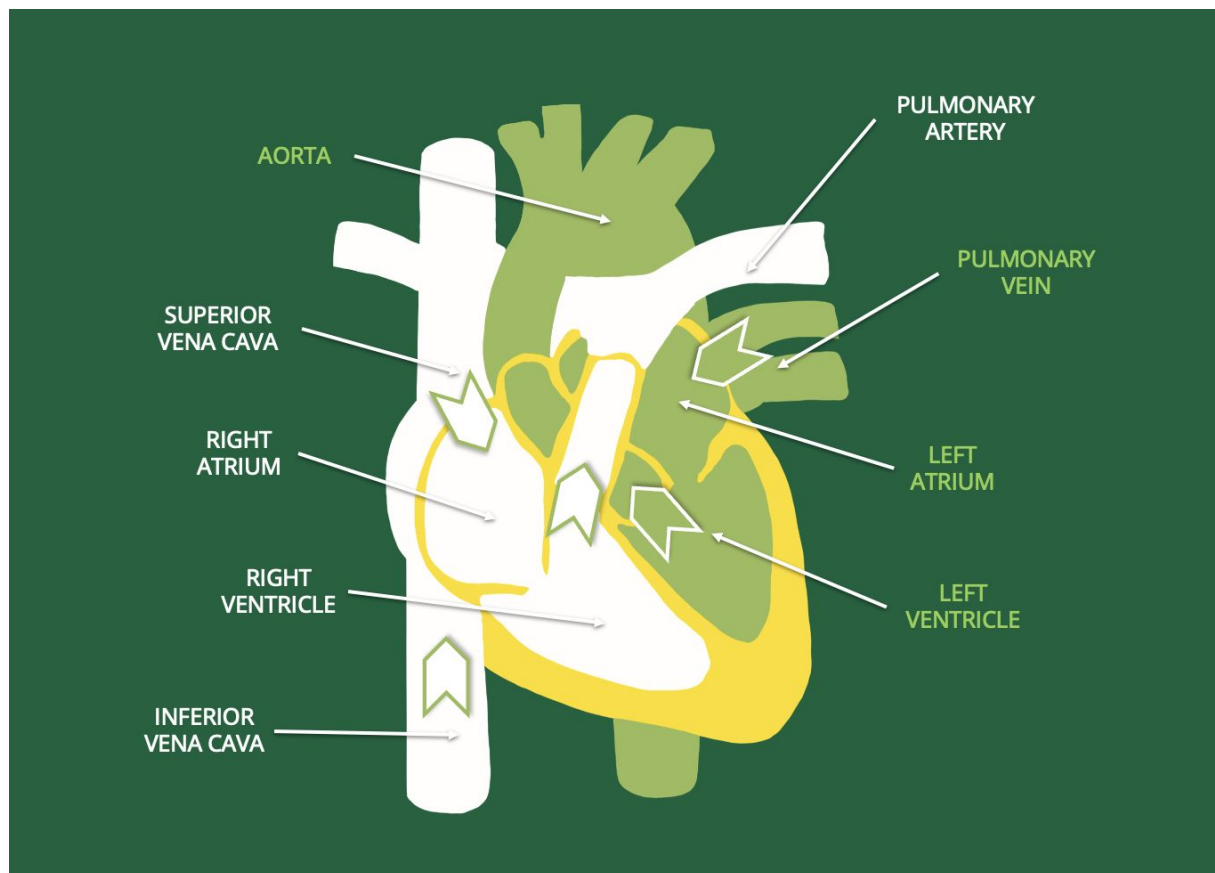


The atria receive blood from veins that carry blood from different parts of the body and pump it down into the ventricles. The atria are structurally smaller than the ventricles due to the fact that they do not require the same level of muscular force to operate in their designated functions as the ventricles do. As gravity is involved in this process, even if the atria do not function correctly or at peak efficiency, most of the blood will still pass into the ventricles passively, in effect, it will fall into the ventricles.

The ventricles have thicker muscular walls and when they contract, they provide the push that is required to force blood under pressure to the correct places in the body. The left ventricle is thicker than the right ventricle because it pumps blood to the rest of the body, whereas the right ventricle pumps only to the lungs.

THE CARDIOVASCULAR SYSTEM

Please see the below diagram for information on the main structures of the heart:



Heart Valves:

There are several valves that can be found in and around the heart, all of which have differing tasks and structures.

The atrioventricular valves separate the atria and ventricles in order to prevent the back flow of blood back into the atria during ventricular contraction.

The semilunar valves prevent the backflow of blood back into the right (pulmonary valve) and left ventricles (aortic valve) during ventricular relaxation.

THE CARDIOVASCULAR SYSTEM

Heart Rate:

The contractions of the heart are controlled by complex systems within the body. The node responsible for initiating cardiac muscle contraction is referred to as the senatorial node (SAN). The SAN is found within the wall of the right atrium. Typically, the myocardium (muscular tissue of the heart) is stimulated 72 times per minute by the SAN. This process is controlled by the autonomic nervous system, meaning that it is not under voluntary control.

Blood Pressure:

Blood pressure is simply a measure of the level of force that is exerted against the walls of arteries as blood flows through them in a pressurised environment.

There are two components to the measurement of blood flow; systolic blood pressure and diastolic blood pressure.

Systolic blood pressure refers to the pressure exerted on to artery walls when the cardiac muscle is contracting and actively pumping blood. As a result of this measurement referring to the stage of active pumping, it should always present itself as the higher of the two readings.

Diastolic blood pressure refers to the pressure that is exerted onto artery walls when the heart relaxes. This period of relaxation is referred to diastole, which occurs to allow the heart chambers to fill with blood again before the next contraction which delivers blood to the rest of the body. Conversely, the diastolic blood pressure should always be the lower of the two readings.



THE CARDIOVASCULAR SYSTEM

Blood pressure is an expression of the arterial blood flow and the peripheral resistance the blood encounters as it flows around the body, therefore this can be expressed as the following.

Blood pressure = Cardiac output x total peripheral resistance

Cardiac output refers to the volume of blood that the heart pumps out in millilitres per minute (ml/min). Therefore the greater the cardiac output, the higher the blood pressure.

Total peripheral resistance refers to the resistance that the blood vessels offer to blood flow. The greater the resistance, the higher the blood pressure. Peripheral resistance is increased by constriction or decreased by dilation of blood vessels, specifically arterioles.

Blood circulation is a closed system and is subject to constantly varying pressures. The blood pressure is at its highest at the height of the contraction of each heartbeat. The blood pressure then lowers until the next heartbeat.

In order to prevent cardiovascular disease, it is recommended that the optimal blood pressure should be below 120/80, which means the systolic reading will show as 120mmHg, and the diastolic reading will show as 80mmHg.

If a client presents themselves with a blood pressure reading of over 180mmHg/110mmHg, then this is a contraindication to exercise and the client should be referred to their GP.

Please see the below table for normative data on blood pressure.

Category	Systolic (mmHg)	Diastolic (mmHg)
Low	<100	<60
Optimal	<120	<80
Normal	<130	<85
High Normal - Pre-hypertension	130-139	85-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	160-179	100-109
Stage 3 Hypertension	>180	>110

THE CARDIOVASCULAR SYSTEM

Control of Circulatory Blood Flow:

Blood vessels have a degree of elasticity with which they are able to expand and contract. When a blood vessel expands, this is referred to as vasodilation and when it contracts, this is referred to as vasoconstriction.

When blood vessels dilate or constrict this means that either more blood or less blood is able to flow through the given blood vessel at a given time. This allows the body to direct the flow of blood to specific areas of the body depending on what the body identifies its need are.

For example, during the digestive process, blood vessels that feed the digestive tract are vasodilator and more blood is shunted to the digestive system in order to assist with the digestive process. During this process, blood will be shunted away from the skeletal muscle through the process of vasoconstriction around the local tissues.

When engaging in exercise, the opposite is true and vasoconstriction will take place around the digestive system, with blood vessels undergoing vasodilation in the skeletal muscle tissues to prepare the body for exercise. Therefore, if a substantial meal is eaten too close to engaging in physical activity, there will not be enough time for digestion to take place before blood is shunted from the digestive system to the muscles which can result in cramps and vomiting.

Circulation of Blood:

As with all mammals, the human circulatory system is what is referred to as a double circulatory system. This means that blood passes through the heart on at least two occasions; in the first instance during pulmonary circulation in which deoxygenated blood is sent to the lungs to be saturated with oxygen, and secondly in systemic circulation when blood pumps from the heart to the rest of the body.

