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

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Course Start Date	
Course Location	
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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	Kasper Nico Raphael	IQA Name	
Learner Signature		IQA Signature	
Date	22/10/2020	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.

regular aerobic training increases the thickness of the walls of the heart, which enables the heart to provide more powerful contractions.

the compartments of the heart increase in size, which means greater volumes of blood

Q2

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

breathing rates increase, meaning more air is enable to move in and out of the lungs. the lungs also increase their tidal volume (the air that moves in and out of the lungs with each respiratory cycle)

additional capillaries form in the lungs. this enables greater blood flow over time.

Q3

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

Learner guidance: short term = during exercise

in general systolic blood pressure will go up during exercise, because more blood needs to be pumped around the body to activate the skeletal muscles. diastolic pressure generally tends to decrease as the arteries vasodilate.

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

people with a normal blood pressure experience little to no change. hypertensive people however (high blood pressure) will find that their blood pressure reduces to a more normal level as they do more exercise, due to a reduction in total peripheral resistance within the artery. This means both the systolic and diastolic pressures are lower.

Q5

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

when suddenly stopping exercise, the blood continues to be pumped into the muscles for some time, because the heart and blood vessels have increased the delivery of blood to the muscles. however, when abruptly stopping exercise, the muscles are no longer contracting against the blood vessels, which causes blood to pool in the lower extremities because of gravity. this can result in dizziness, sickness and even loss of consciousness.

Q6

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

repetitive loading can stimulate the growth of new bone tissue, which increases bone density, making for stronger bones.

Q7

Identify what DOMS stands for?

D	delayed
O	onset
M	muscle
S	soreness

Q8

Describe what DOMS is.

DOMS is the soreness or pain felt in muscles after exercise. it is felt most strongly between 24-72 hours after exercise (with a peak usually around 48 hours after training). it is thought to be caused by lengthening (eccentric) contractions; they cause micro trauma to the muscle fibres. the muscles will work hard after exercise to prevent muscle damage, which can result in soreness in the muscles.

Q9

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

eccentric exercises are particularly associated with DOMS, because they cause more micro trauma to the muscles.

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	increase of blood flow to skeletal muscles. fast twitch fibres activated	increase in power. muscle hypertrophy
Cardiovascular training	increase of blood flow to skeletal muscles. slow twitch fibres activated	muscular endurance improves

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:

we want to loosen up the tight erector spinae and strengthen the joints in the back in general. we can achieve this by doing a variety of stretching exercises. the client could do some dynamic stretching exercises to loosen and warm up the muscles and do static active stretching after careful warm up to further help loosen the erector spinae.

Core stability training:

the transverse abdominis is very important in stabilizing the core and thus the overall posture. to strengthen it I would let the client start by doing a sit-up variation that they feel comfortable with and a plank; making sure the erector spinae is not used to hold the plank but instead the core muscles.

Pass/Refer

Understand The Components Of Fitness

Q1

Define the six components of skill related fitness.

Component	Definition
agility	the ability to change and control the direction and position in a controlled manner.
balance	the ability to control or stabilise the body whilst stationary or during movement.
reaction time	the ability to reach or respond quickly to the senses
power	the ability to move the body or body parts swiftly while applying the maximum force of the muscles. Power is a combination of both speed and muscular strength.
co-ordination	the ability to combine sensory information with control of the body to make precise and efficient movements.
speed	the ability to move the body or parts of the body swiftly.

Q2

Define the five components of physical fitness.

Component	Definition
cardiovascular and cardiorespiratory fitness	the ability to efficiently use heart, blood vessels and blood to pump enough nutrients, oxygen, hormones and cellular waste around the body. the body's ability to absorb oxygen, take in air, and transport oxygen to the muscles and the muscles ability to use and absorb oxygen whilst exercising.
muscular endurance	the ability of the body to repeat certain tasks/exercises over a prolonged period of time
muscular strength	the ability of the body to generate the muscles' maximal force for one repetition
flexibility	the ability to bend and move parts of the body within their range of motion/ to what extent the joint allows movement
body composition	every individual has a different body composition in terms of fat, bone, lean tissue and fluid. the body composition should be taken into account when designing a training program.

