Level 2 Fitness Instructor – Principles of Exercise, Fitness and Health

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Course Start Date	24 January 2021
Course Location	Home based
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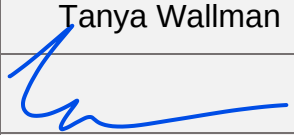
Statement of Achievement

Assessor, by signing this statement of unit achievement you are confirming that all learning outcomes, criteria and range statements have been achieved under specified conditions and that the evidence gathered is authentic.

This statement of unit achievement table must be completed prior to claiming certification.

Section	Pass/Refer	Assessor Full Name	Assessor Signature
Understanding the effects of exercise on the body and the components of fitness			
Understand how to apply the principles and variables of fitness to an exercise programme			
Understand the exercise contraindications and key safety guidelines for special populations			
Understand how to safely monitor exercise intensity			
Understand the health benefits of physical activity			
Understand the importance of healthy eating			

Learner Name	Tanya Wallman	IQA Name	
Learner Signature		IQA Signature	
Date	6 June 2021	Date	

Principles of Exercise, Fitness and Health

To pass this unit all questions must be answered correctly. If you answer a question incorrectly you will be asked to reattempt and resubmit that question.

Learner Guidance:

Pay close attention to the wording of each question:

- Identify: Label a diagram, can be a one-word answer
- Describe: Provide a short one to two-line description
- Explain: Requires more analysis to demonstrate your understanding of the topic, short paragraph.

Understanding the effects of exercise on the body

Q1

Describe two adaptions that occur in the cardiovascular system from regular endurance/aerobic training.

Reduction in blood pressure, increase in the amount of blood pumped out of a ventricle

Stronger heart muscles, reduction in resting heart rate

Q2

Describe two adaptions that occur in the respiratory system from regular endurance/aerobic training.

Reduction in resting respiratory rate

More efficient gas exchange

Q3

Identify the short term effects of exercise on blood pressure for both Systolic and Diastolic pressure.

Learner guidance: short term = during exercise

Blood vessels dilate
Blood pressure increases

Q4

Identify the long term effects of exercise on blood pressure for both Systolic and Diastolic pressure.

Learner guidance: long term = after training for several months

Reduction in both Systolic and Diastolic blood pressure. Due to the reduction in systolic, less resistance to blood flow and therefore a reduction in resting heart rate

Q5

Describe the condition known as “blood pooling” following exercise.

This occurs when exercise is abruptly stopped. Where the heart and blood vessels are delivering blood to the muscles at pace, the blood continues to be pumped into the muscle for some time. However as the muscles are no longer contracting against the blood vessels, gravity causes the blood to pool in the lower extremities which can cause sickness and dizziness and potential loss of consciousness.

Q6

Describe how regular load bearing exercise can be beneficial for the skeletal system?

Increased bone density
Decreased risk of osteoporosis
Improved joint stability
Increased joint mobility
Stronger connective tissue, improved ROM, improved posture, imrpoved co-ordination and balance, decreased risk of injury

Q7

Identify what DOMS stands for?

D	elayed
O	nset
M	uscle
S	oreness

Q8

Describe what DOMS is.

DOMS is the pain and stiffness felt in muscles several hours or days after strenuous or unaccustomised exercise. The pain is felt most strongly 24-72 hours after exercise. It is caused by eccentric contractions which causes small scale damage (micro trauma) to the muscle fibres. After the exercise the muscle adapts rapidly to prevent muscle damage which causes soreness.

Q9

Identify one exercise or technique that is particularly associated with causing DOMS.

Eccentric or lengthening contractions

Q10

Describe the short and long term effects of different types of exercise on muscle by completing the table below.

Types of exercise	During exercise	Long term
Weight training	Small tears of the muscle fibres caused by eccentric contractions	Increase muscle mass (hyperthrophy)
Cardiovascular training	Heart rate increases so that enough blood is provided to the muscles	Heart strengthens and increases therefore lowering resting heart rate as it becomes more efficient. Stronger muscles will develop

Q11

Your client has a Lordotic spine caused by weak transverse abdominis and tight erector spinae. What flexibility exercises and core stability training would you recommend to improve their posture?

Flexibility exercises:

Yoga positions - downward dog, touching toes Hip flexor stretches

Core stability training:

Sit ups, press ups, plank Four point kneeling position (superman)

Pass/Refer

Understand The Components Of Fitness

Q1

Define the six components of skill related fitness.

