

# Food Studies Assignment | How to do it

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## Food Studies Assignments | Overview

**When to do it:** The assignments are common to both higher and ordinary level and account for 20% of your overall mark (80 marks), therefore they must be given sufficient time and consideration. Most of the work for these should be completed by the end of 5<sup>th</sup> year so that all you need to do is transfer your completed and corrected drafts into the official booklets when they arrive to your school in October of 6<sup>th</sup> year, with the deadline for completion usually immediately following the mid-term break. Students should avoid leaving the assignments to be done in September of 6<sup>th</sup> year, as this leads to missing valuable class time and potentially falling one month behind in their other subjects, something which is not uncommon for students who do not stay on top of these assignments.

**How to do your research:** Each year there are 6 assignments given with 5 of these to be completed, each one concerning a different aspect of food science and/or health issues on your course. Although these topics change each year, some are regularly repeated. For this reason, it is important to research the focused topics in depth as there may be resources available to you i.e. marking schemes on the SEC website and sample assignments such as the ones found on Studyclix. Do not limit your research on the topic at hand to merely your Home Economics text book. Use a range of different websites and books where possible to ensure a well-rounded and in-depth knowledge of each topic.

**Understanding headings:** Often students fail to understand the headings of each section, and as a result the information they give is insufficient. It is crucial to understand fully what is required in each section of the booklet if you wish to receive a high grade in this area

**Investigation: Analysis and Research** is the most important section in your coursework journal as it accounts for 30 marks. 20 marks go for initial research using a range of sources, 4 marks for 2 possible solutions, 4 marks for 2 reasons for choosing your solution, and 2 marks for naming 2 different sources. Students often overlook this as an easy part of the task, however they often fail to meet all requirements. You must analyse in depth what is being asked of you in the assignment title for your research section. Consider all possible solutions to the task, and why each one would be a good solution. For example, for a task dealing with the preparation of a meal for an adult suffering from coronary heart disease, you must consider the nutritional value of each ingredient which you will include in your meal. Do not simply say I will use chicken instead of beef as the main ingredient as it is lower in cholesterol. Instead, consider which foods will lower cholesterol (nuts, peas, salmon, etc.). The inclusion of as many relevant ingredients in your recipe as possible, rather than only 1, will make you stand out to the examiner as an A student who understands fully the requirements of the task.

**Preparation and Planning**, the second section accounts for just 6 marks and is more to help the student themselves to carry out the task. They must name the dish, source of the recipe and give the date of the practical. Ingredients must be listed in order of descending quantity, with prices to be worked out for the quantities used. For example, if you buy a packet of 4 chicken breasts for €5 but only use 2 in your recipe, then price this in the relevant column as €2.50. Make sure to practice your dish before your practical in class so that the key equipment section is accurately filled in, avoiding any issues on the day. For the work plan, make sure to say pre heat oven to 160 degrees Celsius etc. if you will be using an oven, or if you are frying vegetables or meat make sure that you say to pre heat the oil before adding food. These are common errors made and will lose a student easy marks. List all steps in a logical sequence, preferable in a numbered layout. Neatness and clarity in the coursework journal are essential. You should finish the work plan with “serve dish, wash up and evaluate”.

**The Implementation section** is very important, accumulating to 28 marks. Marks are often lost heavily here quite easily due to students not including all requirements. Essentially, the student should repeat what they have said in the work plan, but expanding on each point and discussing why they did each step. The explanations must be detailed, justifying all actions. It will not be very impressive to an examiner if a student does not know why they did what they did. Expand

each point out fully with 2 or 3 comments on each step to impress and ensure a high grade. Ensure each step is in order and that you include the cooking times and temperatures. Don't forget to discuss the presentation of your dish, your wash up and that you finished the task with an evaluation. You must state clearly 2 key factors in your task, i.e. 2 things that were essential for the success of your dish. This could be to ensure you preheated the oven to avoid an unevenly-cooked cake or that you made sure to preheat the cooking oil to avoid soggy vegetables. Again, you must justify every statement you make. Finally, you must include 1 safety and 1 hygiene factor, each worth 2 marks with justifications.

**The evaluation** is worth 16 marks and is split into 2 parts; an evaluation of what you did (8 marks) and an evaluation of the specific requirements of the task (8 marks). For the first part, include a discussion of the texture, colour and taste of the dish, 1 difficulty that came about, 1 thing that you learned, 1 thing you could improve on and a comment on how you knew the dish was ready. For the second part, look at the task title again and comment on how you feel your chosen dish suitably acted as a solution to the requirements. Give several points here on different aspects of the dish to ensure you give enough information to satisfy the 8 mark total. Each time you make a statement, keep thinking why you did / choose something and you won't go far wrong.

# Sample Area A Assignment 1 | Investigation: Analysis/Research

**Nutritional requirements:** This assignment is asking me to cook and serve a cheap, healthy, well balanced meal that all family members will enjoy. The family that I will be cooking for will have two children aged 7 and 10 and two parents in their forties. Each member of the family has different dietary needs, and for this reason I must be careful with which ingredients I chose to use.