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	age
2	gender
3	diet
4	body type
5	illness
6	pregnancy

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

every clients' body and goals are different. say if someone wants to for example train their ability to cycle longer, than cycling would need to be included as cardio to train general fitness and cycling fitness, but also exercises that help enhance the muscles that are helpful in cycling, eg the quadriceps, glutes, hamstrings and calves. they could be trained in an explosive training program to be useful specifically for cycling. if a client wants to grow more overall muscle, a program in the hypertrophic rep range would be more helpful.

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

the recovery time that is required depends on the frequency of the work outs and the split that is implemented in the week. the actual adaptations in the body because of training happen in between the workouts in the recovery phase, not during. if a client is willing and able to train 3-4 times a week than a week of training could look like the following: upper body - lower body - rest - upper body - rest - lower body - rest. clients who have been training for longer could have different recovering times than someone who is just starting. recovery time in terms of during the workouts depends on the rep- and set range that is implemented; rule of thumb if the weight is higher and the amount of reps lower than it is generally better to have a longer rest. usually between 30-90 seconds.

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

to ensure progressive overload is adhered and the client keeps progressing, the exercises in the program will increase in weight over time. this is to ensure the stress placed on the body grows gradually, meaning the body will keep adapting and progressing. clients who are just starting out tend to see more progress in the beginning weeks of the program than later on. this usually will increase motivation and it is important that both trainer and the client can see an overall improvement in the area where it was set as a goal.

REVERSIBILITY (How will you prevent reversibility)

the client is prone to see the gained adaptations disappear if a certain type of training is halted. it is important the client stays motivated and keeps on top of regular exercise. one way reversibility can be prevented is by ensuring that progressive overload is adhered to in the program, so the client will keep seeing improvements in fitness.

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

every type of training has a different effect on the body. if for example a client is running long distances multiple times a week, a growth of bone density can be expected as well as improvements in the cardiovascular and cardiorespiratory fitness.

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

there are a range of factors that need to be included when designing a training program. there is no one program that fits every persons goals and needs. age, gender, physical ability, illness and body type all affect an individual's training performance and these (and more) factors should be taken into consideration when designing a unique program.

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	this refers to the amount of times a workout or exercise is repeated. for example the amount of times a muscle group is trained or the amount of times a type of cardio workout is done every week.	aerobic workouts can be repeated more often, with less recovery time in between workouts than anaerobic. heavy lifts like the bench press should not be done every day to allow for proper recovery, whereas light running on a treadmill could be done every day
Intensity	intensity defines the amount of effort that should be invested in a training session or during the entire program.	determining intensity again depends on the type of workout and a balance is needed to constantly challenge the client without making them unnecessarily tired and risk injury. in aerobic training, heart rate is usually a good guide to measure intensity, in anaerobic training it can be measured in for example the weight being lifted or the number of sets in a session.
Type	the goals a client has before starting a training program define what type of exercises fit best.	for example if a client wants to boost overall health and fitness, a program incorporating more aerobic could be beneficial, while a client wanting to build more muscle mass would benefit more from a more anaerobic based program.
Time	time defines how long each training session should last. this depends on the client.	beginners in both aerobic and anaerobic training need to takes things a bit slower than more advanced clients. usually it would be good to start with about 20-30 minutes of cardio and progressively building that up to about 40-50 minutes a session. in anaerobic training the time per session depends on the exercises undertaken and the intensity, but as a rule of thumb the same duration can be held as when doing aerobic training.

Q3

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

when a client is overtraining and therefore negatively impacting their fitness or health, regression may be needed. this could be done by for example lowering the frequency of workouts per week or lowering the time of each training session. regression should be introduced smoothly and not done too abruptly. another example of regression is by taking some time of the session to do a proper warm down, this way the blood does not pool and the body can return to a good resting state

Q4

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

Posture and technique	when doing an exercise too quickly this may negatively influence posture and technique because the form of the exercise is hindered by doing it too quickly. a controlled motion is better to be able to have a proper technique and form.
Intensity of a CV exercise	if an exercise is done too quickly it may increase the heart rate too much. if an exercise is done too slowly it may not increase the heart rate enough to where it is beneficial. a good intensity of workout is needed to improve CV.
Intensity of a resistance exercise	if for example the weight is too high and therefore the form drops, this can cause injury. training always needs to be monitored carefully and the trainer needs to make sure the intensity is at a good amount.