THE CARDIOVASCULAR SYSTEM

Pulmonary Circulation:

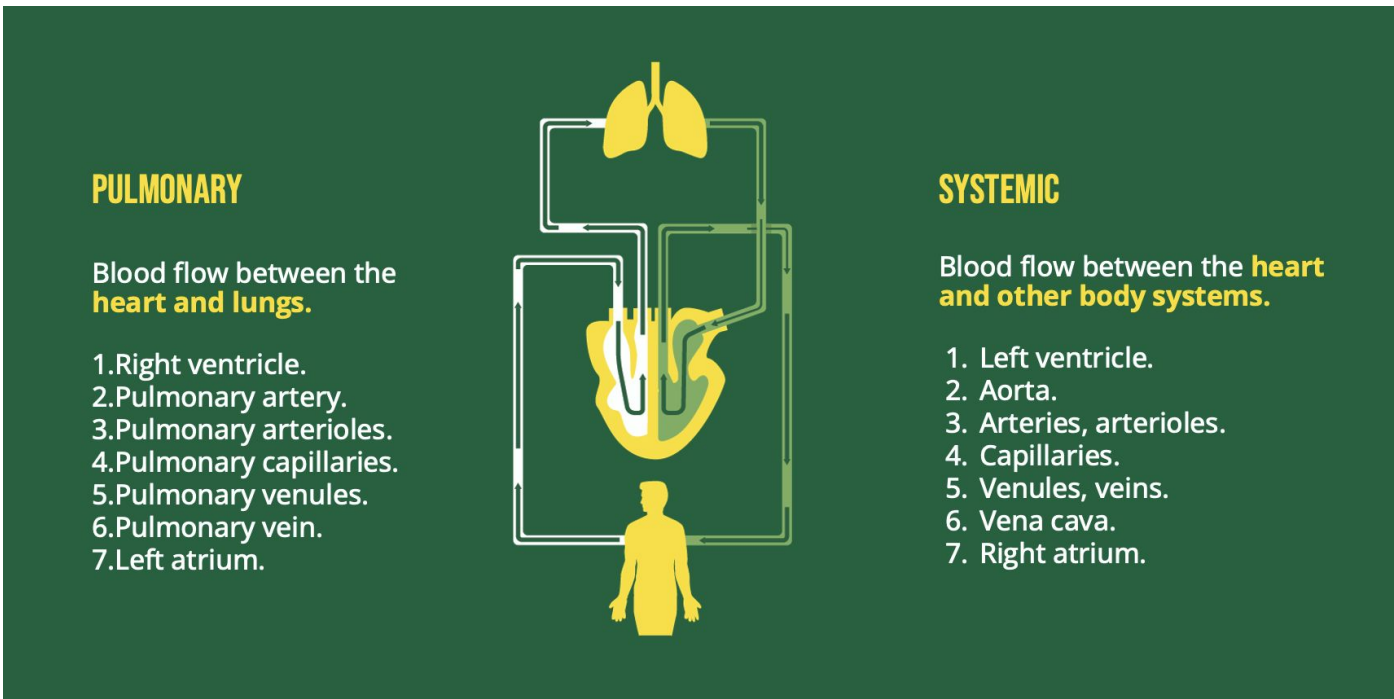
Pulmonary circulation refers to the circulation of blood that takes place between the heart and the lungs.

The left atrium and right ventricle are the two chambers of the heart that operate solely within pulmonary circulation. The pulmonary vein and the pulmonary vein also operate exclusively within the pulmonary system

Systemic Circulation:

The left ventricle and right atrium are the chambers of the heart that work as part of the systemic circulatory system.

The systemic blood vessels are the aorta and the inferior and superior vena cava. The inferior vena cava carries blood from the lower body. The superior vena cava carries blood from the upper body.



THE CARDIOVASCULAR SYSTEM

Structure and function of Blood Vessels:

Arteries have thick muscular walls to withstand the pressure of blood being transported around the body. The largest artery is the aorta, which transports blood from the left ventricle and carries blood under the highest pressure. Arteries also subdivide into smaller vessels referred to as arterioles.

The function of arteries is to carry blood under higher pressure away from the heart and to carry oxygenated blood, with the exception of the pulmonary artery.

Veins have thinner walls than arteries and have very little muscle. Veins subdivide into venules and contain one-way valves to prevent the backflow of blood. These valves are essential, as venous flow is not regulated by pressure in the same way as arterial flow.

The function of veins is to carry blood to the heart in a lower pressure environment. All veins carry deoxygenated blood with the exception of the pulmonary vein.

Capillaries have very thin walls that are around the thickness of a single cell. Capillaries act as the link between arteries and veins and exist in an extremely high abundance in the body.

The function of capillaries is to allow for diffusion of gases and nutrients throughout the body, including to vital organs and muscle tissues.

Please see the diagram overleaf on the structure and function of blood vessels:

THE CARDIOVASCULAR SYSTEM

Structure and function of Blood Vessels:

Arteries

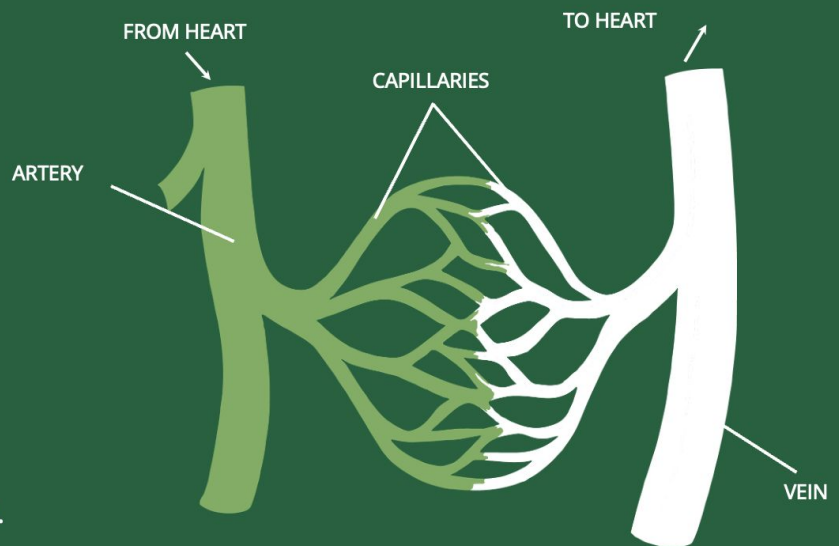
- Take blood away from heart.
- Thick, muscular walls.
- Under high pressure.

Veins

- Take blood to the heart.
- Thin, muscular walls.
- Contain non-return valves.
- Under lower pressure.

Capillaries

- Smallest blood vessels (one cell thick).
- Site of gaseous exchange.
- One cell thick to allow diffusion.



BLOOD

Components of Blood and Their Functions:

Blood acts as a carrying medium in the body which conveys oxygen, nutrients and waste that has been removed from tissues. Blood is made up of a number of key components; plasma, red blood cells, white blood cells and platelets.

Red blood cells contain haemoglobin which is a protein that binds to oxygen to form oxy-haemoglobin which is iron rich and allows oxygen to be carried in the blood.

White blood cells are a part of the immune system and help to fight infection by destroying bacteria and other harmful biological matter.

Platelets help to prevent blood loss from damaged blood vessels by forming a platelet plug. Platelets also release chemicals that help to promote blood clotting which is also the initial stage in the repair of damaged tissue.

THE CARDIOVASCULAR SYSTEM

Plasma is mostly water (91.5%) and solutes (8.5), and contains proteins, electrolytes, nutrients, gases, hormones, enzymes and vitamins. Plasma is straw coloured and partly transparent.