**Protein:** As the most important nutrient, it is crucial for the children's growth and repair of cells, and also the repair of the adult's cells.

**Carbohydrates:** These should consume around 1/3 of the serving plate because they are necessary for energy. The children will have a recommended intake of 1700-2000 calories and adults in the range of 1800-2800, depending on activity, gender, age and other contributing factors. The main course must provide a large amount of this energy intake to maintain a balance of energy input and energy output.

**Fat:** An emphasis should be put on unsaturated fats. I will also consider the healthy eating guidelines, which recommend reducing salt, fat and sugar, as well as increasing fibre in our diet. All of these apply to the family which I will cook for.

**Vitamins:** Vit A (Retinol) - healthy eyes, B1 (Thiamin) - heart, B2 (Riboflavin) - growth, B3 (Niacin) - skin, B5 (Pantothenic Acid) - metabolism, B6 (Pyridoxine) - healthy immune system, B7 (Biotin) - hair, B9 (folic acid) - growth and repair, B12 - nervous system, Vit C (ascorbic acid) - general health, Vit D - bones, Vit E (Tocopherol) - antioxidant, Vit K - blood clotting and bones.

**Minerals:** Iron for transporting oxygen in the blood through haemoglobin, calcium for strong bones. I will consider all of these requirements when selecting the dish that I will cook.

**Meal Planning Guidelines:** The modern family faces many issues; Due to the recession, people have less money to spend on buying ingredients. They may also have less time to spend making the main meal of the day. For this reason I will avoid cooking an expensive, time-consuming dish such as steak. It must also be quick and easy to make, as the family members may have little time in their busy schedules. It must be well balanced because it is crucial that the main course supplies all or most of the nutrients that we need.

## **2 possible solutions: Shepard's pie / Pasta and chicken bake**

I have chosen to make a pasta and chicken vegetable bake because it is a well-balanced, low budget meal. It appeals to the whole family and provides them with all the key nutrients which they need. The pasta provides carbohydrates supplying energy to the family and most importantly the growing children. The protein in the chicken is important for the children's growth and also to the parent's repair of cells. The tomatoes, carrots, peppers, asparagus and chillies provide vitamin A, vitamin C and vitamin E. The carrots also provide vitamin K, potassium, phosphorus and magnesium. These are all needed to keep the immune system strong, healthy skin, bones, teeth, and growth and repair of the body. The cheese provides calcium, and the olive oil keeps the heart healthy. The chillies, tomatoes, and garlic are also disease-fighting antioxidants. This meal is extremely nutritious, suitable for a low-budget and is very appealing and tasty. It has an essence of the Mediterranean and I think it is far nicer than a more traditional dish like Shepard's pie.

### ***Preparation and Planning***

Ingredients:

200g penne pasta – 85c

1 tbsp olive oil – 5c

2 garlic cloves – free

2 small red chillies – 20c

1 red pepper – 49c

50g asparagus – €1

2 carrots – 30c

1 tin chopped tomatoes – 69c

Mixed herbs – 5c

2 chicken breasts - €2

50g feta cheese – 50c

Sprinkle of parmesan cheese – 10c

Total cost = €6.23

### **Equipment:**

3 Pots

2 Waste bins

2 Table spoons

### **Cutlery plate**

2 Chopping boards

2 Sharp knives

Fork

Pasta drainer

Slotted turner

Casserole dish

Serving spoon

Serving plate

### **Work sequence/time allocation:**

Gather equipment and lay out ingredients

Preheat oven to 160 degrees Celsius

Boil water in pot and cook pasta for 10 minutes simmering

Cut and chop vegetables, add to heated oil in another pot and cook for 5 minutes

Meanwhile heat oil in pot and brown chicken when hot

Add chopped tomatoes, mixed herbs and some water to vegetables then stir in chicken

Drain pasta and add to chicken and vegetables

Place in dish in a preheated oven, cook for 35 minutes

Top with cheese

Serve and evaluate

### **Implementation**

The first thing I did was preheat my oven to 160 degrees Celsius because an oven must be hot before you use it. I half-filled a pot with boiling water from the kettle to speed up the process and set the hob to mark 5. As soon as it was boiling there, I added the water, reduced the temperature to 3, half-covered the pot and then allowed it to simmer, stirring occasionally. I cut my vegetables in particular ways to improve appearance and also to avoid waste. I cut the carrots in thin chunks to make sure they cook quickly. I cut the peppers in long, thin strips and cut the asparagus in halves. I thinly and carefully chopped up the garlic clove into minuscule pieces, and the chili into small strips. I had to ensure that no chili seeds remained as they are very dangerous and could even make you blind if they got near your eyes. I washed my hands both before and after dealing

with the vegetables for hygiene reasons and also safety reasons, regarding the chili seeds. Then I sliced the chicken into chunks with a fork and sharp knife. I cut the chicken on a special chopping board to avoid cross contamination, and also washed it immediately after use as well as my hands. In 2 separate pots, I heated up some oil. When hot, I sautéed the vegetables and browned the chicken separately for hygiene reasons. I drained off excess oil from the chicken before adding to the vegetables to reduce the fat content of the meal. I added in the chopped tomatoes and herbs at this stage as they need little heating. I threw in some water for some moisture in the sauce. I then mixed everything together after draining the pasta and stirred everything into the large dish. Then I put the dish in the oven and baked for 35 minutes. I put a piece of tin foil in between the dish and lid to retain moisture. I added the cheese after baking it so that it melts in subtly and adds to the presentation and flavour.