Q5

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

Lever Length	the longer a lever is, the harder it will be for the muscle to contract. for example when doing a bicep curl, if holding the arms further away from the body the lever length will be higher meaning it will be harder to do the exercise
Resistance	the muscles will have to work harder when resistance is increased. for example when doing a leg press, the body will need to work harder under higher resistance as weight is increased
Gravity	any exercise can become more difficult under influence of gravity. if for example when doing leg lifts, this will be harder when hanging off a bar than when lying on the floor.

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

doing any exercise will generally improve overall fitness and be beneficial for health. working with a heightened heart rate will over time improve cardiovascular and respiratory fitness. when exercising to improve physical fitness more factors are important; the goals a client has, focussing on progressive overload and specifically training certain body parts of muscle groups to achieve the specific goals for each individual program.

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 intensity anaerobic exercise (could cause fractures)
high intensity stretching

Key Safety Guidelines (exercises to include)
functional activities that are useful in everyday tasks (eg practicing standing up and sitting down)
balancing exercise

Q2

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

Contraindications (exercises to avoid)
high impact exercise - can damage foetus and mother
no exercise lying on their back (after the second and third trimester of pregnancy)

Key Safety Guidelines (exercises to include)
core stability exercise
balance exercise

Q3

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

Contraindications (exercises to avoid)
heavy resistance training (maximum weight training)
prolonged high intensity training

Key Safety Guidelines (exercises to include)
interval type exercise
body weight training eg push ups, pull ups etc

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)
exercise that exceed the range of motion a client may have
any exercise that may be impeded by sensory nerve impairment

Key Safety Guidelines (exercises to include)
exercise that improves cardiovascular and respiratory fitness
exercise that help improve a client's range of motion

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	does not require any equipment	does not give a heart rate reading
	can be used without the client noticing you are monitoring them	does not take into account asthma or respiratory issues
	can be used at any location and time	only categorised in a few categories of intensity

Method	Benefits	Limitations
Heart rate monitors to monitor different heart rate zones	most accurate monitoring (with expensive equipment)	can be inaccurate when using cheaper equipment
	measures intensity without disturbing the client	heart rate monitoring device required
	gives feedback instantly	expensive

Method	Benefits	Limitations
Rate of Perceived Exertion (RPE)	doesn't cost anything	can be inaccurate
	does not require any equipment	the trainer may over/under push client
	easy for client to understand	does not give heart rate reading

Pass/Refer

Understand the health benefits of physical activity

Q1

Describe three health benefits of physical activity.

reduces the risk of coronary heart disease, strokes and type 2 diabetes

reduces the risk of osteoarthritis (joint disease)

reduces the risk of depression and dementia

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	regular exercise increases cardiovascular fitness; it lowers heart rate and enables the heart to pump more blood around the body which can stop blockages in the coronary arteries which can cause coronary heart disease
Type 2 Diabetes	regular exercise reduces weight and excess fat, which reduces the chances of getting type 2 diabetes
Hypertension	regular exercise can lower blood pressure, which reduces the risk of hypertension
Obesity	regular exercise will help with weight loss which can stop obesity from occurring
Some cancers	research has shown that exercise can reduce the risk of certain cancers, like colon and breast cancer
Osteoporosis	regular exercise strengthens the bones and promotes the production of new bone cells, which can halt osteoporosis