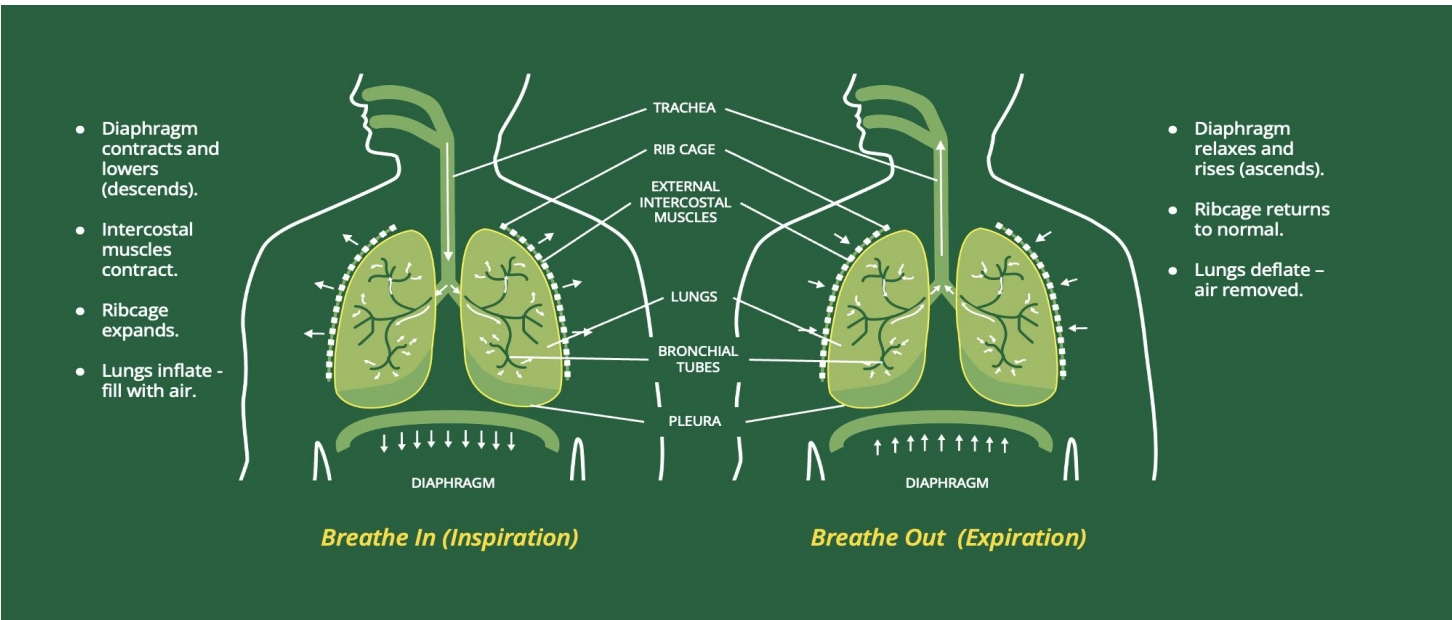
THE RESPIRATORY SYSTEM

What is the Respiratory System?

The role of the respiratory system is to take oxygen into the body and to remove carbon dioxide. The respiratory system is made up of the lungs and respiratory muscles (intercostals and diaphragm).

The Structure and Function of the Lungs:

The lungs are sponge-like structures that fill the majority of the thorax. They are protected by the ribs on either side and have a large sheet of muscle, referred to as the diaphragm, which separates the thoracic cavity from the abdomen.



THE RESPIRATORY SYSTEM

The Mechanics of Breathing:

There are two key conditions under which the human body is triggered to breathe; rising levels of carbon dioxide in the blood and stretch receptors in the intercostal muscles detecting stretching.

The muscles that facilitate the mechanics of breathing are the diaphragm and the external intercostals.

There are two main phases of the breathing cycle:

- Inspiration (also referred to as inhalation) in which air is drawn into the lungs.
- Expiration (also referred to as exhalation) in which air is expelled from the lungs.

In the process of inspiration, the diaphragm muscle contracts, causing the normal dome shape of the muscle to flatten.

The external intercostal muscles also contract and raise the ribcage. These two steps increase the volume of the thoracic cavity.

Negative pressure between the air in the lungs and the air in the external environment is created by the internal expansion of the thoracic cavity. This is in effect a vacuum that has been created such that air is forced into the lungs until the two pressures are balanced.

In the process of expiration, the diaphragm relaxes and rises and returns to its dome shape. The intercostal muscles also relax, creating a positive pressure and allows some of the air to be pulled out of the lungs and back into the external environment.

When exercising, the process of breathing is more vigorous in nature and the intercostal muscles become more active. During expiration, they will contract and force the ribs out down and remove the air in the lungs.

THE RESPIRATORY SYSTEM

Gaseous Exchange:

Gaseous exchange refers to the process of one gas being moved from one area to another before being replaced by another. In human terms, this refers to oxygen moving from an area of higher concentration such as inside the alveoli in the lungs during inspiration to a lower area of concentration, such as into the capillaries at the other side of the lung walls. Carbon dioxide also moves from an area of higher concentration to an area of lower concentration, such as from the capillaries inside the lungs to the inner cavity of the lungs during expiration so that the body can expel it.

The same process occurs in many areas of the body, such as in muscle tissue to allow the removal of carbon dioxide and to facilitate the replenishment of oxygen supplies, or where oxygen diffuses into cells and into mitochondria to allow the organelles to produce energy.

Diffusion is the biological process by which gas exchange is supported. In essence, diffusion is the process of molecules moving from an area of high concentration to an area of low concentration.

In simple terms, this can be demonstrated by the way we smell things; if the source of a smell begins at one side of a room, we will smell it close by quickly, and a little later, we'll begin to smell it at the other side of the room.

In breathing, this works when there is a lot of oxygen sitting in the lungs when we breathe in, and very little at the other side of the selectively permeable membrane in the alveoli. The selectively permeable membrane then allows the oxygen to pass through until there is an even concentration on either side. The same is true for carbon dioxide, though the higher concentration of carbon dioxide will be in the capillaries at the other side of the alveoli.

THE RESPIRATORY SYSTEM

How do the Cardiovascular and the Respiratory Systems Work Together?

Put simply, the respiratory system, is the system that allows us to pull in oxygen and push out carbon dioxide, and the circulatory/cardiovascular system is what carries the oxygen to the tissues that need it, and take carbon dioxide from the body's tissues to the lungs for expiration.

More specifically, the lungs through the processes above, pull in oxygen, which then diffuses through the alveoli before binding to Haemoglobin in the blood to form oxygen-haemoglobin which then allows oxygen to be carried in the blood. Carbon dioxide is carried in red blood cells back to the lungs to be excreted.

Long and Short Term effects of Exercise on the Cardiovascular and Respiratory Systems:

In the short term, the following changes will take place:

- Increased heart rate
- Increased frequency of breaths per minute
- Increase in systolic blood pressure
- Greater vasodilation in blood vessels around the working muscles
- Increased volume of air in the lungs
- Increased stroke volume
- Increased cardiac output

In the long term, the following changes will take place:

- Decreased resting and active heart rate relative to the exertion undertaken
- Increased aerobic capacity
- Normalised blood pressure
- Increased hypertrophy of the left ventricle
- Increase in size and elasticity of the arteries
- Increased capitalisation
- Stronger diaphragm and intercostals
- Increased stroke volume and cardiac output
- Increased blood volume



Unit 5 : Section 1

Planning Gym-Based Exercise

MEETING CLIENT NEEDS AND EXPECTATIONS

When a gym instructor is planning a session, or a series of sessions, this should be done with the client in mind. Specifically, they need to ensure that their needs and preferences are met.

There are many reasons why a client may choose to exercise or to begin exercising and it is important that a gym instructor is able to consider these when supporting them in creating a plan.

Some of these objective and goals can include:

- Improving flexibility
- Improving muscular strength
- Developing cardiovascular fitness
- Losing weight, or changing body composition to reduce body fat
- Improving general health and wellbeing
- Developing fitness for a sport, or a physical activity event

At all times, a gym instructor should keep the following guidance in mind:

All risks should be minimised as far as is possible at all times during the programme, through safe and effective practice as well as through ensuring that best-practice guidelines are adhered to at all times.

The instructor should consider time that is available to a given client, within sessions such that there is enough time for the client to comfortably complete the exercises programmed, but also for wider planning such that the client does not feel as though their new exercise routine is untenable as a result of a lack of time.

Programme plans should also be recorded and shared in a format that is friendly to the client; this means that the client should be able to look at the programme and clearly understand what is going on.

Please see the table overleaf to view the ACSM Exercise Prescription Guidelines.

