



Occupational specialism assessment (OSA)

Food Sciences

Assignment 2 - Pass

Guide standard exemplification materials

v1.1: Specimen assessment materials September 2021 603/6989/9

CACHE

T Level Technical Qualification in Science Occupational specialism assessment

Guide standard exemplification materials

Food Sciences

Assignment 2

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Introduction

The material within this document relates to the Food Science occupational specialism sample assessment. These exemplification materials are designed to give providers and students an indication of what would be expected for the lowest level of attainment required to achieve a pass or distinction grade.

The examiner commentary is provided to detail the judgements examiners will undertake when examining the student work. This is not intended to replace the information within the qualification specification and providers must refer to this for the content.

In Assignment 2, the student must develop and assess their product. This includes food and packaging.

After each live assessment series, authentic student evidence will be published with examiner commentary across the range of achievement.

Carry out a health and safety risk assessment of your proposed production processes.

(12 marks)

30 minutes

Student evidence

I carried out the following risk assessment of the development kitchen:

Risk assessment form

Person carrying out risk assessment:	Jonathan Harding	Those at risk Own staff	Key OWN
Person(s) responsible on site:	Lucinda Grey	Venue staff	VEN
r erson(s) responsible on site.	Eddinas Grey	Organisers	ORG
Venue:	Development Kitchen	Visitors	VIS
	NDD	Public	PUB
Work activity:	NPD	Contractors	CON
Date of assessment:	29/02/2021	All persons onsite	AOS

Please read the guidelines prior to completing your risk assessment.

Section 1

Hazard	Who might be harmed? (see 'those' at risk, above)	Likelihood	Severity	Total risk level	Control measures (add any other control measures you will use)	Likelihood	Severity	Res. Risk level
Slips, Trips and falls	Own, Con, Org	4	3	12	Clean any spillage up immediately . Wear safety shoes to minimise danger of slipping . Keep all walkways clear at all times	2	3	6
Burns from oven/hob/pans/oven trays	Own	4	4	16	Use heatproof glove when removing trays from oven when removing boiling pans from hob	3	2	6

Hazard	Who might be harmed? (see 'those' at risk, above)	Likelihood	Severity	Total risk level	Control measures (add any other control measures you will use)	Likelihood	Severity	Res. Risk level
Cuts, injury from flying debris	Own	4	3	12	Check all equipment, utensil and tools for damage prior to use. If damaged do not use and inform supervisor. Only use equipment you have been trained to use and for its designated purpose. Handle all sharp tools such as knives and skewers responsibly. Always carry or use knives by the handle and do not point them at others	2	2	4
Food poisoning/anaphylaxis	Own, Pub, Org	4	5	20	Ensure all work surfaces and utensils/tools are clean before use. Carry out swab tests on surface areas to ensure all is clear of microbiological contamination and food debris. If unclean, clean prior to start of production and swab until negative result received	1	1	1
Electric shock	Own	4	5	20	Ensure all small electrical appliances have been PAT test and are fit for use. Do not use equipment if plug, fittings or cable are loose or any exposed wiring can be seen. For large electrical equipment ensure you know the location of the isolation/lock off switch. Always check equipment prior to use and if any damage has occurred do not use and report to supervisor.	3	3	6

Hazard	Who might be harmed? (see 'those' at risk, above)	Likelihood	Severity	Total risk level	Control measures (add any other control measures you will use)	Likelihood	Severity	Res. Risk level
Chemical burns/inhalation	AOS, Pub	4	4	16	Always ensure chemicals remain in chemical area and are not being used or held in the immediate area when production is running. Only use chemicals as per the manufacturer's instructions and when you have been trained to do so. Always swab area after cleaning to ensure no chemical residue is left on work surface, equipment, tools or utensils	2	3	6

By signing the declaration below, you have agreed that you will put the appropriate control measures in place to ensure that hazards are reduced and that the risks applicable to your stand are controlled.