Component	Definition
Agility	Ability to control the direction and position in a controlled manner
Balance	Ability to control and stabilise the body whilst stationary or during movement
Reaction time	Ability to reach or respond quickly to the senses
Power	Ability to move the body parts swiftly whilst applying maximum force of the muscle. Power is a combination of speed and muscular strength
Co-ordination	Ability to apply sensory information with control of the body to make precise and efficient movements
Speed	Ability to move the body parts of the body swiftly

Q2

Define the five components of physical fitness.

Component	Definition
Cardiovascular/aerobic capacity	Use oxygen and nutrients and transport to your body
Muscular strength/muscular endurance	Ability to overcome/exert a force to move an object and ability overcome this for a long time
Flexibility	Ability to move around a range of movement at a specific joint
Balance and Co-ordination	Ability to control or stablise the body whilst stationery.
Body Composition	How your body is made up i.e fat etc

Q3

There are many factors that influence an individual's health, fitness and training potential. Identify six different factors that could affect health or skill related fitness.

	Factors that affect health and skill related fitness
1	Physical fitness
2	Mental wellness
3	Emotional wellness
4	Medical health
5	Social wellness
6	Spiritual wellness

Pass/Refer

Understand How To Apply The Principles And Variables Of Fitness To An Exercise Programme

Q1

There are various principles and variables that need to be understood and applied when designing an exercise programme. Provide a short description of how the following principles of training will be applied to your clients:

SPECIFICITY (How will you ensure your programme is specific to your clients' needs and goals?)

Learner guidance: give examples or mention SAID principle

I will understand the specific goals of my client and focus their training programme on the particular exercise or sport relating to their target for example someone who would like to acheive a marathon would be best to concentrate on running as the main activity with strength training and flexibility built in.

RECOVERY TIME (How will you determine what recovery time is required)

I would measure the Rate of Perceived Exertion during exercise and review overall balance between aerobic and anaerobic exercise depending on programme goals.

PROGRESSIVE OVERLOAD (How will you ensure overload is adhered to)

I will design a training programme that increases exertion over time to ensure that the client continues to experience physiological challenge. I will have the client do less reps (i.e. 1 rep max) and gradually increase over time and heavier weights to build muscle strength.

REVERSIBILITY (How will you prevent reversibility)

I will ensure that the the particular exercise is incorporated into the training plan to retain the benefits of the exercise.

ADAPTABILITY (How would you expect the body to adapt when subjected to specific training over time?)

Depending on clients goals I would advise the client to gradually increase the load of weight bearing activity and intensity or time of aerobic activity.

INDIVIDUALITY (What different factors could affect an individual's training performance?)

I will consider if the client is in any group of special population, their age, weight and height, body type, how much time they have to dedicate to acheiving their goal and their baseline fitness.

Q2

Explain each of the variables within the FITT principles, and how you can adapt/modify or progress each of them over time with clients.

Variables	Explanations	How you can adapt/modify or progress
Frequency	The frequency relates to how frequent an activity is undertaken ensuring a balance between the challenge asserted on the body and the rest and recovery required to ensure anaeorboc reserves are replenished, metabolic waste is removed and adaptations can occur.	Schedule enough rest between activities to ensure the body rests, or adapt training on rest days to a different form of exercise.
Intensity	This defines the amount of effort that should be invested during a session or over the entire training programme. The balance needs to be found with having the right amout of intensity in the exercise but not so much that it causes injury.	Vary amounts of intensity of exercise per week or combine high intensity with low intensity exercise during the training programme. Vary only one of the following; - The weight being lifted - The height or distance from the body that the weight is lifted - The number of repetitions of an activity in a set - The amount of rest time between sets - The length of time over which the activity is carried out - The number of sets in a session
Type	The type of exercise will be based on the goals of the client. For example aerobic activity might be selected for general improvement in health and wellbeing, whilst anaerobic training might be selected to achieve greater muscular build.	Vary the type of training between CV and anareobic depending on the type of goal
Time	The time that a particular training should be carried out will depend on goals and fitness level. Beginners of aerobic training might be advised to train at their target heart rate from between 20-30 minutes increasing to 40-50 minutes a session to ensure intensity benefits and efficiency.Time can be considered for the programme as a whole, where it is thought that six to eight weeks of training will begin to see noticeable improvement and adaption. In anaerobic training, the time periods used will depend on the type of activity and intensity as much as rules of thumb, although in general similar periods are used as in aerobic training.	Monior heart rate during training sessions and adapt training accordingly.

Q3

Give an example of when you need to regress a training programme and explain how you would do this.

If the client is injured I would regress the training and adapt the programme accordingly.