ACSM Guidelines for Exercise Prescription:

Component of Fitness	CV Fitness	Muscular Fitness			Flexibility
		Strength	Hypertrophy	Endurance	
Frequency	3-5	1-2 per muscle group	1-2 per muscle group	2-3 per muscle group	2-3 (ideal daily)
Intensity	5 x moderate 3 x vigorous or a combination of both therein	2-6 sets of 1-6 reps at 85% 1RM or above. 2-5 minutes rest.	3-6 sets of 6-12 reps at 67-85% of 1RM 30-90 seconds rest	2 -3 sets of 12+ reps at ≤ 67% of 1RM 30 seconds rest	Stretch to the point of mild tension or slight discomfort
Time	150 minutes per week (moderate), 75 minutes minutes per week (vigorous) or a combination therein	No specific duration has been identified for effectiveness			10-30 seconds per stretch
Type	Rhythmic, purposeful exercise involving large muscle groups such as walking or gentle cycling for moderate, and running and a spin class for vigorous	A range of resistance exercises involving fixed machines, cables, free weights, bands and bodyweight exercises can be used to develop muscular fitness. It is recommended to use both compound and isolation exercises and to ensure that muscular balance is achieved.			Warm Up: dynamic stretches Cool down: static stretches (passive and active) It is important to target the muscles that will be/have been worked during the main session

WHAT IS A 1RM?

The term 1RM refers to one rep maximum which is the largest mass that an individual can successful lift for one repetition safely and without faltering form.

For example, if a client lifted 100KG without faltering form, but could not carry out a second repetition at the same weight, this could be treated as the 1RM. This therefore allows the instructor to use the above table to set weight, sets and reps for the client based on the guidelines from the ACSM.

An instructor should at all times, bear safety in mind, and should critically evaluate whether or not it is appropriate for a client to be given a 1RM test; for example if a client is substantially deconditioned due to age or sedentary behaviour, then their chances of injury are higher and alternative fitness tests should be selected.

SAFE AND EFFECTIVE SESSION STRUCTURE

All gym-based exercise sessions should include:

- A warm up to help the client prepare mentally and physically for exercise
- A main session targeting specific areas of fitness identified as meeting the client's needs
- A cool down to help the client bring their body and mind back to a non-exercising state, and to promote recovery and flexibility

WARM UPS

Warm ups are critical components of all sessions; they help to prepare the client for exercise mentally, and help to prepare the muscles and key body systems in such a way that a client is less likely to become injured.

Warm ups address the following:

- Reduction in the likelihood of injury by ensuring that muscles are taken through their range of motion gradually
- Improving performance through increased muscle suppleness and readiness
- Increased vasodilation around the muscles meaning that more oxygen can be fed to the muscles
- Higher muscle temperature which allows for greater elasticity and contractility

PLANNING WARM UPS

Warm ups should be specific to the activities that the instructor intends to take the client through. For example, if a client is planning an upper body session, then it is critical that they warm up the areas of the body that they are going to be working during the session.

A gym instructor should bear the following factors in mind when planning warm ups for their clients:

Age:

The older a person gets, the longer they will likely need to warm up safely and effectively warm up. This is due to joints taking longer to lubricate and a reduction in the efficiency of the cardiovascular system.

PLANNING WARM UPS

Type of session:

The specific activities of the main session should dictate the activities carried out in the warm up.

Intensity of the main workout:

If a main session is more intense, then so too must the warm be of a greater intensity. However the gym instructor must take care to ensure that the client is still warming up gradually.

Client fitness levels:

If a client has a high level of fitness, then they will typically take less time to warm up effectively as they will be more efficient at the transportation and use of oxygen. Less conditioned clients will require longer to warm up.

Health conditions:

For example, if a client had asthma, it may take them longer to warm up due to having a lower aerobic capacity.

Environmental factors:

If the temperature is low, it may take clients longer to warm up as it will take muscles longer to heat up. Care should also be taken with clients who have any respiratory such as asthma as cold conditions can bring about an asthmatic event, if a suitable warm up is not carried out.

GENERAL WARM UP GUIDELINES

If specific joint mobility exercises are being carried out, the client should aim to complete 15-20 reps at each joint, with a gradual increase in ROM.

A pulse raiser section should last between 5-10 minutes in an healthy client who is undertaking the warm up in a normal environment. This can however, be extended if the client has particular needs that would make this appropriate.

In all instances of a warm up, the client should move gradually along an intensity gradient to ensure that they are reaching an RPE of 4-7 when using the 1-10 scale.

Gym instructors should also ensure that their clients are undertaking dynamic stretching prior to beginning a session. The aim of this is move the body such that muscles are lengthened through controlled movement, such that the muscles reach their ROM, but without any bouncing or pulsing that could be considered ballistic or plyometric.

GENERAL WARM UP GUIDELINES

Around 8-10 reps of each dynamic stretches should be carried out with a controlled motion, and the ROM gradually worked through.

For further information and examples of dynamic stretches, please review the planning and instructing section on the learner portal.

PLANNING CV TRAINING

CV fitness refers to the ability to take in, transport and utilise oxygen. CV training seeks to develop and improve this ability.

When planning CV exercise, it is essential to have an understanding of and an ability to utilise the training principles: frequency, intensity, time and type to ensure that progressive overload is included in a client's programme but without overtraining them.

The current guidelines from the ACSM state that healthy adults should aim to achieve the following:

150 minutes of moderate-intensity aerobic activity per week.

OR

75 minutes of vigorous aerobic activity per week.

OR

An equivalent combination of moderate and vigorous intensity aerobic activity each week.

MODERATE AND INTENSE ACTIVITY

When a client is working at a moderate intensity, they will become out of breath and will be working at an equivalent of a brisk walk for an average person. Typically, this translates as being 12-13 on the RPE scale (6-20 scale).

MODERATE AND INTENSE ACTIVITY

When a client is working at a vigorous intensity, they will be out of breath and likely sweating when in a normal exercise environment. This will be equivalent of a fast run or sprinting, with the client's heart rate being around 77-95% of their maximum. This roughly translates as an RPE of 14-17 (6-20 scale).

Aerobic training will benefit a client when carried out between 60-90% of their maximum heart rate and a client will see more substantial developments to their fitness levels when engaging in vigorous activity for short durations.

CV TRAINING METHODS

Continuous Training:

Continuous training refers to working for extended periods of time at relatively low intensities (50-70% MHR). This training method best suits deconditioned clients, beginners and those who have a preference for it.

Continuous training can trigger physiological adaptations that improve the efficiency and effectiveness of the CV system in addition to improving oxygen transportation. However, training exclusively with continuous training can result in a plateau, meaning that further adaptations to training will need to be put in place to ensure progressive overload is achieved by the client.

For advanced clients, or clients who are well conditioned, continuous training can effectively be used as a recovery or preparation technique as part of their training.

When programming continuous training, this could be scheduled in for three 30 minute sessions at an RPE of 6-7 a the client should be able to maintain a conversation throughout their training.



INTERVAL TRAINING

Interval training involves deliberate sections of working and recovering. This will help to promote adaptation and development of the aerobic system.

Due to the intensity of interval training, intervals can usually only be maintained for a couple of minutes at most due to the lack of oxygen that muscles will experience alongside a buildup of carbon dioxide and other waste substances such as lactic acid.

Interval training can be more engaging for a client to take part in than continuous training, and the ability to work anaerobically can be developed. However, a limitation of interval training is that overload might not be achieved if the incorrect structure of intervals is put in place during training.

For clients who are more conditioned or who play sports, interval training can be useful as over time it will allow them to tolerate higher levels of lactic acid in the muscles.

In terms of planning interval training for clients, an intermediate client could be prescribed an aerobic interval with a 3 minute working window, followed by a 3 minute rest period, which would be performed 2-5 times.

An advanced client, may be given a 3 minute working window, followed by a 90 second recovery period which would be performed between 4 and 6 times.

FARTLEK TRAINING

The term Fartlek, refers to playing with speed and was originally used as a method of working outdoors with natural or artificial landmarks in order to provide a variation in training and speed for training. Fartlek training is essentially a semi-structured, or unstructured form of interval training

Fartlek training is effective for sports or activities that will involve unpredictable bursts of high and low intensity and will allow the client to work both aerobically and anaerobically. This is also often more interesting for a client than continuous training.

FARTLEK TRAINING

However, as there is less structure in planning Fartlek training, it can be hard to quantitatively measure progress due to the lack of structure. This method of training can also be unfamiliar, and at first unfamiliar, for clients who are not used to training.

This training method can also be adapted to suit different clients. For example, a client can use a slow walk, a fast walk and a jog as their speed increments rather than a jog, a fast run and a sprint.