1. Safety factor: I took special care to remove all the chili seeds and I washed my hands after disposing of them to avoid the risk of burning my eyes or skin.
2. Hygiene factor: I washed my hands before and after handling the raw chicken and I washed the sharp knife, fork and chopping board I used with hot soapy water to avoid cross contamination and diseases such as salmonella. I also made sure the chicken was fully browned and cooked by putting a few pieces in half to check the inside.

## **Evaluation**

**Colour:** It is a colourful dish, with red, orange and green vegetables. The garnish of cheese enhanced the presentation and added further flavour and texture.

**Flavour:** The flavour was nice with a subtle spice from the chili. The vegetables each added their own element of flavour to lighten up the bland pasta. The chicken was very tasty due to

**Texture:** The texture was creamy and smooth, and the vegetables were slightly crunchy. The pasta was soft and the chicken was smooth and tender.

**Issues & Improvements:** Everything went as expected during the making of this meal, however next time I might use more chili or different herbs to give it even more flavour. I planned everything well in general, so there was no time wasted and I knew what I was doing, using the time allocations effectively. I would also cut the carrots in strips like the pepper to make them cook even quicker and improve the appearance, and I could also serve it with some mixed salad to provide more vitamins and minerals.

**Analysis:** My pasta and chicken vegetable bake turned out very well. I didn't over-bake it in the oven so the moisture and sauce were retained. Overall my meal satisfied the brief well:

1. It was a very tasty, healthy, well balanced, and does not take a long time to make. It provides all nutrients needed in a main meal for a family and a variety of vitamins and minerals which are essential.
2. It is a low budget meal and works out very cheap for each person so it is perfect for the modern family. I think it would be enjoyed by the whole family due to its colour, flavour and easiness to eat.

## Sample Area A Assignment 2 | Investigation: Analysis/Research

**Risk factors:** There are many risk factors associated with poor cardiovascular health. These include hereditary, stress, unhealthy diet, obesity, smoking, excessive alcohol inactivity, high blood pressure, high cholesterol and diabetes. One or more of these factors may cause the small blood vessels that supply blood and oxygen to the heart to narrow, due to the build-up of fatty substances in the arteries.

**Nutritional requirements:** It is crucial that people who suffer from heart disease are aware of their nutritional needs and follow a healthy, well balanced diet. Protein is the most important nutrient; however people with poor cardiovascular health must be extremely careful. Focus on vegetable proteins, nuts and cereals especially. They need to reduce saturated fats from animal meat. Unsaturated fats from vegetables and fish oils are better because they contain low density lipoproteins which remove cholesterol from the arteries. Avoid eating visible fat and processed snacks. They need to reduce sugary carbohydrates and increase dietary fibre instead. Make sure to balance this diet with 2 litres of water a day for optimum health. Vitamins and minerals are needed for general body function.

**Meal Planning Guidelines:** Taking all of the nutritional requirements and meal planning guidelines into consideration, I have chosen to make a chicken stir fry with wholegrain rice and assorted vegetables. Chicken provides low fat protein which is ideal for healthy cardiovascular health. The cashew nuts also provide low biological value protein. Wholegrain rice is high in fibre, needed for slow release energy. Vitamins A, B, C, E and K can be found in the selection of vegetables: red pepper, carrot, mange tout, garlic, baby corn. The minerals potassium, phosphorus and calcium can be found in coconut milk and carrots. Iron is in the mange tout and cashew nuts. Overall this meal is well balanced and contains 3 out of the 4 food groups. It is perfect for somebody suffering from a heart disease as it complies with all the necessary guidelines. I will drizzle the dish lightly with low-salt soy sauce because it is quite high in sodium, and also some coconut milk. It will add flavour, forming a sauce, and improve the presentation of the meal.

### Menu:

Breakfast: porridge with mixed berries, orange juice, yoghurt

Lunch: wholegrain tune and cheese sandwich with mixed vegetable soup

Dinner: chicken stir fry with wholegrain rice and vegetables

I have chosen a chicken stir fry because it is perfect for someone suffering from heart disease as it is low in salt and it is also a well-balanced, attractive and tasty meal. It provides all key nutrients required.