Signed	
Print name	Jane Smith
Review date	10 th January 2021

Produce kitchen samples of your product for analysis. Samples should be labelled appropriately to enable safe handling, and to be safe for consumption. Records should be kept of:

- equipment used
- changes to recipe and/or process, and reasons for the changes

(14 marks)

2 hours

Student evidence

I collected 2 samples from each batch of the trial runs – 6 samples in total. 3 samples were quartered, placed in sterile bags which were then sealed. Bags were labelled with the name of the product, batch number, and time and date of manufacture and I signed each label. These samples were sent to the lab for testing

The raw materials specification and finished product specification were also made available along with the HACCP flow diagram and the equipment list and what the equipment was used for.

The raw material specification contained the name of the raw ingredient, the name of the supplier, the storage shelf life of each ingredient, the nutritional information of each ingredient, the microbial limits of each ingredient, the labelling and coding (for example use by/best before) of each ingredient, and detailed information on the packaging used included the supplier and the type of packaging, highlighting the fact it was recyclable. Soy was also listed as an allergen as the recipe included soya milk.

The finished goods specification was created to show what was acceptable and what was not. Photos showed acceptable/unacceptable with a representation of the whole cupcake as it should look and how it shouldn't. A photo was included of the packaging components and how the cakes look in the packaging.

A complete equipment list was produced and the equipment used was as follows:

- sieve used to sift all dry ingredient to remove lumps and check for foreign body contamination
- · hand-held electric mixer to ensure cake batter was smooth and all ingredients were well mixed
- whisk used to cream dairy free spread and sugar for the cake mix and also for all ingredients for the frosting
- the hob was used as the thermal heat process to make the jam
- the oven was used as the thermal heat process to make the cakes set at 180°C
- · cupcake oven trays were used
- · cooling racks were used
- scales were used to ensure the amounts of ingredients were correct

I tried different approaches to see the impact on the product, I added 1 tablespoon of beetroot juice to the cake mix but it made it too runny so I decided not to do it.

I also tried to use a whole fresh cherry but though it would work out too expensive and would contaminate the cakes.

Accurately record all of the production data from your process which may include:

- time and temperature data
- ingredient details (for example weights, batch numbers)
- measurements related to product safety characteristics

(9 marks)

15 minutes

(Suggested time for tasks 1, 2 and 3) 2 hours 45 minutes

Student evidence

I identified the following CCPs as part of my process:

Storage chiller temperatures – carried out hourly, temp, time and date recorded on monitoring form by operative and signed. Corrective action identified when temperature is exceeded by moving contents to another chiller and informing supervisor/engineer.

Decant and sieving – foreign body contamination – all dry goods to be decanted into bowls and then sieved. Any dry goods containing stored product insects to be sent straight to waste and supervisor informed. Batch number, ingredient name, time and date recorded along with signature of operative on monitoring sheet.

Metal detection checks – caried out hourly, time, date, batch number and ok/reject recorded on monitoring form and signed by operative. Order identified as 1.5 ferrous, 2.0 non-ferrous, and 35 stainless steel. Corrective action identified if metal piece not rejected. Product placed on hold since last check which passed, supervisor informed.

The following process checks were also identified:

Goods in – all goods checked against product specification and damage to packaging – reject if does not meet spec of packaging damaged. Supplier, batch number and temperature checked, best before/use by date checked. All items recorded on goods in sheet and signed by intake operative.

Storage – all raw materials stored appropriately and used in FI/FO. Ambient ingredients stored in cool conditions, stored off floor and away from wall. Sheets signed, batch number, date, time, and amount recorded when placed in storage and removed. Any damaged or out of date stock to be sent to waste. Chilled ingredients to be stored in chiller. Chiller temperature always maintained <5°C. Temperature checks carried out hourly and result recorded and operative to sign sheet. Corrective action in place if chiller temperature exceeds 5°C. Contents to be moved to other chiller and supervisor informed.