TRAINING BEGINNERS

Beginners should carry out activity that is of a moderate intensity such that they are not experiencing undue fatigue, soreness or discomfort. Ideally, sessions should initially involve 30 minutes of continuous training, or as long as the client can manage if 30 minutes is not deemed to be suitable due to client fitness.

Beginners will often display improvements relatively quickly and the instructor should take care to anticipate that this might result in a plateau and that to prevent this, they should programme for increases in the FITT principles to ensure that progressive overload is maintained.

TRAINING INTERMEDIATE AND ADVANCED CLIENTS

When a client can complete 30 minutes of exercise at a moderate intensity five times per week, they should be progressed by manipulating the FITT principles in their programme.

For example, if a client has been working at 60% of their MHR in the above scenario, it would be logical to increase intensity by increasing the working heart rate to 70% of the MHR.

Care should however be taken to ensure that clients are not being progressed too quickly as clients can develop overuse/overtraining injuries or become demotivated.

Interval training can act as a good 'bridge' between intensities and can be used effectively by introducing clients to new intensities in such a way that is not an immediate jump as they work towards a full session at their new intensity.

RESISTANCE TRAINING

Resistance training seeks to address a client's muscular fitness in a specific way depending on the techniques used. Muscular fitness refers to muscular endurance, muscular strength and muscular power.

PRESCRIBING MUSCULAR FITNESS

Just as with any other area of fitness, it is important when prescribing muscular fitness that this is done in such a way that the client needs are satisfied in a safe and effective way.

The current recommendations for strength training dictate that, training should take place for 1-2 days per week, per muscle group. Within the session, the client should carry out 2-6 sets of 1-6 reps at 85% of their 1RM or above. They should also have between 2-5 minutes of rest per set.

The recommendations for hypertrophy state that the client should undertake 1-2 days of training per week, per muscle group and that within the session they should perform 3-6 sets of 6-12 reps at 67-85% of their 1RM. They should also have around 90 seconds of rest per set.

The recommendations for muscular endurance state that a client should engage in 2-3 sessions per week, per muscle group. During the session they should perform 3-6 sets of 12+ reps at 67% of their 1RM. They should also take around 30 seconds between each set.

Prior to working on any specific training goals such as hypertrophy, a client should first ensure that they have an adequate baseline of fitness. This will allow the instructor to accurately and effectively set the FITT principles for each client.

As the client's fitness level increases, both client goals, and the instructor's manipulation of the FITT principles. In order to achieve this, the number of sessions that a client completes in a given week might increase, however this will focus more on specific areas of the body, which is often referred to as a split routine.

KEY CONSIDERATIONS WHEN PLANNING RESISTANCE TRAINING SESSIONS

Exercise and Equipment:

Some exercises and pieces of equipment require greater skill and fitness to use effectively, therefore some exercises might not be suitable for every client.

Training Approach:

For beginners and deconditioned clients, it would be most advisable to carry out single set activities. Circuit-based weight training might also be more appropriate. More advanced clients will often have specific goals and might use more of a multi-set approach.

Muscle Balance:

Muscle balance refers to working all of the major muscle groups. This is an important consideration as an over focus on particular areas of the body might lead to an imbalanced posture or musculature.

Exercise Order:

If multiple muscle groups are to be used during a session, the biggest must be used first. This is because larger muscle groups require the most energy and coordination to train safely and effectively.

This also prevents pre-fatigue of smaller muscles which can prevent the effectiveness of training larger muscles. For example, if a client performed a tricep exercise before doing a bench press, there would be pre-fatigue of the triceps meaning that the pectoral muscles would not be trained as effectively as they otherwise would.

Exercise Sequence:

Sessions can be laid out in a number of manners including all upper body exercises followed by all lower body exercises, an upper-lower rotation which means that one exercise will be performed for the upper body, and the next exercise will be for the lower body with the sequence repeating until a full body workout has been achieved.

Another common exercise sequence is a push-pull method with which a client would carry out a pulling exercise before performing a pushing exercise with the opposite muscle group until a full body balance has been achieved. For example, if a bent row was performed, the next exercise could be a chest press.

PROGRESSIVE OVERLOAD

In order to ensure that progressive overload is maintained, the gym instructor must think ahead to ensure that there is sufficient adaptation to the programme. Specifically, every four to eight weeks, the exercise variables should be progressed.

SINGLE AND MULTIPLE SET SYSTEMS

A single set system refers to a client carrying out a single set of the same exercise 2-3 times per week. For example, a client would do 1 set of 12 reps of a shoulder press before moving onto 1 set of 12 reps of a lat pulldown.

A multiple set system refers to a client performing multiple sets of the same exercise before moving onto the next exercise. For example, a client could carry out 3 sets of 12 reps on the leg press before moving on to carry out 3 sets of 12 reps of the leg curl.

CIRCUIT FORMATS

Circuit formats are a popular approach for planning and delivering gym-based exercises. The same formats can be used for both one to one and group training formats.

There are many types of exercises that can be included in circuit-based training:

- CV machines
- Fixed resistance machines
- Free weights
- Stability equipment
- Bodyweight exercises
- Manual resistance exercises
- Exercises with small equipment such as resistance bands or speed ladders

COMMON TRAINING VARIABLES

There are many ways in which circuits can be varied in order to help an instructor guide a client towards their goals. Usually, this will involve the instructor manipulating one or more of the following:

- Number of exercise stations in each circuit.
- Exercise order and progression route through stations.
- Individual, paired or group stations.
- Exercises chosen for each station.
- Work time for each station (number of seconds or repetitions).
- Rest between stations (this could be active rest, e.g. a CV exercise between resistance exercises, such as marching, jogging or lunging) .
- Rest time between circuits (this could be active rest, e.g. an allocated time for CV training between circuits)
- if more than one circuit is used.
- Number of circuits (which would depend on the number of exercises in one circuit).
- Training focus: strength, endurance, aerobic, functional, stability or any combination.

CIRCUIT EXAMPLES

If an instructor is developing a circuit session for a beginner who is focussing on muscular endurance, they could have the following stations:

1. Seated row
2. Chest press
3. Lat Pulldown
4. Shoulder press
5. Leg press
6. Abdominal curl
7. Back extension

Each exercise would have one set and the circuit can be repeated with 60 seconds rest after each exercise is completed. There would also be 12-15 reps per exercise.

CIRCUIT EXAMPLES

Another example of a circuit session for intermediate clients with CV and muscular endurance could be the following stations:

1. Step ups
2. Press ups
3. Star jumps
4. Bodyweight squats
5. Shuttle runs
6. Abdominal curls
7. Skipping
8. Back extension

Each station would have 60 seconds of rest and the circuit can be completed multiple times.

REST AND RECOVERY TIME

The amount of time that is given between each station depends on the intensity of the stations and the fitness levels of the clients. Generally however, it is recommended that the following are used as a guideline for recovery periods:

0-10 seconds' recovery for general and CV conditioning.

20-60 seconds' recovery for older or deconditioned participants.

60-120 seconds' recovery for strength and power approaches.

Typically, a higher intensity will involve shorter rest and recovery periods and a lower intensity session will include slightly longer periods of rest and recovery.

Recovery periods can be manipulated to achieve specific workout objectives. Active rests (e.g. performing a CV exercise between muscular exercises) can be used to help a specific body area recuperate while maintaining the intensity and flow of the circuit. This is effective for aerobic endurance training goals.

CONSIDERATIONS FOR DELIVERING CIRCUIT SESSIONS

Working with groups of clients can be a rewarding endeavour both for instructors and for clients; they offer an opportunity for accessible training for clients, and it offers the instructor the opportunity to work with a larger number of clients.

There are some key considerations that are key for delivering client sessions to groups.

Client safety measures should still be taken, this will involve steps such as pre-exercise screening and risk assessments being carried out on the exercise area.

The instructor should also consider what the maximum class size should be for the space, equipment and instructors available. The instructor should also ensure that there is adequate choice of equipment and availability for clients.

The instructor should ensure that they are selecting appropriate principles of training options for the fitness levels, age and capability of their clients.

The instructor should also ensure that they are observing the whole group when possible and providing a combination of group and individual feedback where each is appropriate to ensure that clients develop accordingly and are kept as safe as possible at all times.

FUNCTIONAL TRAINING

Functional training refers to training that promotes and improves optimal human movement and physical capacity. For example a client who lacks stability, perhaps due to older age, might benefit from supported squats to help them move in and out of chairs independently in their home.