### **Preparation and Planning**

#### **Ingredients:**

125g wholegrain rice – 32c

2 tbsp olive oil – 5c

1 garlic clove – 5c

2 chicken breasts - €3

1 red pepper – 99c

25g mange tout – 50c

2 carrots – 26c

25g baby corn – 50c

20ml coconut milk – 10c

50g cashew nuts – 10c

10ml soy sauce – 20c

Total cost = €6.07 for 2 people, €3.04 each

#### **Equipment:**

1 Pot

2 Frying pans

2 Waste bins

2 Table spoons

Cutlery plate

Knife

Fork

2 Chopping knives

Slotted turner

Serving spoon

#### **Work sequence/time allocation:**

Gather equipment and lay out ingredients

Boil water for rice, cook for 25 minutes

Heat oil and add chicken when hot, cook until browned

Cut and chop vegetables

Add vegetables to heated oil in another pot and cook for 10 minutes

Drain excess oil from chicken and add to vegetables, add cashews

Drizzle with light soy sauce and coconut milk with a bit of water

Serve and evaluate

## **Implementation**

First, I half-filled a pot with boiling water from the kettle to cook the rice. I did this to save time as wholegrain rice takes at least 25 minutes to cook. It is high in fibre so it must be cooked for longer than basmati or long grain rice. It is crucial that the oil in the frying pan is heated and sizzling before I add the garlic. If I had added it in before the oil was hot, the vegetables and chicken would have soaked it up and become soggy. The fat content would also become higher as I wouldn't be able to drain off excess oil. I cut the carrots, pepper and baby corn in long slim strips so that they cook quicker and to improve presentation. I sliced the mange tout in half diagonal for further added textures. I cooked the chicken separately to ensure that it was fully browned to avoid any risk of food poisoning or illness. I made sure that it was completely cooked by cutting a piece in half when I thought it was ready and making sure that it was properly browned. Then I drained off excess oil and added it to the vegetables so that I could mix in the sauce all together. I drizzled in the soy sauce and stirred in the coconut milk with some water to keep the dish moist and tasty. When I served the dish, I put the rice on the plate first so the sauce would go over it. I presented the vegetables in an artistic way in the centre of the rice to improve presentation. Finally, I drizzled over the left over sauce for flavour.

## **Key Factors:**

- Heat oil before vegetables and chicken are added to avoid them becoming soggy
- Make sure the brown rice is cooked for the right amount of time to avoid a dry, overly grainy texture

## **Safety / hygiene:**

- I must ensure that I chop the vegetables correctly and safely to avoid an accident
- I must wash my hands both before and after dealing with the chicken and take care with the equipment to avoid cross contamination

## Evaluation

Implementation: My dish turned out extremely well and had a delicious yet subtle flavouring with varying textures. Everything was cooked perfectly for the right amount of time, and I presented it nicely with the vegetables and chicken on top of the rice, drizzled in some sauce.

Colour: It was very colourful due to the range of vegetables I chose; red peppers, yellow corn, green mange tout, orange carrot, as well as white chicken and brown rice.

Texture: The rice was perfectly cooked, as was the chicken. The vegetables were well-cooked, slightly soft and crunchy. The sauce was light and creamy.

Flavour: Subtle flavouring from the soy sauce and coconut milk. The rice was quite high in fibre however the flavour of the vegetables made it pleasant. The peppers were juicy and sweet. The chicken was very tasty.

Specific requirements of the assignment: If I was to make this meal again, I would avoid using the coconut milk as, even though I used only a tiny amount, it contains saturated fat. Instead I might substitute it for a spice such as paprika to add extra flavouring. I might also put a garnish such as some parsley on top to improve the presentation. Other than that, my meal was perfectly suitable for someone suffering from heart disease. If a diet similar to my sample menu was followed, a person's cardiovascular health would improve sufficiently, along with other lifestyle changes.

## Sample Area B Assignment 3 | Investigation: Analysis/Research

Gelatine is a colourless water-soluble glutinous protein obtained from animal tissues such as bone and skin. It is used as a gelling agent in food, cosmetic manufacturing and pharmaceuticals. It is found in many jelly-like sweets as well as marshmallows, ice cream, cheesecake and yogurt. Household gelatine comes in the form of sheets, granules or powder. Instant types can be added directly to food as they are, others need to be soaked in water prior to use. Gelatine is an irreversibly hydrolysed form of collagen (proteins). Different forms of gelatine exist to meet the needs of those wishing to use alternatives to meat products for various reasons.

### Types of Gelatine

Unflavored Gelatin - a thickening agent with no taste, colour or odour. Used to stabilise whipped cream, pie fillings, custards, cheesecakes and trifles. The granulated form and sheet form are most widely available and used in home baking.

Isinglass - a type of gelatine extracted from the air bladders of certain fish, particularly sturgeon, but is rarely used these days. A cheaper version has also been developed from cod. It is not often used, but in the past was used in confectionary such as fruit jellies.

Carrageen - also known as Irish moss, a thickening agent derived from red algae seaweed which grows off the coast of Ireland, often used in making homebrews and meads. Used as a stabiliser and thickener in processed foods, milk products and ice cream. Not as widely available as ordinary unflavoured gelatine, but is suitable for vegetarians.

Agar – also known as kanten and Japanese gelatine, a dried seaweed sold in blocks, powder and strands used as a setting agent. Agar has stronger setting properties than gelatine, so less is needed when substituting. Used as a vegetarian gelatine in jellies and confectionery. It comes from agarophyte red algae and is popular in Asia for use in baking.