Pass/Refer

Understand the importance of healthy eating

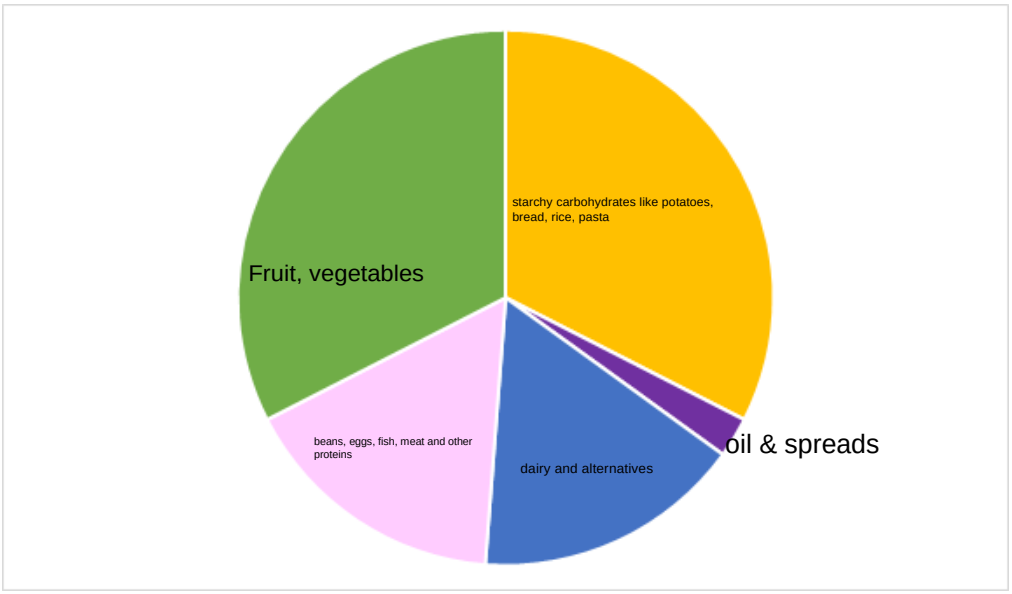
Q1

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) meals should be based around starchy foods and contain ideally a type of lean protein. plenty of fruit and vegetables should be eaten every day. the FSA recommends to eat at least one portion of oily fish each week. meals should not contain too much saturated fats as they can clog our bodies. Eat no more than 6g of salt a day for adults. Stay active while also eating healthy to maintain a good healthy weight. Drink plenty of water (around 2-2.5L every day). Do not skip breakfast, as this is the first meal of the day and prepares our bodies for the day. in total adult males should eat around 2550 calories a day, whereas females should eat around 1950.

Q2

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

Eat plenty of fruit and vegetables. They contain important minerals and vitamins and also fibre, which are all important to maintain a healthy body.

Do not eat too much saturated fat or sugars. They can cause unwanted weight gain and too much saturated fat can even clog arteries

Eat enough proteins. Fish are a good source of protein and omega. Meat and dairy products, and nuts and pulses all are good sources of protein. Protein is important in the growth, repair and a range of other metabolic processes in the body.

Drink plenty of water, but not too much. Water helps with temperature regulation, nutrient and gas transports and metabolic chemical processes. A sedentary individual should drink around 2-2.5L of water every day, while someone undertaking exercise should drink around 4-5L.

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.

The body needs plenty of water to function properly. Water helps with temperature regulation, nutrient and gas transports and metabolic chemical processes. A sedentary individual should drink around 2-2.5L of water every day, while someone undertaking exercise should drink around 4-5L. In warmer weather the body sweats out more water so more intake is required to quench this thirst. the body will tell us when it is dehydrated when we get thirsty.

Q4

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

Dizziness and fatigue - when a client seems unsteady on their feet or for example suddenly is incomprehensive this could be a sign of dehydration

Dry lips and mouth - the client may suddenly be overly thirsty and feel weak, this could mean they are dehydrated

Q5

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

a client with health issues the instructor is unfamiliar with

if a client uses medication the instructor is unfamiliar with

if a client has weight problems - either weighing too much or too little

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.

as a trainer you don't have a full understanding and insight in the clients medical records. this means that you cannot give any dietary advice as this might hinder their health problems. professional advice should be sought from either a dietician or doctor

you can advice a client on what is generally accepted as healthy eating guidelines, however if a client is on certain types of medication that have a direct impact on what they can or can't eat, this should be discussed with a professional

if a client is for example obese or has an eating disorder, they will need more specialist advice from a doctor or dietician. you can still tell them about the importance of a balanced diet and the importance of sufficient vitamin and mineral intake.