Similarly, a sports person may seek to carry out vertical jumps in order to promote power in the legs to improve their sports performance.

Typically, functional exercises are carried out standing and often will include large compound movements, in which multiple joints are actively working. Functional exercises can however, also include stability exercises. For example, if a client lacked core stability, a static plank could be considered a functional exercise.

FUNCTIONAL TRAINING

Most commonly, functional training will be carried out with the following types of equipment:

- Kettlebells
- Free weights
- Suspension trainers
- Cables
- Core balls
- Medicine balls
- Sand bags

COOL DOWNS

Put simply, the purpose of a cool down is to return the body to a pre-exercise state of being in which:

- Oxygen debt is repaid
- Blood pooling is avoided
- Tension is reduced in muscles
- Lactic acid buildup in the muscles is dispersed
- Muscle recovery is facilitated
- Waste products are removed

There are two main components to a cool down: pulse-lowering and stretching and flexibility work.

Pulse Lowering:

Intensity should be reduced gradually from its CV training level in order to lower the heart rate. How intense the pulse lowering section of a session is and how long it will last should be determined by the intensity of the session.

Clients who are deconditioned or who are otherwise less physically fit, should be given a longer cool down to help facilitate the above processes.

Light cardiovascular work can also be carried out between resistance training and stretching; this assists the body in removing waste products such as lactic acid. This process can also assist in oxygenating the muscles and bringing fresh nutrients to areas that have been worked.

STRETCHING AND FLEXIBILITY

Stretching is a key phase in all gym-based exercise sessions. This is to help release muscle tension and to help muscle return to their normal range of motion following a period of high contractility. Flexibility training can also help clients to increase their overall range of motion and flexibility, which allows them to perform more successful movements and can assist with joint stability through mitigating muscle imbalances.

There are two main types of stretches that will be used in a cool down: static maintenance stretches and static developmental stretches

Static maintenance stretches take the muscle to the end of its normal range of motion and hold it there without bouncing or shaking. These are generally shorter stretches, designed to maintain flexibility and to recover from physical sessions. Generally, these should be held for 10-15 seconds.

Static developmental stretches are used to develop flexibility and range of motion in a joint.

Typically, the following teaching guidelines apply for instructing static stretches:

- Take the stretch to the point of mild tension, maintaining good alignment and posture
- Hold for 10-15 seconds until the tension within the muscle has reduced
- Relax and passively increase the ROM of the stretch until tension is felt again
- Hold for 10-15 seconds until the tension within the muscle has reduced
- Increase the ROM of the stretch until tension is felt again.
- Hold until the tension reduces, then slowly return the limb to its normal position
- Repeat the stretch if desired

For further information and examples of static stretches, please view the content on the learner portal.



Unit 5 : Section 1

Instructing Safe and Effective Gym-Based Sessions

THE FITNESS GROUP

PREPARATION FOR A SESSION

Prior to all sessions with clients, instructors should take the action to prepare themselves for leading a session

There are three main areas in which an instructor must ensure that they are prepared to lead a session: themselves, the environment they are working in and the equipment that they will be using.

In order to prepare themselves for a session, a gym instructor should ensure that they are presenting themselves professionally with clean clothes appropriate for the session alongside a professional manner. They should also ensure that they have all of the necessary paperwork for the session to hand and that they are able to provide this to the client.



In order to prepare the environment for a session, the instructor should check that the space is appropriate to be used for a session. This can include checking that there is available space, that there is no equipment left lying on the floor and that there is a first aider on site.

Instructors should also check that the equipment they will require for their session is available and in good working order, free of defect and hazards. The instructor should also plan adaptations for all components of the session to ensure that it can go ahead irrespective of the equipment they have.

The instructor should also ensure that they are correctly preparing their client for sessions. They can do this in the first instance by making them welcome and ensuring that they are explaining the purpose and function of everything that they are doing.

Instructors should also explain the physical and technical demands of the session to the client, and confirm plans for development and future sessions with the client. They should also advise the client of any health and safety considerations in the fitness facility that they are working in.

INSTRUCTING AND SUPERVISING SAFE AND EFFECTIVE GYM-BASED EXERCISE

Teaching Sequence: **NASTY**

The NASTY acronym is generally accepted as being an appropriate method with which to teach exercise technique safely and effectively

N - Name the exercise: the instructor should state the purpose and the major muscles that are used in the body

A - Adjustments: demonstrate how to make adjustments to the equipment used including seats, height, weight and speed

S - Silent Demonstration: allow the client to concentrate on the technique without distractions. The silent demonstration should be 3-6 reps

T - Teaching points: run the client through the main teaching points and offer another demonstration

Y - Your turn: the client should attempt the exercise while being closely supervised by the instructor

COACHING POINTS

Differing from an instruction, a coaching point refers to a brief statement that is both instructional and motivational.

An instruction may read, "Make sure you reduce excessive kyphosis." While accurate, this is neither motivational, or client friendly.

Therefore, gym instructors can utilise a coaching point, which might instead read, "Lift your chest." and, "Draw your shoulder blades back".

These statements are made motivational by the instructor, who can inject positivity and an encouraging tone into their voice.

COACHING POINTS

Coaching points should always be relevant and should always serve a specific purpose that aids the client - there is no point in including coaching points in a session when there is no specific outcome.

VERBAL AND NON-VERBAL INSTRUCTING TECHNIQUES

Clear communication with a client is critical to the concept of instructing them. A key way to ensure that communication is accurate is to check for understanding after imparting information and this can be done by asking non-overbearing questions that are of an open-ended nature to allow the client to think about what they have just taken in and provide an appropriate answer.

Body language as a whole should also be considered by the instructor, and they should be aware that the way they stand or the way that they express things with their face can have a powerful impact upon their client.

For example, an instructor standing with their arms folded and a single eyebrow raised, does not connote a positive attitude to their client, however an instructor who faces their client, and has open body language is more likely to instil confidence and comfort in their client.

Three positive examples of body language and non-verbal communication are:

- Smiling genuinely
- Nodding when listening to a client speaking to show interest
- Open body language - chest open, hands by sides or holding programme card

Three negative examples of body language and non-verbal communication are:

- Standing with arms folded
- Leaning against equipment and not showing engagement with the client
- Rolling eyes

Please see the below table for further examples of verbal and non-verbal communication:

Key Instructing Skills	
Verbal	Non-verbal
Instructions - words, language and terminology that imparts information to the client.	Demonstration and alignment
Motivation, praise and encouragement	Observation
Teaching points - as with instructions, but brief statements designed to trigger the response of the client maintaining the correct technique	Body language and posture
Voice intonation, volume and accent	Teaching position - being able to see the client and what they are doing clearly
Correction	Facial expression
Cueing	Eye contact
Questions	Gestures
Adaptation of exercises - regressions or progressions	

MOTIVATION

Motivation can be instilled by an instructor in both a verbal and non-verbal manner.

Motivational language should always be positive, however it should also be constructive so as to always serve the aim of client development. A positively phrased piece of feedback to a client could be, "Great alignment in your knees - well done!"

Constructive feedback should also be framed positively and could read as, "Great job - keep your elbows unlocked." This way, the instructor is able to correct the client's form and enhance their safety and the standard of their training, while also taking care to encourage them.

Negative phrasing of feedback should be avoided wherever possible. While this might seem easy to avoid for a discerning instructor who values professionalism, sometimes certain comments can connote negative influences without being overtly unpleasant. For example, giving feedback such as, "Don't lock your knees." or, "Poor technique." can demote the confidence of a client which ultimately does not serve them or the instructor well.

Non-verbal motivation supports the feedback and motivational points given to a client verbally; the attitude and character that the instructor demonstrates are key to not only reinforcing positive feedback, but also in forming and maintaining rapport with the client.

MOTIVATION

Posture should be open when addressing clients and facial expressions should be positive, energetic and warm. For example, smiling in a genuine way, and showing clear interest with facial expressions when a client is speaking, instills a positivity in the client and makes them feel valued by the instructor.

TEACHING POSITION

It is critical that the instructor positions both themselves and their client in a position that allows the client to observe demonstrations, and in turn for the instructor to be able to observe the client when they are supervising them.



When carrying out a demonstration, the client should be able to see the major muscle groups of the gym instructor. For example, if the instructor was demonstrating a bent over row, then the best position for the client to stand would be the side as they will be able to observe the posture in the back, and the position of the legs. They will then be able to observe the correct technique when the weights are pulled up by the hands.