Q4

Describe the effect that the speed of an exercise has on the following:

Posture and technique	Improves posture and technque due to the muscles strengthing and giving stability to the joints.
Intensity of a CV exercise	Speed on CV exercise will push the client in to the anaerobic system if you go faster, if you go slower you reduce intensity and will unlikely make physiological changes
Intensity of a resistance exercise	If you increase weight it will build muscle strength If you increase the number of reps with a low weight it reduces intensity and works towards muscle endurance

Q5

Explain how each of the following factors affects the intensity of an exercise:

Lever Length	The longer a lever is during an exercise position, the harder it is for the muscle to contract. For example, if you raise your hands above your head when doing an abdominal curl, the pivot point from hips to finger tips is longer than if the hands were by the side.
Resistance	The greater the resistance the harder the muscles have to work in the extension or abduction stage
Gravity	Gravity may try and pull the body back. An example will be doing sit ups on the floor. As the force of gravity tries to pull the body down, the body continues to move against gravity.

Q6

Programming exercise to improve physical fitness requires a different approach to programming for health benefits. In the box below describe these differences.

Learner guidance: consider the differences between improving performance, and simply improving health

Programming exercise to improve physical fitness means the intensity should be higher i.e. increased reps, weights or length of time on CV machines. For someone who would like to improve their health the intensity would be lower with less weights and reps and would include a combination of CV and weights.

Pass/Refer

Understand the exercise contraindications and key safety guidelines for special populations

Working with any special population on a regular basis requires a full understanding of specific needs.

Q1

Describe two exercise contraindications and two key safety guidelines for working with older people (50 plus)

Learner guidance: Contraindication is a physical or mental condition or factor that increases the risk involved when engaging in particular activity. Contra means 'against'.

Contraindications (exercises to avoid)
High impact
Prone/flexion activities

Key Safety Guidelines (exercises to include)
Interval type training which allow for rest between harder bouts of exercise
Balance activities

Q2

Describe two exercise contraindications and two key safety guidelines for working with antenatal and postnatal clients.

Contraindications (exercises to avoid)
High impact exercises
Supine position exercises after first trimester

Key Safety Guidelines (exercises to include)
Interval type training
Maintenance (static) stretches

Q3

Describe two exercise contraindications and two key safety guidelines for working with young people (14-16).

Contraindications (exercises to avoid)
High impact activities
Vigorous aerobic exercise

Key Safety Guidelines (exercises to include)
Interval type exercise
Body weight training

Q4

Describe two exercise contraindications and two key safety guidelines for working with disabled people.

Learner guidance: disability include visually impaired or learning disability

Contraindications (exercises to avoid)
Visually impaired - not running on a treadmill
Learning disability - not exercising unsupervised

Key Safety Guidelines (exercises to include)
Weight training
Static stretches

Pass/Refer

Understand how to safely monitor exercise intensity

The talk test, Rate of Perceived Exertion (RPE) scale and using heart rate monitors to monitor different heart rate zones are all different ways to monitor the intensity of an exercise. In the table below describe the benefits and limitations of using each different method.

Method	Benefits	Limitations
The talk test	Doesnt require equipment	Does not give HR reading
	Can be used so client does not realise you are assessing	Does not take into account asthma or respiratory issues
	Can be used anywhere - parks, gyms, home, virtual	Only categorised into 4 categories

Method	Benefits	Limitations
Heart rate monitors to monitor different heart rate zones	It is accurate if paying money with a HR watch	Can be expensive
	Can check intensity without disturbing workout	Can be inaccurate if handcream on etc
	Can give feedback instantly	Wearing a chest band can be uncomfortable

Method	Benefits	Limitations
Rate of Perceived Exertion (RPE)	No financial cost	Client may not provide you with correct information
	Easy to explain	It doesnt provide you with a HR reading
	Easy to understand	Trainer may over or under push client

Pass/Refer

Understand the health benefits of physical activity

Q1

Describe three health benefits of physical activity.

Lower risk of depression and mental health challenges due to the increase of neuro transmitters, endorphins and endocannanbinoids

Lower risk of heart disease and stroke

Lower risk of osteoarthritis

Q2

Physical activity can have a positive impact on certain chronic health conditions. Describe the effect that physical activity can have on the following chronic health conditions.