Pectin – occurs naturally in fruits and vegetables and is used in the preparation of jams, jellies and preserves. Can also be extracted from fish bones. Available in a solution or powdered form.

### How gelatine is used

Gelatine is extracted from the bones and hooves of animals which have been purified and dried. Gelatine is colourless, odourless and tasteless. It can absorb large quantities of hot water to form a solution. When this solution cools it sets as a gel – known as gelation.

Powdered gelatine - Sprinkle the granules of gelatine over cold water. Do not dump them in a pile as the granules in the middle won't dissolve. Allow to stand for 5-10 minutes. Add warm liquid or heat gently, stirring until dissolved. To verify the granules are melted, lift the stirring utensil and make certain that there are no undissolved granules clinging to it.

Sheet gelatine - Soak sheets of gelatine in a bowl of cold water for 5-10 minutes. Once soft, lift the sheets from the water. Wring gently to remove excess water, and then add to warm liquid stirring until dissolved. If adding to a cold mixture, melt the softened sheets in a saucepan or microwave over very low heat, stirring just until melted completely. Then stir into the cold mixture gradually.

### **Dishes that illustrate the use of gelatine**

Gelatine is used in many semi-solid dishes including: Cheesecakes, mousses, soufflés, marshmallows, puddings, panna cotta, jelly, pies, ice cream, and yogurt

### **Ensuring success when using gelatine**

To ensure the success of a recipe, use 15g of gelatine to 500 ml of liquid. Add the gelatine to either cold or warm water, ensuring that it is not boiling as it will lose its gelling power. Dissolve it by stirring in a bowl over gently simmering water. Use when the solution is clear. Keep gelatine dishes refrigerated until ready to serve to maintain their gelatinous state and avoid spoiling. Do not add fresh or frozen pineapple, raw figs, kiwifruit, ginger root or papaya to gelatine, as these fruits contain an enzyme called bromelain which breaks down gelatine causing it to lose its thickening properties.

2 possible solutions: Strawberry cheesecake, vanilla panna cotta

I have chosen to make a strawberry cheesecake:

1. Gelatine is used in the preparation
2. It is a tasty, popular dish

### *Preparation and planning*

#### **Ingredients:**

175g digestive biscuits, finely crushed – 73c

75g butter, melted – 40c

120g strawberries, hulled and halved - €3

300g Philadelphia cream cheese - €3.38

150g castor sugar – 20c

2 gelatine leaves, softened – 35c

150ml double cream, whipped - €1.45

150ml natural Greek yoghurt - €1.25

Total cost: €10.76

**Equipment:**

20cm spring form cake tin

Baking parchment

Rolling pin

2 mixing bowls

Side plate

Electric whisk

Spoon

Fork

Sharp knife

Chopping board

2 jugs

Saucepan

**Work sequence/time allocation:**

- Grease and line the base of the tin
- Mix the crushed biscuits and melted butter together and press into the base of the tin
- Chill in the fridge for several hours
- Heat up most of the strawberries with 75g castor sugar and 2 tablespoons of water in a saucepan until soft
- Allow the gelatine to soften in cold water for 5 minutes, drain water then add to the strawberries to dissolve

- Beat the cream cheese and remaining sugar in a mixing bowl until smooth
- Add the cooled strawberry and gelatine mixture and beat again
- Add the yoghurt and double cream, folding in until thoroughly combined
- Pour over the biscuit base and chill for a minimum of 6 hours
- When ready, place the remaining strawberries on top to decorate
- Serve and evaluate

### ***Implementation***

I greased the tin well with some butter and lined the base with parchment paper to avoid it sticking during setting. I crushed the biscuits into tiny pieces by putting them in a sealable plastic and using a rolling pin to make them even. I melted the butter in the microwave as this is fast and easy. I mixed this with the biscuits straight away to form a moist mixture. I combined both together until the butter was evenly distributed. I patted the mixture down firmly into the tin to form a solid base. I made sure that the fridge was a temperature between 1.7 and 3.3°C before I placed the tin in it to allow the base to harden. When this was set, I began to make the cream cheese mixture. I heated up the strawberries on the hob with castor sugar and water to let them soften and melt gently. I put the gelatine in a jug of soft water to soften in before I melted it. This is effective when using leaf gelatine so that it works efficiently. When soft I stirred it into the strawberries until dissolved completely. In a bowl I beat the cream cheese and remaining sugar until a light smooth consistency was obtained. Then I added the cooled strawberry and gelatine mixture making sure to combine everything well so that the gelatine would be successful. I then folded in the yogurt and double cream until combined evenly. When I was happy with the texture I poured this mixture on top of the biscuit base and gave it 6 hours to set in the fridge. When it was ready, I sliced 2 strawberries in slivers and decorated the top of the cheesecake. I was able to remove the side of the spring form tin so that the base of the tin remained as a serving platter also. It was easy to serve as the gelatine allowed the cheesecake to set.

### ***Evaluation***

#### **(a) Implementation**

Colour: Vibrant light pink colour with a light golden brown base. The colours were very appetising and contributed to the overall presentation.