Although this is optimal, the client should also be encouraged to move around the instructor where appropriate to allow them to view different angles while the instructor demonstrates.

When the client is carrying out an exercise, it is also important for the instructor to select an appropriate position. For example, if a client is performing an exercise on the floor, the instructor should kneel down next to them to avoid appearing overbearing by standing over them and to help maintain interaction throughout the exercise.

It may also be important for an instructor to change position during the exercises to ensure that they are accurately viewing all relevant angles of the client's movements. For example, during a deadlift, it would be sensible for an instructor to begin observing from the side to ensure that the clients' back is in alignment, however, they should also observe from the front to ensure that they are also observing the alignment of the knees and the head.

MONITORING INTENSITY AND ENSURING SAFETY

It is critical that a gym instructor can monitor the the intensity with which their client is working as this will allow them to decide whether it is safe to carry on with their original plan, whether they need to progress, regress, or adapt what their client is doing to make it more suitable.

There are four generally accepted methods of checking intensity:

- Observation
- Talking test
- RPE
- Heart rate

Observation is an important tool in a gym instructor toolbox and can allow the instructor to see the posture and alignment of the client during exercise alongside coordination and general exercise technique. It can also allow facial expressions and sweating to be observed which can indicate fatigue.

This allows an instructor to make quick visual assessments of their client and this can give them a strong indication of how intense the client is finding the session. This is however, very subjective and cannot always be backed up by quantitative means, clients can also show more or less exertion than others.

The talking test can be a strong indicator of where a client is in a scale between light activity where they might be showing a small amount of breathlessness, but can otherwise hold a conversation to vigorous where it is very hard for the client to speak clearly, with only single words between heavy breaths being possible.

In moderate activity, the client will still be able to talk relatively easily in short sentences and will be a little more breathless. In moderate to vigorous activity, the client will have difficulty speaking and will only manage a few words between breath.

The talking test is a quick way to gauge intensity, however it is again subjective and is not standardised across all clients.

RPR (Rate of Perceived Exertion) is a useful scale for determining client intensity. The client will be given a scale by their instructor which will usually be a scale of 1-10 and the client will indicate where they lie on the scale.

MONITORING INTENSITY AND ENSURING SAFETY

This is a convenient method of assessing client intensity that can provide accurate results, however in order to avoid subjectivity, the client must be adequately instructed in how to answer and how each stage of the scale should feel.

1-10 RPE Scale		Training Zone
Nothing at all	0	Warm Up/Cool Down Zone
Extremely weak	0.5	
Very weak	1	
Weak	2	
Moderate	3	
Somewhat strong	4	Aeorbic
	5	
	6	
Stong	7	
Very strong	8	High Intensity Intervals - Anaerobic Zone
	9	
Extremely Strong	10	

Heart rate is another useful method for determining client intensity.

Typically, a client’s predicted maximum heart rate (MHR) is calculated by the following: 220 - client age = MHR (predicted)

For example, a 26 year old would have an MHR or 194bpm (220-26 = 194bpm)

Intensity	% MHR
very light	<57
Light	57-63
Moderate	64-76
Vigorous	77-95
Near maximal to maximal	>96

To calculate a client’s Target Heart Rate (THR), the MHR can be multiplied by the desired % MHR:

THR = MHR × %MHR

THR = 194 × 80%

THR = 194 × 0.8

THR = 155bpm

Although MHR can be a useful and relatively accurate method of measuring intensity, there is some degree of individuality to the results found in each client and a client who is younger but less fit, might struggle with a prescribed session that an older but fitter client may find too easy. However, MHR remains effective in demonstrating a client's progress and therefore should be utilised by the gym instructor where appropriate.

OVER-EXERTION

When a client is over-exerting, they could be more prone to injury and to falling away from exercise. Therefore it is important for the gym instructor to recognise what the signs of this are:

1. Chest pain: any pain in the chest during exercise should be taken seriously as this could be an indicator of a serious cardiac event.
2. Shortness of breath: This only refers to exercise that wouldn't normally cause SOB. It may be a warning sign of high blood pressure or other heart- or lung-related problems.
3. Light-headedness: Some light-headedness after exercise is quite normal as blood pressure drops during this period, however if it occurs during exercise and doesn't quickly disappear, it may indicate heart-, lung- or brain-related issues such as a stroke or tumour.
4. Severe joint pain: Joint stiffness or slight pain is normal before or at the start of an exercise session, however once warmed up, this should subside. If the pain persists, and is described as 'severe' by your client, it might be due to tendon or ligament damage, which would be exacerbated by continuing to exercise

If at any point during a session, a client exhibits signs of a serious medical issue, the gym instructor should stop the session safely and refer the client to their GP, or call the emergency services as appropriate.

OVER-EXERTION: SAFETY

If at any point during a session, a client exhibits signs of a serious medical issue, the gym instructor should stop the session safely and refer the client to their GP, or call the emergency services as appropriate.

ADAPTING EXERCISE

In some instances a session, or a part of a session, will be too easy, too hard, or not possible for a client to complete. When this happens, the gym instructor would progress, regress, or adapt the session.

Progression - making things more challenging

Regression - making things easier

Adaptation - using an alternative exercise or piece of equipment to achieve the same objective.

Please note that although adding and subtracting weight is a valid progression and regression, that the gym instructor should also demonstrate changes to the exercise itself that makes it harder or easier. For example, if a client is finding their reps on the chest press to easy, the gym instructor could progress the session by getting them to do the exercise with free weights where movement and stability will also be challenged.

Similarly if a client was finding their back squat too challenging, they could be given a supported bodyweight squat to regress the session.

The instructor could also adapt the session; if for instance the shoulder press machine was not available, then they could get their client to do the should press with either dumbbells or barbells.

Typically, adaptations are made through manipulating the following variables:

- Speed - faster or slower
- Resistance - more or less
- Type of equipments - fixed weight machines are easier than free weights
- Number of sets and reps - more or less
- Lever length - moving the hands above the head to make an abdominal crunch harder, or to the legs to make it easier
- Position - for example, doing a press-up from hands and feet being on the ground to feet being on a bench to make the exercise more challenging
- Exercise selection - choosing a harder or easier exercise

SPOTTING

Spotting refers to the process of the instructor assisting with the execution of an exercise, or being on standby to assist a client if the client is finding it challenging to control a weight.

The aim of spotting is to mitigate risk where at all possible.

Please see the below table for spotting considerations:

Exercise	Considerations
All exercises identified below	Use more than one spotter (heavy back squat or heavy bench press) Spotters should know the correct exercise technique for the exercise they are helping. Spotters should know how many repetitions the client is attempting Spotters should be attentive to the client and their technique at all times Spotters should summon help if an accident or injury occurs Communication is key and is the responsibility of both the spotter and the client
Overhead exercises e.g. barbell shoulder press	The spotter should be strong enough to assist the client and ensure their safety throughout
Exercises with the bar on the back of the shoulders e.g. back squat	The spotter should be as tall as the client. Where possible, these exercises should be performed inside or next to a rack, so the bar can be placed back safely and quickly if the client is experiencing difficulty
Exercises with the bar on the front of the shoulders e.g. front squat	All plates, bars, locks and weight plate stacks should be cleared from the lifting area.
Over the face exercises e.g. bent-arm pullover	Grip the bar either inside or outside of the client's hand position, whichever offers best hold Spot with a supinated (palms-up) grip to prevent the bar from rolling out of the hands.
Dumbbell exercises, e.g. lying dumbbell bench press. Spot as close to the dumbbells as possible The spotter should be experienced as these exercises require more skill For some exercises, it is better to spot the dumbbell itself, e.g. dumbbell overhead triceps extension When spotting pressing exercises, e.g. dumbbell shoulder press, it is better to place hands on the client's upper arms (forearms), rather than underneath the elbows. If the client were to 'fail', i.e. collapse and flex the elbows at any stage, the spotter would be able to prevent the weights from falling onto the client's head, face or chest.	