Prep and mixing – allergen – allergenic products used with the introduction of soya milk. Product to be returned immediately to relevant segregated area after use. Foreign body contamination through poor maintenance of tools and equipment. All equipment to be checked for damage prior to use. Any equipment or tool showing signs of damage not to be used, supervisor informed and damaged tools/equipment removed immediately from production area.

Frosting- allergen product being used in area – return of soya milk to segregated area after use. Foreign body contamination by damaged tools/utensils. All tools/utensils to be checked prior to use and inform supervisor of any damage. Damaged tools/utensils should be removed from the production area. If tools/utensils break during use

ingredient should be checked and sent to waste if any contamination found.

Packing – allergen product risk of contamination of work surface and foreign body contamination of product. Boxes should be assembled prior to arrival in packing area and boxes should be checked and any damaged boxes should be sent to waste.

As an allergen is contained within this product the preparation/mixing, assembly/frosting areas and packing areas must be thoroughly cleaning prior to future use to ensure there is no possibility of future allergen contamination.

Task 4

Carry out a taste panel for your product, using a minimum of 8 participants. Your panel should cover at least 3 sensory characteristics related to the product. Create a questionnaire for them to complete, then evaluate the feedback and produce a report to include recommendations for further development.

(12 marks)

1 hour 30 minutes

Student evidence

I screened the 6 taste panel participants to check that there was no medical, primarily because of the pregnancy or food intolerance, any of which would have stopped them taking part. I did inform the participants that this was a vegan product so it should be okay but there was soya and gluten in the product so I checked again if any of the participants had any allergies to these ingredients.

I laid out a place for each participant at intervals around the room I provided the participants with 3 cupcakes which were placed on individual white paper plates along with a white plastic knife. I also provided the participants with a copy of the finished product specification and scoring sheet, a clear glass and water with diluted lime juice to clear the palate between samples. Samples were labelled as A, B and C. A copy of the packaging from each batch was placed in the centre table.

I used the following form to ask participants to record their result 1 (red) being unacceptable and should be rejected, 2 (amber) being acceptable quality with some acceptable defects which requires action and 3 (green) which is acceptable.

Taste Panel Record

JS Products Specifications

Chocolate Cherry Cupcake

Unprepared Pr	roduct Photograh	Prepared Product Photograh
Ingredient Listing		
Product description fr	om pack	
Standard product cha	racteristics	
Physical Parameters		
Appearance		
Odour		
Flavour		
Texture		

Sensory Grading

	3	2	1
Physical Parameters			
Appearance			
Odour			
Flavour			
Texture			

I then collated the information and recorded the results on the score collation sheet.

Provide details of recipe formulation, including:

- · how it contributes to the desired organoleptic properties
- considerations for at least 2 potential ingredient substitutions and alternatives

(9 marks)

15 minutes

Student evidence

I then collated the information and recorded the results on the score collation sheet as shown below:

Score Collation Record Sample A

Numerical Grade

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8
Physical								
Parameters								
Appearance								
Odour								
Flavour								
Texture								
Overall								
score								

RAG Score

3 - Green	
2 - Amber	
1 - Red	

This helped me identify that there was an issue with batch 3 as the cakes were bigger than the 3cm diameter and the cake was drier. Having checked the production records again it appears that there was additional batter placed in the cupcake case and they were placed on a flat tray rather than the cupcake hole trays. They were also cooked

for longer than 25 minutes but I let the cakes go as they were still safe to eat. I also updated the procedure to put 25 minutes in bold so it wouldn't happen again.

I would also replace the sugar in the cake mix with xylitol and this would reduce both the sugar and carbohydrate levels in the cake and means it would still be suitable for those on a low GI diet.

This wouldn't impact on the predicted shelf life.

