**Level 3 Food Science and Nutrition CPD Autumn 2015**

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Handout A

**Unit 1 Planning to meet nutritional needs - Sample External Assessment**

**Section C case study** *(exemplar response taken from QCF unit 1: controlled assessment, Distinction)*

1. Analyse Rhiannon `s profile to determine her current and future nutritional needs.

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*Learners would not be able to analyse the sample diet in the examination to this extent*

As shown in the figure above Rhiannon’s diet is very unhealthy and she is a massive percentage over the RDA for all of the nutrients, this is due to her very high carbohydrate, fat and sugar diet. A calorie intake like this would only be suitable for someone who was extremely active, such as an athlete, but even then they would not get their calories from the same nutrients as Rhiannon. She is not a particularly active person, she would be classed as sedentary, and an intake like this is not healthy at all.

When you break down her daily diet you can clearly see where she is going wrong, first thing she goes for white bread and jam, both of which are very high in sugar levels, she also has butter on her toast meaning there is a significant amount of fat and saturated fat in her breakfast alone. Although this does provide a high amount of unhealthy nutrients, it does have some carbohydrate and fibre value, not enough however, to fill her up for a long while and give her sufficient energy to last until lunch.

For this reason she goes for quite an early lunch (12 pm) that is far less than minimal and nutritious. She has a BLT baguette; this is high in proteins, complex carbohydrates, fats, salts and sugars; however it does also provide a significant amount of fibre and some vegetables, which is a positive. If this was the only high fat thing she ate at lunch it would be an ok lunch, however the BLT is then followed by a packet of crisps (high salt, fat, carbohydrate levels) and a chocolate bar (high sugar, fat, carbohydrates). She then washes her meal down with Cola which is also high in sugar and fats. These are all high in the least valuable of the nutrients and the energy provided from a high sugar lunch like this would not be sufficient to last until dinner time.

Due to her ‘fast burning’ energy lunch she then reaches for further chocolate and a cup of tea with semi-skimmed milk and 2 sugars at around 3 pm. This adds more ‘fast burning’ energy foods to her day, they would give her an energy boost for a short period of time due to the high sugar and fat levels in them. All of this snacking is not helping her weight issues, and it also raises the issue that the more she eats, the more she needs to eat as her body gets used to regular snacking, this would make it harder for her to stop snacking, or miss a snack throughout the day.

For dinner she would then have a whole meat feast pizza to herself and chips. This is not good for two reasons; firstly pizza and chips are full of carbohydrates, fats, salts and sugars which add to her nutritional intake for all of these nutrients. More importantly, she has a second portion of red meats which are very high in protein and should not be eaten every day, so should definitely not be eaten twice in the same day. This makes her protein, fats, sat fats, sugars and salt intake dangerously high; she then has a two glasses of wine with and following her meal. Wine is also very high in fats and sat fats and sugar so is also very unhealthy, not to mention it can be addictive, this means that uncontrollable amounts can be consumed, Rhiannon admits that she does consume a lot more of weekends, which would increase her caloric intake further on weekends.

When you pick her diet apart like this you can see just where she is going wrong, she consumes far too many ‘fast burning’ energy resources, this lack of energy shortly after eating causes her to snack between meals. This increases her caloric intake greatly and a good start would be to remove unhealthy snacking between meals, if she does require a snack it should be a healthy snack that will provide energy in a healthy way.

She must also seriously reduce her alcohol intake as two large glasses of red wine a night is a lot of alcohol and based on the usual %vol of 14%vol, 14 units and 4 large glasses per bottle, she is drinking half a bottle of wine and 7 units per night. This is extremely unhealthy as the recommended units per week for a woman are 14 and 2-3 units a day maximum, Rhiannon is drinking half her weekly allowance of alcohol a night. This kind of alcoholism is not only borderline alcoholic, but it is also very bad for her body and can lead to problems such as weight gain, bad skin, tired eyes and, more dangerously, CHD, Liver failure and other illnesses caused by alcohol abuse. This is because she is consuming over 500 calories in alcohol a day, which is fat and saturated fat, such consumption, can cause the major arteries to clot or collapse due to an increase in blood pressure, this can then cause things such as a stroke and, if the clot happens in the heart, complete cardiovascular failure causing a heart attack that is potentially fatal. To prevent this Rhiannon needs to limit her alcohol consumption to one glass a night maximum, and it was be better for her health if she stopped drinking every night, if she reduced her drinking to 2-3 nights and less alcohol consumption on those nights, her health would increase, her weight would decrease and her skin and arteries would recover well.