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 are the main source of energy in our bodies. once they are broken down in the body they are stored in the form of glucose, which is transported in the blood to wherever the body requires energy. Some glucose is stored in the liver and muscles for direct use. Too many carbs can cause diabetes	Minimum 50-55
Fats	Fats are a more concentrated form of energy storage in the body; it can be broken down into glucose however this process is more difficult than with carbs. Fats are used to produce energy when carb and protein are exhausted.	Maximum of 30-35
Proteins	protein is important in the growth and maintenance of muscle. it can also be used by the body to generate energy. protein are broken down into amino acids, which can be used to construct particular proteins that the body needs for specific functions. protein is also used in oxygen transport.	Minimum of 10-15

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	the body requires many different types of vitamins to function properly. some organs need certain types of vitamins.	vitamin A: respectively 0.7mg and 0.6mg for men and women per day. vitamin C: 40mg a day for adults vitamin D: 15mg a day for adults
Minerals	calcium, sodium and iron are examples of important minerals the body needs in daily food intake. calcium for example is needed for strong and healthy bones.	sodium: 2.6mg a day for adults iron: 8.7mg for men and 14.8mg for women calcium: 700mg per day for adults
Fibre	fibres are not broken down by the body. they help with digestion and pushing food through the intestines. some foods rich in fibre include rice, bread and certain vegetables	the RDA is between 18g to 30g per day

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

Macronutrients	Sources
Carbohydrates	potatoes, pasta, rice, bread; starchy foods
Fats	fish, butter, meats, nuts, oils
Proteins	meat, fish, beans, dairy, soy

Micronutrients	Sources
Vitamins	vegetables, fruits, seeds
Minerals	dairy, vegetables
Fibre	fruits, nuts and seeds, vegetables

Energy Balance

Q9

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

Describe the meaning of energy intake:

the amount of calories a person ingests daily

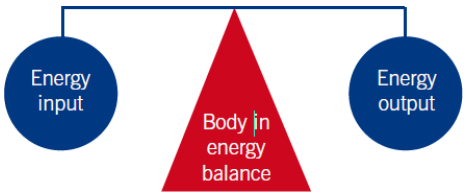
Q10

Describe the meaning of energy output:

the amount of calories burned by a person daily

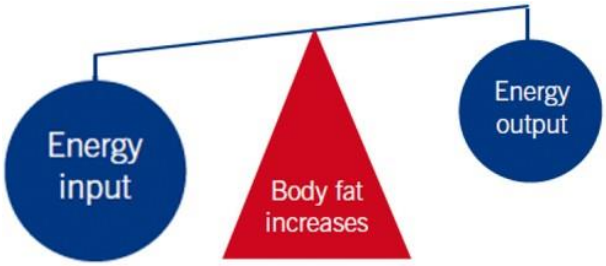
Q11

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:



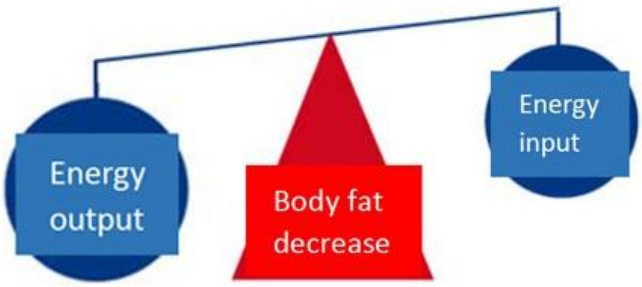
Energy balance: neutral

Describe how you came to that decision: the energy input and energy output are the same, meaning the body energy is in balance this balance means the body weight will generally be maintained



Energy balance: negative

Describe how you came to that decision: the amount of calories ingested is higher than the amount of calories burned.
this means the body has excess energy left over which may be stored as fat in the body.



Energy balance: positive

Describe how you came to that decision: the calories burned is higher than the amount of food ingested.
this means the body will eventually start to use up excess fats in the body which will drop body fat percentage.

Pass/Refer

Assessor Feedback

Assessor Feedback