Explain:

- a) the advantages and disadvantages of the specific processes you used in the development of your product
- b) the impact on your product's shelf life, nutritional content and organoleptic properties as a result of the specific processes used

Processes may include:

- energy transfer
- heat processing
- heat removal
- · ambient temperature processing technologies

(12 marks)

30 minutes

(Suggested time for tasks 4,5 and 6) 2 hours 15 minutes

Student evidence

On evaluating the existing recipe and process I was able to reach the following conclusions:

The cupcake is a thermally processed product which is high in sugar content and therefore low in $A_{w.}$ The baking process itself also reduce $A_{w.}$ This limits the growth of microbiological organisms.

Boiling the jam will reduce microbial contamination. Boiling for long periods of time may also degrade the flavour and change the colour of the fruit but there's no way this can be avoided.

Create a mock-up of your product packaging to include all mandatory labelling requirements.

Marks will be awarded on the physical aspects of the packaging, such as materials used, size of packaging, and mandatory labelling. No marks are awarded for the design elements on the packaging, or any non-mandatory labelling.

(8 marks)

1 hour

Student evidence

The brown cardboard cake box, inner flat tray and inner shaped insert is made from 100% sustainable material as is the outer sleeve, which wraps around the middle. The polypropylene window on the cake box meets the standard required within the EU regs. The insert stops the cupcakes smashing into each other during transit.



The sleeve is also firmly wrapped around the middle of the box and this means you don't need any sellotape.

The sleeve has been printed with the name and picture of the product in the middle of the sleeve so customers see that first. The folded part of the sleeve down the front face of the box is marked with the vegan symbol shows the storage conditions and best before date and the part of the sleeve on the bottom of the box contains the remaining mandatory labelling requirements including the name of the product, list of ingredients, all allergens listed in bold typeface, QUID, net quantity, name and address of manufacturer and nutritional declaration.

Complete a sustainability study of the product and prepare a report that includes:

- · any potential sustainability issues
- any mitigation strategies that can be used to minimise the environmental impact of the product

(12 marks)

30 minutes

Student evidence

I considered the following points when evaluating the sustainability of the product:

- raw materials all raw materials have been sourced from local suppliers. This has reduced the environmental impact of transporting raw materials over longer distances as we would need to do so using a national supplier and also providing a big saving on transportation costs. It is also easier for us to build up relationships with businesses closer to site and less time is spent travelling to audits or resolving any complex issues which need to be done face to face. Also buying locally improves the local economy and this helps sustain the local community. This lessens the impact of CO₂ through the reduction in fuel consumption. One consideration to note it may affect availability and lead times of raw materials
- energy usage I have implemented a chiller check procedure. Overfilling chillers ultimately leads to a rise in
 the chiller temperature and the chiller utilises more energy in trying to keep the contents cool. By ensuring
 chillers don't exceed fill levels we have produced savings by reducing waste we have to discard due to
 breaching temperature requirements and also reduce energy by maintaining chillers at a good temperature
 for efficient use

- a) Select the most appropriate test methods for each stage of the process to:
 - ensure compliance with raw material and finished product specifications
 - demonstrate product organoleptic, safety and quality compliance
- b) For each test method selected above, describe the monitoring activities to verify compliance.

(12 marks)

30 minutes

Student evidence

At each stage of the process I have implemented checks to ensure quality standards are consistently maintained. I have also identified 3 critical control points with the chiller temperatures at goods in, the decant and sifting of dry goods and the metal detection checks to maintain food safety levels. I have also introduced microbial and nutritional testing prior to despatch to ensure the product is safe to eat and provides the nutritional claim as identified on the label.

Intake - goods in check incoming raw materials against material specification to ensure it matches, check batch number, check supplier details are right and product is intact and vehicle as it should be. Temperature monitoring of raw materials applicable.

Storage - all dry raw materials stored off floor, segregation of allergens; segregation of chilled product stored appropriately at required temperatures. Monitoring of chiller temperatures and temperature of chilled materials; first in first out rotation in place for all stock. All raw materials checked against raw material specification on withdrawal from store and batch codes recorded on processing documentation.