The other main issue with Rhiannon’s diet is her complete lack of five a day; she doesn’t have a well balanced diet at all. The only hint of fruit and vegetables she ate were in her BLT and they would not be enough to class as two individual portions of five a day. She needs to increase her five a day by either snacking on fruit and vegetables during the day if she requires a snack, or she should incorporate portions into her meals, she could incorporate one into each meal and have two fruit and vegetable snacks and then she will get her five a day, increase her ‘long lasting’ energy sources, which will fill her up for longer, and also decrease her calorie intake. All of these things come from having a well balanced diet. She also has next to no calcium consumption, the only calcium is in her tea, and that would not be enough for a portion. A lack in Calcium may not show at her young age, but as she ages her bones will weaken due to a lack of calcium and she could end up with bowed legs, fragile bones and aches and pains, she will have to increase her calcium intake, especially if she starts exercising because she will need strong bones to prevent injury during exercise.

Those were the issues with nutrients Rhiannon lacks, however there are nutrients Rhiannon eats a dangerous percentage more than recommended. The average intake of daily carbohydrates for a woman should be 193g; however Rhiannon has 579g of carbohydrates a day! That is 219% of the RDA! This amount of carbohydrate intake is extremely unhealthy, and as carbohydrates assist in weight gain this is also the reason she is overweight. She also only tends to eat simple carbohydrates which are easy to break down and store in the muscles as glycogen, therefore these type of carbohydrates are ‘fast burning’ and would not provide energy for very long, the lack of energy so quickly after eating will also cause an energy ‘crash’ this would make Rhiannon want to eat more simple carbohydrates. To reduce carbohydrate intake and increase energy levels Rhiannon needs to eat more complex carbohydrates, this is because it takes longer for the digestive enzymes to break down and store complex carbohydrates as glycogen meaning the consumer would receive more energy from less carbohydrates. It is vital that Rhiannon reduces her carbohydrate level as a carbohydrate level like this can lead to poor blood sugar level control, weight gain and brain fog. Poor blood sugar level control is when the consumer eats a food high is refined carbohydrates such as cake, this will then cause a sudden increase in insulin to try and reduce your blood sugar levels, insulin then stores all the carbohydrates in the blood as fat causing weight gain as well. After a spike like this in insulin the consumer has the risk of developing hypoglycaemia, or low blood sugar levels, due to the overproduction of insulin. This has really negative effects on the body and especially on the cardiovascular system, and can also lead to type 2 diabetes for many people if it isn’t dealt with efficiently. The other problem caused by this fall of blood sugar levels is ‘brain fog’ or in other words the decrease in cognitive function. The neurones in the brain suffer greatly from this sudden drop in blood sugar and can stop functioning efficiently; this can lead to the consumer feeling confused, anxious and spaced out. For all of these reasons it is vital that Rhiannon gets her carbohydrate type and intake under control quickly, as the repercussions can be severe when she gets older.

Rhiannon should focus on a low GI+GL diet, therefore reducing the number of carbohydrates she takes in a day. However, when considering the new diet plan she may need more medium GI+GL foods to provide the energy for their new exercise regime.

Another thing Rhiannon over consumes is Protein, the average women should aim for 45g of protein a day, Rhiannon consumes 167g a day, that is 367% of the RDA of protein! Proteins are a requirement of a well balanced every day, however the main problem with proteins are that they often contain very high levels of Saturated Fat, Cholesterol and Sodium which is very dangerous for the cardiovascular system, this also shows in Rhiannon’s diet as she has 85g per day which is 329% of the RDA for saturated fat, this shows that Rhiannon is overeating her proteins to a very dangerous levels. An intake like this on a daily basis will not only led to weight gain, but it can also lead to potentially fatal diseases such as heart, liver, kidney and cancer disease. However this is mainly due to the high levels of sodium, cholesterol and saturated fat in animal proteins, to minimise

All of this overeating means that Rhiannon has a daily Caloric intake of 4845 Kcal which is 230% of the RDA for calories! This kind of caloric intake would only be acceptable in someone who lived an unusually high activity level life such as a sportsman, however Rhiannon lives a sedentary life and would only burn around 88 calories an hour at work (calorie lab), so if she worked from and eight hour shift as you usually would in a shop, she would burn around 704 calories a day, which is not a sufficient amount when put into comparison with her diet. She does not have a strenuous job and should therefore not need as much energy as she takes in every day; this is what is causing her weight gain and unhealthy lifestyle.