Flavour: It had a very fruity taste and the strawberry was a perfect acidity. It was refreshing and not too bitter. The base was light and complimentary to the fruity mixture.

Texture: The crunch of the biscuit base enhanced the rest of the cheesecake, adding varying textures. The cream cheese part became firm but remained its slightly bubbly and foamy constituency.

Issues: Before I added the cream cheese mixture the tin I was using almost became loose. It is important to ensure that spring form tins are closed properly to avoid the mixture from spilling out before it is set. The flavour could have been enhanced further with more fruit, flavourings or decorations.

Solutions: I would make sure that my tin is secured fully in the proper position before beginning. I would add in some blueberries and blackberries for more variety. I could use some melted white chocolate or mint leaves to improve the presentation further.

My strawberry cheesecake suited the task perfectly and displayed the uses of gelatine well. My preparation of the gelatine was successful which resulted in the cheesecake having the correct texture and prevented it from remaining a liquid or from collapsing. This allowed me to cut and serve slices easily with a knife.

**(b) Advantages of using gelatine:**

- aids in improving the metabolism
- Beneficial for athletes - helps to improve muscle growth
- Beneficial to the skin - hydrolysis of collagen protein - a substance that constitutes about 33% of our bodies and makes the skin firm and smooth
- Beneficial to hair and nails – for growth as well as keeping hair shiny and nails strong
- Makes you feel full
- Improves digestion - naturally binds to water and helps food move more easily through the digestive track

**Disadvantages of using gelatine:**

- Against certain religious beliefs due to originating in pigs and fish
- Unsuitable for vegans
- Some children may be allergic to gelatine
- If not prepared correctly, it may spoil and lose its gelatinised texture
- Loses its stability easily

# Sample Area C Assignment 4 | Investigation: Analysis/Research

Pickling is a process of preserving food by either anaerobic fermentation in brine to produce lactic acid, or by marinating and storing it in an acid solution such as vinegar. This procedure gives the food a salty or sour taste. They are stored in jars and have a variety of uses.

## Types of Pickles

There are a wide range of vegetables that may be pickled as a form of preservation. Soft-skinned vegetables including cucumbers, cabbages, beetroot, olives, red cabbage, onion, peppers are placed in a brine solution. It may also contain salt, water and spices. There are other types of pickles which may be made:

**Dill** - the most popular type of pickle, made with dill oil, herbs, and spices such as mustard, pepper, and garlic. Dill pickles are unfermented and have a less sour taste. Kosher dill pickles are made with garlic, giving them a much stronger taste. Overnight dill pickles are a bright green and less acidic because they are made over a short period of one or two days without as much vinegar.

**Bread and Butter** – has a distinct sweet, tangy taste. They are usually cut into thin slices and added to sandwiches and burgers.

**Gherkins** – usually much smaller than other pickles, and can be dill or sweet. Most often used as garnishes or to enhance the flavour of sausages or pates.

**Half Sour** – without vinegar, they are refrigerated throughout the entire pickling process and are pickled for a shorter period of time. They are known for being firm and crunchy and are commonly eaten on sandwiches.

**Sour** – remain in the pickling process much longer than other pickles. The longer cucumbers remain in the brine, the sourer they become. They are less crispy than half sour pickles, but they have a much stronger taste.

**Sweet** – candied pickles that are usually packed in a heavily-sweetened liquid or syrup.

## Preservation

The jar and lid are first boiled in order to sterilize them. The fruits or vegetables to be pickled are added to the jar along with brine or vinegar, and are then allowed to ferment until the desired taste is obtained. The food can be pre-soaked in brine before transferring to vinegar. This reduces the water content of the food which would otherwise dilute the vinegar. This method is particularly useful for fruit and vegetables with a high natural water content.

## Possible problems

1. Pickles are too soft and slippery – vinegar too weak or an insufficient amount of brine. Use vinegar of at least 5% acidity and keep the vegetable immersed in the brine to avoid this.
2. Strong, bitter taste – too much vinegar, dry weather or spices being cooked for too long. Use the correct acidity vinegar and reduce the amount of spices used.
3. Shrivelled pickles – Brine too strong, overcooked or dry weather. Avoid by following a reliable recipe exactly.
4. Dark or discoloured pickles – Minerals in hard water, ground spices, iodized salt or the use of brass, iron copper or zinc utensils. Use soft water, whole spices, pickling salt and glass or stainless steel utensils during preparation.

Possible solutions: Pickled beetroot, pickled cucumber

I chose to make pickled beetroot 1. Because it is easy and cheap to make and 2. Because it has many uses and is quite popular.