Decant and sieving – sifting of dry goods such as flour to ensure no foreign body contamination from items such as stored product insects or packaging - batch number and any foreign bodies recorded on monitoring record.

Preparation – check of all tools/equipment/utensils are fit for use. No damaged tools/equipment/utensils to be used. Product prepared for heat processing or removal arranged as per pictorial standard and procedure. Allergen product removed from allergen chiller when required and return after use.

Heat processing - check of all tools/equipment/utensils are fit for use. No damaged tools/equipment/utensils to be used. Cooking temperature and time recorded, core temperature baked goods checked with the use of a sterile stainless steel skewer to ensure fully cooked. Checked jam to make sure its setting properly. Visual checks carried out against photos to ensure match before moving to next stage.

Heat removal - cooling time to <12°C in <1 hour. Cooling method – placed on cooling racks within development area.

Frosting - allergen product being used in area – return of soya milk to segregated area after use. Foreign body contamination by damaged tools/utensils. All tools/utensils to be checked prior to use and inform supervisor of any damage. Damaged tools/utensils should be removed from the production area. If tools/utensils break during use ingredient should be checked and sent to waste if any contamination found.

Packaging - visual check against photo to ensure product placed correctly, labelling of product correct and correct

packaging used. Allergen product risk of cross contamination of work surface and foreign body contamination of product. Boxes should be assembled prior to arrival in packing area and any damaged boxes should be sent to waste.

Metal detection – final critical control point to ensure no metal fragments or pieces are in product prior to despatch.

Final product check - during taste panel checked against final product specification, ingredients checked against traceability record, product gone through taste panel, sample collected as per sampling procedure for nutritional and microbial analysis.

Assess the product formulation and processing conditions, identifying what worked well and any areas for improvement

(12 marks)

30 minutes

(Suggested time for tasks 7, 8, 9 and 10) 2 hours 30 minutes

Student evidence

Here is my evaluation as to how I feel what has went well and what could be improved on:

Idea generation – I feel I should have done more research in the beginning even walking round a supermarket for ideas as that stopped me coming up with something different.

Feasibility check – I checked in plenty of time to make sure my tutor was aware of what equipment, raw materials and packaging I would need. It would have been better if I had paid more attention to detail as I want sure exactly what I would need. I also didn't think about the lead times at this stage so didn't really plan this into my project plan.

Review of product – I feel this went well and I received good feedback from the customer group. More research though by visiting local retailers may have thrown up a similar product which would have made any comparison much more valid

Trial run – I think my trial run went well and I was quite confident that everything would work out. I also took some samples and sent them to the lab for microbiological and nutritional testing.

Review of trail run – this went as expected I was able to provide my tutor with a copy of my process and the recipe, raw materials, WIP procedures, CCPs along with monitoring sheets. I included sieving as a CCP which I didn't need to do but I didn't want to get anything contaminated as part of the decanting process and not find out till the end and then have to start from the beginning.

Pre-production – this went well and I sent my final samples for testing which came back all good. I also spoke to the artwork department to ensure the sleeves were ready and contained all of the required information and all was well.

Launch – I was finally ready to launch the product during June and advertised throughout the college on the noticeboard and also in the college paper. During June in the college is exam time so not all students are on campus and those that are come for the exam and go again. Lucky for me the tutors were so I sold some of them and took the rest home to my Mum.

Think I may have sold more if they weren't so sweet. No sugar for me next time!

Examiner commentary

The student could identify the serious hazard, explain why it was hazardous and identify how the controls would mitigate or eliminate them.

The relevant number of samples are collected, labelled and handled properly. All samples are fit for consumption. Changes made are recorded on the relevant documentation. The larger items of equipment used are listed and its purpose identified.