Chronic health conditions	Effects of exercise on causes
Coronary Heart Disease	It lowers the risk of heart disease by 35%
Type 2 Diabetes	Lower risk of diabetes up to 50%
Hypertension	It reduces both systolic and diastolic blood pressure and therefore can lower blood pressure
Obesity	Exercise decreases total body fat, reducing or slowing down the risk of obesity.
Some cancers	Exercise has the effect of lowering the levels of estrogen and growth factors that have been associated with cancer development such as breast and colon.
Osteoporosis	Exercising regularly can reduce or slow the rate of bone loss which reduces the risk of fractures from osteoporosis

Pass/Refer

Understand the importance of healthy eating

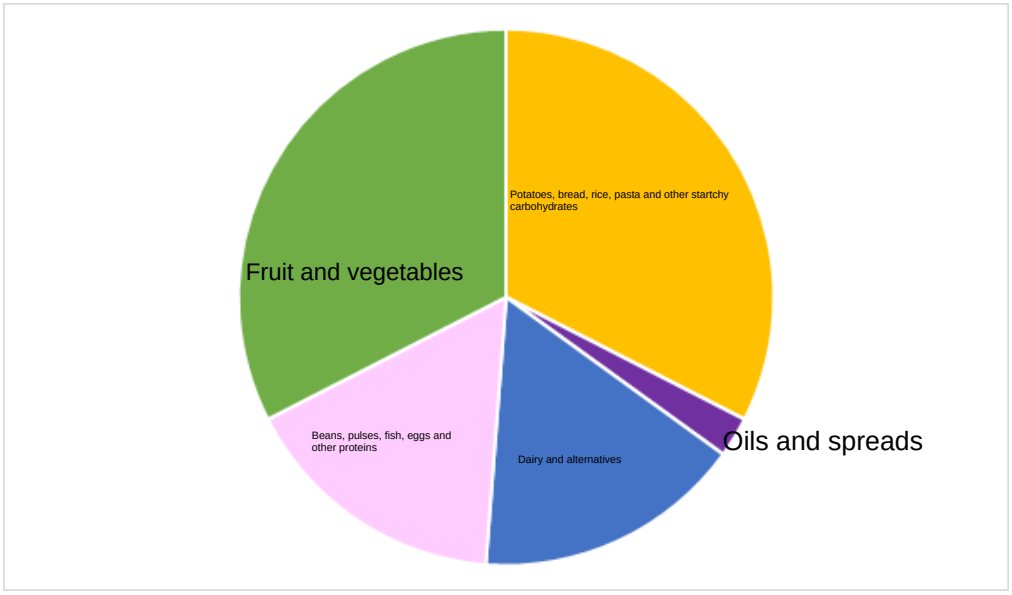
Q1

The national food model in the UK is the 'Eatwell Guide'. The model provides guidance on healthy eating for the general public and aims to ease some of the confusion that often arises when trying to plan a meal.

a) Complete the Eatwell Guide

b) Provide a short paragraph describing the national food model

a)



b) Most of us arent eating enough fruit and veg so this guide helps to understand how much of each type of food is the recommended intake.

Q2

Describe four key healthy eating advice points that underpin a healthy diet

Water is essential for temperature regulation, gas, nutrient and waste transport and metabolic chemical processes.

Marconutrients are a source of energy

Minerals help your body to build strong bones and stay healthy

Vitamins help your body to build strong bones and improve immune system

Importance of adequate hydration

Q3

An adequate intake of water is essential for life, health and performance. Explain the importance of adequate hydration.

Learner Guidance: In your answer include how the amount of water required will depend on intensity of activity and environmental temperature.

An adequate intake of water is essential for temperature regulation, gas nutrient and waste transport, metabolic chemical processes. Unlike animals we cannot gain enough water by eating fresh foods so we need to take it on seperately.

The amount of water needed will depend on how much that person exercises 0- i.e. someone who exercises vigourously will need to have 4-5 L of water per day and even more in hot weather. Someone who is more sedentry will need 2-2.5L per day.

Q4

Explain two ways you could you tell whether your client was dehydrated.

The client will become dizzy

The client will be more fatigued than normal with the unability to think clearly.

Q5

Which three populations could you not give specific or specialist dietary guidance to?

Pre and post natal clients

Children

Diabetes

Q6

For each of the answers you have provided for the previous question, explain what your professional role boundaries are and why you won't provide them specific or specialist dietary guidance.

Pre and post natal as some foods are not appropriate such as unpasteurised foods

Children's portion sizes are different to adults

Need specialist GP advice on what is appropriate to eat depending on type of diabetes.

Q7. It is important that you can show your understanding of all the components that complete a balanced diet, and the requirements of each.
Please explain the dietary role for both macro and micronutrients, and identify the requirements for them using the UK governments recommendations.