## Preparation and Planning

### Ingredients:

1 raw beetroot – 60c

200mls white vinegar - €40c

Total cost = €1 per jar

### Equipment:

1 Pot and lid

1 chopping board

Sharp knife

Gloves

Jar

**Work sequence/time allocation:**

Gather equipment and lay out ingredients

Place beetroot in a pot of cold water and bring to the boil

Simmer for roughly 3 hours

Put on gloves and remove beetroot from the pot

Place on a chopping board and rub off outer skin layer

Slice finely and evenly and place in jar

Bring vinegar to the boil and pour on top of the beetroot until jar is full

Seal with the lid and evaluate

**Implementation**

I sterilised the jar to ensure it was clean and safe to keep the pickled beetroot in. I washed it thoroughly with soap and warm water to prevent bacteria or food poisoning. I immersed the beetroot in cold water and made sure there was enough water so that it would not dry out during boiling. I covered the pot with a lid to retain heat. I heated it gradually on a hob with the handle turned inwards to avoid an accident. Once the water reached boiling point, I reduced the heat and allowed to simmer for a couple of hours until soft. When the beetroot was cooked and the water was purple I removed the pot from the heat and drained off the water. I plunged the beetroot quickly into cold water to allow it to cool before it started to bleed. I then removed it from the cold water and cut off the root tips & stems. I wore gloves to avoid the beetroot staining my hands. I also wore an apron and took precautions with my clothes as their colour dye is very strong. I gently rubbed off the outer skin of the beetroot with my hands by rubbing it with a circular motion. It comes off easily because it has been softened for the correct amount of time. I then removed my gloves and disposed of them immediately to avoid making a mess with the beetroot juice. With a large sharp knife I sliced the beetroot into thin and even strips and placed them directly into the heated jar. I heated the jar in the oven prior to adding the pickle solution because a hot food or liquid should always be placed in a heated container. Meanwhile, I boiled the vinegar in the pot until it reached the boil. I then poured it into the jar until all of the beetroot

was covered in the vinegar and the jar was full. This is crucial to ensure the preservation of the pickle. I sealed it securely with a lid to avoid spillage.

Safety factor: I took care when using the sharp knife and kept it away from my hands to avoid an accident.

Hygiene factor: I sterilised the jar thoroughly to minimise bacteria and avoid the risk of food poisoning.

## **Evaluation**

Implementation: My pickled beetroot was very simple yet tasty. The texture was smooth and soft, perfectly cooked. It had a slightly acidic flavour but not too strong. It fitted in the jar perfectly and the overall appearance was neat and professional. I used a clear glass jar previously used for jam. Glass is good as a material for packaging as it is hygienic and protects food very well. It is transparent, resealable, easy to stack and suitable for heat treatment. The disadvantages of my jar are that it is slightly heavier to transport than other containers and it may be breakable. However, it is reusable and recyclable making it good for the environment. I sterilised the jar and removed the original label. I created my own label, dating it and labelling it "Homemade Pickled Beetroot" made on the 4th of March 2013. The net weight of the jar was approximately 300g. I also wrote "Use within 2 months" as it will lose its flavour and colour after this time. My label was clear and unambiguous with legible writing.

The practicability of making pickles at home: Making pickles at home is both easy and economical. The beauty of making pickles at home is that you can tailor them to suit your tastes, making them sweet or sour, and adding as much or as little flavouring as you wish. The trick with pickling is to create an environment that is inhospitable to harmful bacteria while preserving the integrity of the vegetables. The ratio of vinegar to water keeps vegetables crisp in the fridge, but is also acidic enough that they can be canned safely if you choose to do so.

# Sample Area D Task 5 | Investigation: Analysis/Research

**1. Protein denaturation:** a process where proteins lose the structure which is present in their native state, by the application of some external force or compound such as a strong acid / base, heat or mechanical action. This results in the disruption of cell activity in the protein. Denatured proteins have many different characteristics. Egg whites (albumin) when fresh are a transparent liquid. When cooked, they turn opaque forming a solid. This denaturation of the egg albumin is irreversible; however some denaturation processes can be reversible such as the modern permanent wave technique for curling or straightening hair.

Proteins are long strands of amino acids linked together in specific sequences. When a protein is denatured, the secondary and tertiary structures are altered but the peptide bonds of the primary structure between the amino acids stay together. The protein's structure changes completely so it can no longer perform its original function once it has been denatured. Proteins such as enzymes are essential molecules in human metabolism. If a type of enzyme becomes denatured, the reactions cannot continue and that specific metabolic function will cease in the body.

Egg protein coagulates and sets when heated. The egg albumin denatures at 60°C and the yolk denatures at 70°C. This coagulation causes the protein chains to untwist and straighten, bonding together around small pockets of water. When overheated the protein clumps together squeezing out the water causing curdling. This method of denaturation is supplied by heat and features in the making of all egg dishes including omelettes and scrambled eggs.

## **2. Causes of protein denaturation:**

**Heat:** Heat can be used to disrupt hydrogen bonds and non-polar hydrophobic interactions. This occurs because heat increases the kinetic energy and causes the molecules to vibrate so rapidly and violently that the bonds are disrupted. The proteins in eggs denature and coagulate during cooking, becoming easier for enzymes to digest. Medical supplies and instruments are sterilized by heating to denature proteins in bacteria and destroy them. Example: Quiche, pavlova

**Acids and bases:** These cause the salt bridges in protein to break apart. There are many examples of acidic or basic protein denaturation including milk curdling. Bacteria in milk grow to form a lactic acid. This protonates the carboxylate groups in the milk which becomes isoelectric. This causes the protein to coagulate into a solid curd.