The student has produced logical documented procedures and monitoring records which focuses of the key stages of the process flow such as intake, storage, heat processing, heat removal and dispatch and this ensures the food is safe for consumption.

The student carried out a taste panel under mostly controlled conditions with a minimum of 6 participants and correctly collated all data and recorded accurate results. All products were graded and 2 sensory characteristics were recorded. Recommendations were made for improvement, and where no recommendations were made reasons were given why this wasn't possible.

The student has made 1 change to the product to improve or enhance the organoleptic properties and changed 1 ingredient to enhance flavour, colour or for nutritional reasons. They have provided an evaluation as to why the change was made and the difference to the product as a result.

The student has examined their own process and linked the food technologies used to the impact on the product's organoleptic characteristics, food safety or nutritional value. They have identified some advantages/disadvantages in using this methodology.

The student has produced fit for purpose packaging which will help ensure the product is safe to eat for the duration of its shelf life. All labelling requirements which are essential for food safety such as allergens, cooking/storage instructions/use by dates are clearly labelled.

The student has considered at least 2 ways to improve or enhance the product sustainability whilst reducing costs with no impact on food safety, nutritional value or shelf life of product.

Student can describe test methods to verify organoleptic properties, food safety or nutritional value of product at most stages of the product. Most monitoring checks described relate to food safety or organoleptic testing rather than nutritional analysis.

The student has assessed most stages of the product formulation and the process and has highlighted, in the stages assessed, at least 1 thing which went well and 1 thing which could have been improved or enhanced the outcome of that stage.

Overall grade descriptors

The performance outcomes form the basis of the overall grading descriptors for pass and distinction grades.

These grading descriptors have been developed to reflect the appropriate level of demand for students of other level 3 qualifications, the threshold competence requirements of the role and have been validated with employers within the sector to describe achievement appropriate to the role.

Occupational Specialism overall grade descriptors:

Grade	Demonstration of attainment
	The evidence is logical but displays minimal knowledge in response to the demands of the brief.
	The student makes some use of relevant knowledge and understanding of how it informs practices of the sector and demonstrates a limited understanding of perspectives or approaches associated with food science and food product development processes.
	The student makes adequate use of facts/theories/approaches/concepts/data and attempts to demonstrate breadth and depth of knowledge and understanding.
Pass	The student is able to identify some information from appropriate sources and makes use of appropriate information/appraise relevancy of information and can combine information to make decisions and recommendations.
	The student makes minimal judgements/takes appropriate action/seeks clarification with guidance and is able to make limited progress towards solving non-routine problems in real life situations.
	The student attempts to demonstrate skills and knowledge of the relevant concepts and techniques reflected in a food science and/or food product development role and generally applies this across different contexts.
	The student shows adequate understanding of problems that have not been seen before, using limited knowledge to find solutions to problems and make justification for strategies for solving problems, explaining their reasoning.
	The evidence is precise, logical and provides a detailed and informative response to the demands of the brief.
	The student makes extensive use of relevant knowledge and has extensive understanding of the practices of the sector and demonstrates an understanding of the different perspectives/approaches associated with food science and food development processes.
Distinction	The student makes decisive use of facts/theories/approaches/concepts/data, demonstrating extensive breadth and depth of knowledge and understanding and selects highly appropriate skills/techniques/methods.
	The student is able to comprehensively identify information from a range of suitable sources and makes exceptional use of appropriate information/appraises relevancy of information and can combine information to make coherent decisions.
	The student makes well founded judgements/takes appropriate action/seeks clarification and guidance and is able to use that to reflect on real life situations in a food science and/or food development role.

The student demonstrates extensive knowledge of relevant concepts and techniques reflected in a food science and/or food development role and precisely applies this across a variety of contexts and tackles unstructured problems that have not been seen before, using their knowledge to analyse and find suitable solutions to the problems.

Document information

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Owner: Head of Assessment Design

Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Published final version.		June 2021
v1.1	NCFE rebrand		September 2021