Macronutrients	Explain Dietary Role	Nutritional Requirements (%)
Carbohydrates	Carbohydrates can be broken down into glucose in the body to produce energy. In addition fibres help to get rid of excessive fat in the intestine.	50-55%
Fats	The body can use fat to produce glucose, provide a cushion to help organs from damage, produces energy, act as an insulator helping to maintain the correct body temperature, enable the body to produce vitamins A,D, E and K which are needed for good health. In addition fat contains fatty acids which help the heart and immune system.	30-35%
Proteins	Proteins can help with tissue growth and repair, oxygen transport, cell function and fighting disease.	9-12%

Learner guidance: please give a minimum of three examples of recommended daily intake of nutritional requirements for vitamins and minerals

Micronutrients	Explain Dietary Role	Nutritional Requirements (g,mg,mcg)
Vitamins	Enables us to use the energy from the macronutrients. Multi functional with major health benefits	Vit A - 0.7mg for men and 0.6mg women Vit C - 40mg per day Vit D - 15mg a day
Minerals	Multi functional with major health benefits	Sodium - 2.6mg per day for adults Iron - 8.7mg for men and 14.8mg for women Calcium - 700mg per day
Fibre	Aids digestion in the body and reduces risk of constipation.	17.2g per day for women and 20.1g per day for men

Q8 Identify the common dietary sources of each of the following nutrients:

Macronutrients	Sources
Carbohydrates	Simple sugare - milk, fruits Complex carbohydrates - such as potatos, beans, bread, grain Dietary fibres - fuit, vegetables, nuts, seeds, wholemeal food such as bread
Fats	Saturated fat - in fatty meals such as bacon, butter, eggs Monounsaturated fat - meat, olive oil and nuts Polyunsaturated fat - fish, nuts, leafy greens
Proteins	Dairy, eggs, meat, fish, nuts, seeds

Micronutrients	Sources
Vitamins	Iron - meat, poultry, fish, beans. Vit A - carrots, sweet potatoes, spinach, kale Vit B12 - meat, poultry, fish Vit E - nuts, seeds, vegetable oil
Minerals	Meat, cereals, fish, milk and dairy foods, fruit and vegetables, nuts
Fibre	Fruit, vegetables, nuts, seeds, wholemeal food such as bread

Energy Balance

Q9

Energy input and energy output can be adjusted in order to meet individual goals.

Describe the meaning of energy intake:

The total energy content of food consumed

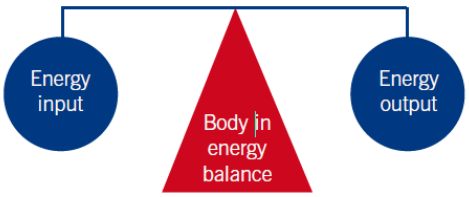
Q10

Describe the meaning of energy output:

The total amount of energy expended by the body

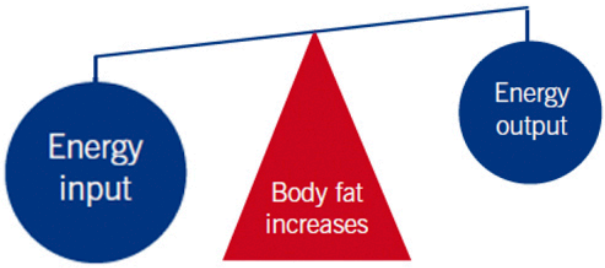
Q11

Below identify whether your clients energy balance would be positive, negative or neutral by looking at the below diagrams. You also need to describe how you came to that decision:



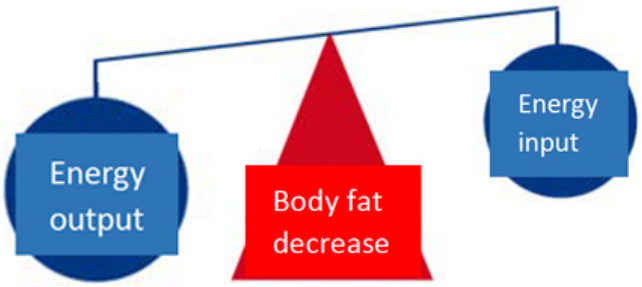
Energy balance: Neutral energy balance - maintain weight

Describe how you came to that decision: The amount of calories you eat is the same as you burn as the same quantity is the same either side.



Energy balance: Weight gain - positive energy balance

Describe how you came to that decision: The energy output is less than the input therefore you will be eating more than you will be burning and the excess calories will be stored as fat.



Energy balance: Weight loss - negative energy balance

Describe how you came to that decision: Output is more than input i.e. the body will be burning more calories than eating therefore the body fat decreases

Pass/Refer

Assessor Feedback

Assessor Feedback