One final important issue to consider when designing Rhiannon’s diet plan is her anaemia. Anaemia is a deficiency of Iron in the blood, Iron is important as it aids the production of red blood cells and haemoglobin, both of which are vital for the transportation of oxygen around the body. Anaemia has many side-effects, some of which Rhiannon is already getting, these are: fatigue, energy loss, weakness, dizziness, heart palpitations, shortness of breath and a pale looking complexion. If Rhiannon does not increase her Iron intake and therefore cure her anaemia, she may begin to suffer from all of the symptoms, making her everyday life more difficult. For this reason it is vital that Rhiannon’s diet must include plenty of Iron on a daily basis.

Rhiannon has a BMI of 23.8 which is on the high side of healthy weight, so if she targets her eating problems now she will be able to maintain a healthy weight.

Hypercholesterolemia (high cholesterol) – Cholesterol are lipids referred to ad LDL’s and HDL, if you have too many of these in your blood it can lead to fatty build up in your arteries and serious health conditions such as CHD. Someone with high cholesterol should have a low fat diet to help lower their cholesterol and minimise their chances of serious illnesses like CHD or a Stroke.

Again an illness such as this is often a self inflicted illness caused by a consistently unhealthy diet and lifestyle. Rhiannon runs the risk of developing this on her current diet plans. She needs to cut down on fatty and sugary foods and therefore minimise her fat and sugar intake.

Rhiannon is technically within the healthy BMI for her height and age, however judging by her previous diet, this would not have lasted. A healthy weight for Rhiannon to be is within 55-68 Kilos, she is already 65 so she is healthy for her height and age; however she needs to stay like this to reduce her risk of diseases and illness due to weight and diet. Rhiannon has a BMR of 1499 calories per day; this must be taken into consideration when planning her diet and caloric requirements for the day. To be successful in her weight loss Rhiannon needs to do the following things:

* Eat a well balanced diet
* Reduce her sugar and saturated fat intake
* Increase her Iron intake
* Increase her complex carbohydrate intake
* Eat 5 fruit and vegetables every day
* Reduce portion sizes
* Aim for 1,974-2,217 calories per day, including weekends
* Reduce her alcohol intake to 2-3 medium glasses per week
* Cut out fizzy drinks
* Drink at least 9 ½ pints of water on non exercise days (79 Oz)
* Drink at least 12 pints of water on exercise days (101 Oz)
1. Produce a 3 day dietary programme for Rhiannon with 1 day being on the weekend.
2. Justify your dietary plan in relation to fitness for purpose.

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| Day 1 (working day and workout day) | Consumption |
| 7 am | Porridge with Strawberries, Bananas and Semi-skimmed milkOrange Juice (unsweetened, not from concentrate, with pulp) |
| 12 pm | Potato salad with spinach and chickenEight baby tomatoesSmall bag of mixed fruit and nuts (35g, unsalted)Water |
| 5 pm | Red berry Special K barWater |
| 8 pm | Fish Pie (Salmon, Cod, Peas, Roux Sauce, potato topping, a little cheese) – with Broccoli and CarrotsLow fat YoghurtWater |

Due to Rhiannon’s workout today it is very important that she drinks her 12 pints of water to stay hydrated and increase her metabolism. She must remember to take a water bottle in the gym when she does her workout, and in a 45 minute workout she should really refill it once during her workout. This will ensure she replaces any water lost through sweat.

**7 am –** Porridge oats contain plenty of nutrients, including fibre and a little iron, these are a great start to a healthy day, and the milk should be semi-skimmed to give Rhiannon the calcium benefits without the fat. Adding a whole small banana and 6 chopped or mashed strawberries to her porridge is a great way to incorporate natural sugars to her breakfast, making it healthier. It also adds a lovely flavour and counts as two of her five a day. The orange juice will give Rhiannon a great source of Vitamin C, especially with pulp; it also counts for one of her five a day. Having a breakfast like this that is full of complex carbohydrates will fill Rhiannon up for longer and provide her with enough energy to last until lunch with no snacks.