SPOTTING

Recommendations for the spotter:

- Establish a solid base of support to lift and pass the weight (foot stance and position)
- Maintain a neutral spine and use correct technique when lifting and passing
- Keep the barbell or dumbbell close to your body when lifting and passing
- Pass the bar or dumbbell to the lifter away from their body/face and move into position together
- Use four hands on the bar (three hands for dumbbells) to move the weight into position
- Ensure a high standard of communication with the client; this should be practised and made clear before the exercise is executed
- Only release the barbell or dumbbell to the lifter when they have given a clear instruction (e.g. 'mine' or 'my bar')
- When passing dumbbells, they should be moved one at a time by the ends to allow the client to safely grip the handle

FEEDBACK

After taking a client through an appropriate cool down, the gym instructor should seek to close the session. This involves, both the instructor giving the client feedback, and the instructor in turn receiving feedback from the client.

In order to provide feedback to the client, the instructor should give honest, positive and constructive feedback. Using the examples and descriptions of positive and negative feedback in the above sections, the gym instructor should seek to present feedback to their client in such a way that they:

- Highlight where they showed good performance, or hard work in order to bolster their motivation
- The feedback should be conveyed in a friendly and positive tone of voice and body language should be positive

The formula for success in giving a client feedback is as follows:

A positive statement + stating constructive feedback as being part of a goal for the next session + complimentary body language and non-verbal cues.

For example, an instructor could say, "It was great to see how much effort you put into that last set, it was a hard one! The next time we have a session, let's see if we can get those last three reps."

FEEDBACK

Conversely a negative statement, could be, "You didn't manage to carry out the final three reps for the last exercise and you lost form."

The above statement, though true and accurate, is not motivational and is not positive. In fact, it could act to detriment a client's motivation levels.

When gaining feedback from clients, the instructor should do so with a view to reflecting on their session and ultimately improving their professional practice.

Asking a client for feedback can prompt them to reflect on their session, and to share with the instructor what they found challenging and what they liked and disliked.

The client is also given an opportunity to ask questions and to clarify the 'Why' as well as the 'How' of the session.

The client should also be encouraged to discuss their motivation levels with the instructor, specifically, what they found to be motivating and what did not enhance their session quite so much. This then allows the instructor to better tailor what motivational approaches they utilise and to what extent.

In all instances, a client should be encouraged to be candid, as honest feedback coming from the client will allow them to begin building a deeper rapport with the instructor. This is especially important when identifying any further needs, and any further objectives that the client wants to work on.

CLEARING THE AREA

The gym instructor should incorporate clearing away equipment that has been used, and cleaning equipment that the client has used during the session to instil a sense of gym-etiquette in them, and more importantly, to ensure that they are aware of the health and safety considerations for each exercise and piece of equipment used.



Unit 5 : Section 3

Planning and Instructing Safe and Effective Inductions

PLANNING AND INSTRUCTING SAFE AND EFFECTIVE INDUCTIONS

Gym inductions serve the function of ensuring that gym members are made aware of several key things: health and safety considerations in the gym, how to use equipment safely and effectively and how to carry out a basic gym session themselves.

Clients should be informed of health and safety information such as the location of the fire exits, where to find drinking water, and what the first aid arrangements are for the specific fitness facility. Clients should also be made aware of any specific gym etiquette such as tidying away weights and wiping down sweaty equipment after use.

There should also be some degree of pre-exercise screening taking place to ensure that clients are safe to exercise and to allow the gym instructor to set them appropriate activities. Throughout an induction, a gym instructor should monitor the intensity of their clients, ensuring that they are reinforcing good technique and posture and helping them to improve where possible. This ensures that the client is working at the correct intensity for each exercise, which allows the client to know how each exercise should feel, thus allowing them to perform the exercises on their own at an appropriate intensity.

DELIVERING SAFE AND EFFECTIVE GROUP INDUCTIONS

Often, inductions are run in groups, as this is more time efficient for the gym instructor and allows fitness facilities to build an element of social inclusion into their member onboarding process.

There are many benefits to running group inductions. Specifically, they are time efficient and they allow some clients, who may not otherwise be confident in the gym, feel a sense of 'safety in numbers'. Research also shows that social inclusion, is a significant indicator of adherence to healthier living behaviours, and group inductions are a great way to build this into the culture of a fitness facility.

There are however, several challenges that come with running group inductions. Specifically, it is harder for an instructor to adequately observe and support multiple clients at the same time. It can also be challenging for an instructor to be as watchful of each client in terms of health and safety, and at all times, the instructor must take care to ensure that they are checking client understanding of health and safety matters covered during the induction. As a group induction is less likely to result in a client being given a bespoke programme, this can mean that clients who have a specific idea of what they want to achieve may not find as much benefit of the process as others would.

WORKING WITH GROUPS

Working with groups is a different task to working with individuals; and instructor must ensure that they are adequately spreading their attention amongst all clients in attendance. Similarly, the instructor should ensure that all clients present feel welcome and valued.

The group induction should also be planned as effectively as possible to ensure that all clients are working in roughly the same area, and not spread across the gym floor as this allows the instructor to more effectively work with each client. This is also a crucial health and safety consideration as it is necessary for the clients to be in eyeshot of the instructor.



SUGGESTED GROUP INDUCTION STRUCTURE

1. The instructor demonstrates the bike and the cross trainer, with all clients observing
2. Half of the clients can use the bike to warm up, and the remaining half the cross trainer. The instructor can observe the technique adopted by the clients and correct where appropriate
3. The instructor demonstrates the chest press and lat-pulldown in succession and all clients observe
4. Half of the group will perform 6-10 reps on the chest press and the others do the same amount on the lat pulldown
5. The instructor observes both exercises and provides feedback on technique, the clients then swap and perform the opposite exercise
6. Steps 3 and 4 can be repeated for each exercise until a whole-body approach is achieved

Throughout an induction, it is key that the instructor remains alert and attentive to clients at all times. This is not only an ethical and legal responsibility in terms of health and safety, but it allows the instructor to provide a high level of service to their clients by ensuring that they are helping them improve their technique and skills where at all possible.



Unit 5 : Section 4

Programme Review and Reflective Practice

PROGRAMME REVIEW

To ensure that a client is able to adhere to their positive exercise habits and to ensure that they are getting the best out of their time, the instructor should continue to support them by agreeing long term goals with them, and setting a review date for these goals. Normally, this would take place over a 4-6 week period.

Some key areas that a goal review session can cover would be:

- How the client has progressed against the goals that they have set themselves
- How much improvement they have made in terms of the reps, sets, weight and speed that they are able to utilise during sessions
- What they have found to be easy or too challenging and what their likes and dislikes are
- Whether they have had any change in circumstance in either their personal circumstances or their medical position
- New goals should be developed and the client issued with a new programme, with agreed review dates

It is common that clients can fall away from adherence to positive exercise behaviours when they reach a performance plateau and no longer feel the same benefit or developments from training. It is therefore important to have review meetings with the instructor so that the programme can be developed and so that the client is able to achieve progressive overload consistently.

REFLECTIVE PRACTICE

Reflective practice is a critical part of a gym instructor's professional practice and the development of this professional practice over time. A gym instructor can reflect on a given session and any feedback that they have received throughout the session in such a way that they can seek to improve the way in which they approach future sessions.

If an instructor evaluates their work honestly, they will be better able to improve upon any issues identified and to ensure that they are able to work any improvements into their continuing professional development plans.

REFLECTIVE PRACTICE

When reflecting, a gym instructor should consider:

- Whether or not the exercises prescribed met the client needs and if they need to make any further changes to the client's sessions or programmes
- Evaluate the rapport built between the client and the instructor; was this effective for building client motivation?
- Whether or not the instruction style matched the client's needs and preferences

GIBBS REFLECTIVE CYCLE

The Gibbs Cycle is a commonly accepted format with which professionals can self-evaluate their performance. In order to engage with the model, the gym instructor should seek to answer the below questions and recording the results.

Description - what happened?

Feelings - what were you thinking and feeling?

Evaluation - what was good about the experience and what was bad?

Analysis - what sense can you make of the situation?

Action - If the situation arose again, what would you do differently?

IMPROVING PRACTICE

There are many ways in which an instructor can improve their practice through reflections. For example, if an instructor identifies that a client didn't work as hard as they could then they could identify several points to improve on; they could review the programme and increase the intensity of the session prescribed and they could also use different motivational techniques.

Another example would be that, even after further demonstration, that a client still cannot perform a given exercise safely and effectively. The instructor could therefore deduce that they should seek further feedback from the client at the end of sessions and that they should research further options for different exercises that the client might be able to perform correctly and safely while building up to attempting the original exercise again.

Gym instructors should then ensure that they are taking session by session observations and reflections that they have made into their professional and personal development plans.



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