**Mechanical action:** A physical action / agitation such as whipping stretches the polypeptide chain until the bonds break within the protein. An example of this includes the whipping of cream

or egg whites. Agitation also uses aeration and the entrapping of air to create bubbles of air into a mixture. Whisking causes heating of the egg protein by friction which slightly sets the protein chains and makes them unravel around the air bubbles. Example: sponge cake

**3: Two possible solutions:** Sponge cake, Spanish omelette

I have chosen to make a sponge cake using agitation and the whisking method:

1. The egg yolks are whisked with sugar until a pale creamy texture is obtained, forming air bubbles allowing it to rise and for the eggs to denature
2. The egg protein albumin is denatured during pasteurisation and baking, as they are usually sensible to temperature and are responsible for the stability of the mixture

### **Preparation and Planning**

#### **Ingredients:**

3 eggs – 50c

75g castor sugar – 23c

75g self-raising flour – 11c

Tsp vanilla essence – 6c

#### **Filling and icing:**

Icing sugar – 40c

20g butter – 15c

Strawberry jam – 70c

Cream – 68c

Total cost = €3.91

#### **Equipment:**

2 18cm cake tins

2 Waste bins

Baking parchment

Mixing bowl

Sieve

Knife

Electric whisk

Large metal spoon

Spatula

Fork

Knife

2 Spoons

Skewer

Cutlery plate

Wire rack

Work sequence/time allocation:

Gather equipment and lay out ingredients

Heat the oven to 180C

Grease and line two tins with baking parchment

In the mixing bowl, whisk the egg and sugar together to form a foam

Keep whisking until the desired consistency is achieved

Sift over the flour and fold in using a large metal spoon and a figure 8 technique

Divide the mixture between the cake tins and gently spread out with the spatula

Bake for 20 minutes until an inserted skewer comes out clean

Sieve icing sugar into a bowl with some water and beat in soft butter

Allow to stand for 5 minutes before turning on to a wire rack to cool

Smooth over one half with jam and then cream

Ice and decorate, sieve with icing sugar

Serve and evaluate

## **Implementation**

Firstly, I preheated my oven to make sure that my cakes would be well cooked and would rise sufficiently, and also to make sure that the temperature was correct to allow air to expand. I greased the tins well with oil and cut out parchment paper to line the bases. I whisked the egg and sugar together to form a foam, allowing it to rise. As the whisking proceeded, the mixture became thicker and lighter in colour. To test if the correct consistency had been obtained, I made a figure of 8 from the mixture adhering to the whisk. The mixture dropped gently to the surface of the foam so I knew it was ready. I used a sieve to add air to the flour to ensure an even texture and the correct constituency. I used a large metal spoon to fold it in to retain the air. If the egg and sugar mixture is under-whisked or the folding in of flour is excessive, the cake will be a poor volume, heavy and with a coarse grain as opposed to a fine one. I spread the mixtures evenly between the 2 tins and cooked them in the hot oven until the denaturation of the eggs had successfully occurred and my cake remained clean when a metal skewer was inserted. I turned

them out onto wire racks to cool before applying the filling or icing to avoid it melting. I put the jam on one side first as it is easier to place whipped cream on top of this. I made sure it was presented well by smoothing the icing over the cake gently. I also dusted it with some more icing sugar to make it tasty and more interesting.

**Safety factor:** I used oven gloves when turning over the cakes onto the rack to avoid burning myself, and took care when removing them from the hot oven.

**Hygiene factor:** I avoided over-handling the cooked cakes and used different utensils to ice it to prevent bacteria and the spreading of germs.

## **Evaluation**

### **(a) Implementation:**

**Colour:** The sponge had a warm yellow colour on the insides and a golden brown colour on the outside. The red of the strawberry jam contrasted with the white whipped cream of the filling. The icing was a slightly off-white colour with speckles of white from the further scattering of icing sugar on top.

**Flavour:** The sponge was sweet and creamy due to the butter being beaten and the eggs denatured. The jam was quite acidic and very sweet. The cream was mild and cooling and went well with the jam. The icing was sugary and sweet also. Overall the cake was very delicious and lightly flavours helped to achieve this. The jam gave it a unique flavour.

**Texture:** The inside of the sponge was light and fluffy, with a slightly crumbly and melt-in-the-mouth texture. The filling added contrasting textures with the real fruit jam and smooth cream. The icing was soft and creamy yet firm to touch as it cooled.

### **(b) The effects of protein denaturation on the dish prepared:**

The egg protein denatured at 60 degrees C as it changed state to form a solid as a result of heat. The whisking and sieving are very important stages. This makes the sponge light so that it is easy to create air allowing the cake to rise. I beat the egg and sugar mixture well to ensure enough air was created. By whisking the mixture and sieving in the flour, I allowed air to form and rise while the cakes were under heat. My cake was cooked perfectly however in future I would leave it to cool for longer before applying the filling as it was still warm and the cream melted slightly. The cakes should be nice and cool to make sure the whipped cream stays light and solid. I would also enhance presentation further with some strawberries on top.