**12 pm –** An early lunch will prevent Rhiannon from snacking between meals, that is why she should eat her lunch at 12pm. Potato salad with spinach and chicken will provide Rhiannon with complex carbohydrates, iron, protein and a minimal amount of fat from the light mayonnaise used to make the potato salad. This will aid her anaemia as well as give her plenty of energy. The eight baby tomatoes will give Rhiannon another one of her five a day as well as giving her a little fibre from the skin and some hydration from the water content. The bag of fruit and nut will give Rhiannon some more natural proteins and a little natural salt; it will also give her more complex carbohydrates to give her energy to last the rest of the day. She should accompany this meal with at least one pint of water to hydrate her after the nuts as well as add to her daily water requirement.

**5 pm –** A special K bar with red berries will give Rhiannon a good energy boost just before the gym, as well as fibre, complex carbohydrates and a little sugar with very few calories. This will ensure she performs her best when she is in the gym. Rhiannon should also drink a pint of water with her bar. This has to be at five so that she has time to digest and absorb the nutrients before going to the gym; this will ensure she gets the energy in time as well as preventing her from feeling ill during her workout.

**8 pm –** Dinner should be at eight because this gives Rhiannon reasonable time to get home and cook it as well as ensuring her metabolism is at its best for digestion and absorption of food an hour after exercise. The fish pie will provide Rhiannon with omega 3, zinc, mercury, a little salt, calcium, complex carbohydrates, iron and a little fat. This covers a lot of her daily nutrient requirement in as little calories as possible as well as aiding her anaemia with the peas as well as the broccoli accompaniment. The carrots will provide her with vitamin A and the cheese will provide her with some calcium. Rhiannon will then follow this meal with low fat yoghurt of her choice; this will provide her with some calcium and some sugar. To wash it down she should drink at least one glass of water, this will ensure she is well hydrated after this meal.

Rhiannon needs to ensure she is drinking between these meals and snacks as well to fill her daily water intake requirement. This will not only keep her hydrated and maintain her metabolism, but it also reduces hunger, as sometimes when you get a feeling of hunger it is actually thirst, this will hopefully help prevent Rhiannon from snacking between meals.

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| **Day 2 (working day without workout)** | **Consumption** |
| 7 am | One boiled egg and one piece of lightly buttered wholemeal toastOrange Juice (unsweetened, not from concentrate, with pulp) |
| 12 pm | Beef, Tomato and Coleslaw wholemeal sandwich Medium bananaWater  |
| 5 pm | Small bag of mixed dried fruit (35g)Water |
| 8 pm | Cheese topped chicken fillet – with peas, sweet corn, carrots and a small portion of riceLow fat yogurtWater  |

**7 am –** Boiled egg is a great way to get some healthy proteins first thing in the morning and eaten with wholemeal toast will include plenty of complex carbohydrates to keep Rhiannon full and full of nutrients and energy until her next meal. Accompanied with a glass of orange juice will give Rhiannon one of her five a day as well as a good source of vitamin C for the day. This breakfast will keep Rhiannon full of energy and prevent snacking before her next meal.

**12 pm –** an early lunch will ensure that Rhiannon does not snack between breakfast and lunch. Beef will provide lots of nutrients for Rhiannon as well as giving her some meat variety, this is important as different meats contain different nutrients. Tomato will give her another one of her five a day and the coleslaw will add some flavour and texture as well as adding some nutritional value from the vegetables. The wholemeal bread will provide Rhiannon with lots of complex carbohydrates as well as fibre to keep her energy levels high for a long period of time as well as filling her up for longer. Having a banana to follow her sandwich will provide fibre, potassium and another one of her five a day. It will also give her a naturally sweet ‘dessert’ and fill her up more. The water will ensure Rhiannon keeps well hydrated and keeps her metabolism up.

**5 pm –** a small bag of mixed dried fruit will provide Rhiannon with some more natural sugars and enough energy to keep her going until dinner, this will prevent Rhiannon from snacking on the wrong kinds of snacks. It will also provide Rhiannon with lots of fibre which will be good for her digestive system as well as iron to aid her anaemia. Dried fruit is very good as the drying process locks in all the good nutrients at a more concentrated rate as the water is all removed, this will provide Rhiannon with lots more energy.

**8pm –** Rhiannon has not had very much calcium in today’s menu so far, so it is very important that she gets her RDA in this meal, this is why she is having a chicken fillet topped with cheese as this will provide Rhiannon with lots of protein and calcium, the vegetable accompaniment will provide 2 more portions of her five a day and the rice will provide a little salt and more fibre. Having a yogurt to follow will not only please Rhiannon’s sweet tooth, but it will also provide more calcium to her day. To wash all of this down another glass of water will rehydrate her and increase her metabolism.

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| **Day 3 (weekend day)** | **Consumption** |
| 10 am | 1 chicken sausage, 2 rashes of bacon, 2 poached eggs, small portion of baked beans, grilled tomatoes and 6 grilled mushroomsOrange juice (unsweetened, not from concentrate, with pulp) |
| 3 pm | Unsalted mixed nutsAppleWater  |
| 7 pm | Tuna pasta bake (tuna, spinach, cheese, pasta tubes, tomato puree and chopped tomatoes)Mixed salad sideChocolate puddingWater  |
| 8 pm | 1 glass of Red Wine |

**10 am –** after a long week of dieting it is important to have a day for enjoyment in a healthy and balanced way. Having breakfast at 10 am will allow Rhiannon to have a good lie in before her day begins. This also means she will have less hours in the day to eat and can therefore have a bigger breakfast. For Rhiannon’s healthier full English breakfast she will have a chicken sausage (grilled) as poultry contains less fat and grilling it ensure no fat is added, Rhiannon can also have two small rashes of bacon as two rashes will not contain too many calories but will have some iron content. Giving Rhiannon poached eggs can ensure that nothing is added to the eggs during cooking as poached eggs are boiled without their shell. To incorporate some fruit and vegetables her breakfast will also include some tomatoes, beans and some mushrooms as this will give her some of her five a day and well as lots of fibre. To accompany this large breakfast should be a glass of orange juice as this will provide Rhiannon with vitamin C and one of her five a day. A nutritious and filling breakfast like this will mean that Rhiannon will not need an actual lunch; this means the extra calories at breakfast will not affect her daily caloric intake.

**3 pm –** having a pack of unsalted mixed nuts will provide Rhiannon with sufficient complex carbohydrates to provide energy until her dinner, this will prevent her from snacking between meals. Nuts also contain protein, fibre and iron; this means Rhiannon will get a good amount of nutrients from a fairly small snack. Having a glass of water with this meal will ensure that Rhiannon stays hydrated and also will help maintain her metabolism.

**7 pm –** Tuna pasta bake can be packed full of nutrients if it has the correct contents. The tuna will provide omega 3, iron and a little salt, spinach is a great source of iron so will aid Rhiannon’s anaemia; cheese is full of calcium, whole grain pasta will provide lots of energy from the complex carbohydrates and the tomatoes will count as one of Rhiannon’s five a day as well as providing fibre and some moisture. When served with a green salad this meal will count for 2 of Rhiannon’s five a day. The perfect diet should always include a little of what we shouldn’t have, this is why Rhiannon can have chocolate pudding on this one day a week, this is because she will have eaten little enough calories to allow this as well as pleasing her personal requirements as well. A glass or two of water to drink will provide hydration and boost metabolism.

**8 pm –** allowing a glass of wine on weekends is a healthy habit, this means that Rhiannon can drink if she goes out with her friends, but she will just have to limit her drinks.

**The Nutritional needs of Specific Groups**

At Rhiannon’s age, and during the teenage years, it is very important to eat healthily as these are the vital years for growth and development. This often becomes a difficult time as teenagers often do not eat with their parents and are therefore fully nutritionally responsible for them selves, as Rhiannon is. Teenagers should eat a well balanced, healthy diet that contains lots of complex carbohydrates, calcium, fruit and vegetables, proteins, fibre and plenty of water, they should also limit sugar intake, but this is often difficult due to peer pressure. Teenage girls should be sure to have high iron intake, as during the teenage years is when their body begins its menstrual cycle which very commonly leads to an iron deficiency and Anaemia, this could be the cause of Rhiannon’s anaemia. This diet with regular exercise is the ideal for people of Rhiannon’s age, as it will aid their development and growth in a healthy and efficient way.

As Rhiannon enters adulthood she needs to maintain a healthy diet with plenty of healthy, balanced nutrients. She will also need to maintain an active lifestyle and limit her weight gain to remain within the healthy limits for her height and age. Rhiannon will also need to limit her alcohol intake to the recommended two to three units per day; this will prevent her from developing any potentially fatal cardiovascular diseases as well as keeping her weight down. It is also beneficial for adults to take supplements, but not an official requirement. It is a great way to ensure that Rhiannon is getting all of the nutrients she needs every day on top of all the ones she will be eating in her healthy diet.