



T Level Technical Qualification in Science

Occupational specialism assessment (OSA)

Food Sciences

Assignment 2

Mark scheme

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Contents

Task 1: carry out a health and safety risk assessment	3
Task 2: produce kitchen samples of product for analysis	4
Task 3: accurately record production data	6
Task 4: carry out a taste panel	7
Task 5: provide details of recipe formulation	9
Task 6: processes and development	10
Task 7: product packaging mock-up	12
Task 8: sustainability study of the product	13
Task 9(a) and 9(b): test method selection and rationale	15
Task 10: product formulation and processing conditions	17
Performance outcome grid	18
Document information	19
Change History Record	19

Task 1: carry out a health and safety risk assessment

Band	Mark	Descriptor
4	10–12	The student has produced a health and safety risk assessment that systematically and comprehensively evaluates all risks for the proposed production process and explains how the selected control measures work together to bring about mitigation.
3	7–9	The student has produced a health and safety risk assessment with a credible description for all risks for the proposed production process. Has identified which risks are the most serious with reasons and explains how the selected control measures work.
2	4–6	The student has produced a health and safety risk assessment that describes most of the risks for the proposed production process. Identifies 2 or 3 risks as the most serious with general reasons and describes the selected control measures.
1	1–3	The student has produced a health and safety risk assessment that lists most of the risks for the proposed production process and describes some control measures.
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content:

Each step of the process has been systematically considered for potential health and safety hazards from the 5 hazard types, namely microbiological, physical, chemical, mechanical and electrical. Where a potential hazard has been identified the hazard and source are clearly stated for example, physical: spillage on the floor, chemical: incorrectly diluted cleaning chemicals. The identified hazards are realistic for example, hot liquids that might cause burns or scalding.

The person who may be at risk from each hazard is identified for example student is at risk of slipping on a spillage on the floor.

Each hazard identified has been risk assessed by considering the likelihood of occurrence and severity of harm. The outcome shows a likelihood score and a severity score and an overall risk level. A reference table for the determination of risk levels is provided. The risk evaluations are logical.

Each hazard has an effective control measure for example clean up spillages immediately.

Content mapping:

S2.35: Follow procedural requirements to collect samples, including:

- collecting the correct sample size
- collecting the correct numbers per batch
- collecting the sample at the correct frequency

K2.24: How the sample size, sample numbers per batch and frequency of sampling are determined for the procedural requirements

Task 2: produce kitchen samples of product for analysis

Criteria	Marks awarded
Produced sufficient kitchen samples	<p>2 marks for producing a sufficient number of kitchen samples to enable adequate further analysis.</p> <p>1 mark for producing more than one kitchen sample to enable some further analysis.</p> <p>0 marks for producing only one kitchen sample.</p>
Provided labelling with information to enable safe handling	<p>4 marks for labelling with full and relevant information to enable safe handling, including:</p> <ul style="list-style-type: none"> • allergens emphasised (1 mark) • expiry date/use by date (1 mark) • storage conditions (1 mark) • labelling is clear to read (1 mark)
Provided production data to demonstrate evidence of 'safe for consumption'	2 marks for providing all relevant production data, (for example safe core temperatures achieved during cooking)
Total marks	8 marks

Band	Mark	Descriptor
3	5–6	<p>The student has provided records that give comprehensive details of all changes made to the recipe and process with technical justification or comprehensive justification for retaining the original recipe and process.</p> <p>Answers include complete lists of equipment used.</p>
2	3–4	<p>The student has provided records with statement of changes made to the recipe and process with reasons, or reasons for retaining the original recipe and process.</p> <p>Answers include lists of main items of equipment used.</p>
1	1–2	<p>The student has provided list of changes made to the recipe or process with general reasons or makes a general statement in support of retaining the original recipe and process.</p> <p>Answers include lists of some items of equipment used.</p>
0	0	No creditworthy material as described in bands 3 to 1.

Indicative content:

Records are available detailing all equipment used and all relevant changes to the recipe or process that were required with reasons (if applicable).

A list of all equipment used needs to be provided including: fridge, oven, blender (utensils used in the process are not necessary to include but students should not be marked down for including them).

All relevant changes to the recipe or process (if applicable) that were made need to be stated for example: increased vinegar addition by 5% to lower the pH, cooked the cake for 10 minutes longer to ensure fully cooked.

Content mapping

S2.26: Perform an impact assessment of consumer trends on the design of both a new product development and an existing product development

S2.29: Develop a new food product to meet customer requirements, taking into account:

- the suitability of all raw materials
- substituting raw materials, dependent on consumer need and seasonality

K2.1: The stages and principles of the product development process from concept to launch

K2.7: Why ingredients may need to be substituted

K2.8: How the functionality of ingredients can be used to enhance a recipe

K2.9: The reasons for selecting ingredients for specific applications

Task 3: accurately record production data

Band	Mark	Descriptor
3	7–9	<p>The student has produced a complete set of records giving accurate data from all stages of the production process, including time, temperature, ingredients and measurements related to product safety.</p> <p>The records will be fit-for-purpose and will be presented logically and coherently using language that is technically correct.</p>
2	4–6	<p>The student has produced a set of records giving data, which is mostly accurate, from the main stages of the production process, including most measurements related to product safety, time, temperature and ingredients.</p> <p>The records will be informative and will be presented in an organised fashion using language that is technically appropriate.</p>
1	1–3	<p>The student has produced data from some stages of the production process, including measurements related to product safety and at least one other.</p> <p>The data will be presented in a simple format (using lists or similar) and will use every day (rather than technical) language.</p>
0	0	No creditworthy material as described in bands 3 to 1.

Indicative content:

Images and other tools may be used to enhance the presentation and understanding of the production data, but students should not be marked down for not using images or other such tools if the production data records are presented in a logical and clear way.

The records need to include accurate production data gathered from the production of the kitchen samples, including:

- time and temperature data for example, regular check of fridge temperature during the making of the samples, core cooking temperature achieved and time at that temperature
- ingredient details (weights, batch numbers) for example: white flour, 500g, expiry end August 2021
- measurements related to product safety characteristics for example, sample 1 water activity 0.8, sample 2 water activity 0.75

The presentation of the data needs to be such that it is clear and easy to understand and makes sense.

Language needs to be technically accurate for example units of all readings provided: °C, g, pH

Content mapping:

K2.5: How impact assessments are used to investigate the viability of a new product

Task 4: carry out a taste panel

Band	Mark	Descriptor
4	10–12	<p>The student has carried out a taste-test that is fit-for purpose.</p> <p>Provided a thorough and detailed evaluation of the data making recommendations for improvement.</p> <p>Justified the decisions to accept or reject recommendations for change.</p> <p>Included a detailed report that is presented logically and coherently using language that is technically correct and includes data that is accurate and accessible.</p> <p>The taste test must have:</p> <ul style="list-style-type: none"> • used a minimum of 8 participants • included at least 3 sensory characteristics • recorded data from all participants (in line with GDPR legislation) • determined a grade for the product
3	7–9	<p>The student has carried out a taste-test that is credible.</p> <p>Provided a clear evaluation of the data making reasonable recommendations for improvement.</p> <p>Justified some decisions to accept or reject recommendations for change.</p> <p>Included a report that is presented logically with sufficient use of technically accurate language and included data that is accurate and accessible.</p> <p>The taste test must have:</p> <ul style="list-style-type: none"> • used a minimum of 8 participants • included at least 2 sensory characteristics • recorded data from all participants (in line with GDPR legislation) • determined a grade for the product
2	4–6	<p>The student has carried out a taste-test.</p> <p>Provided a simplistic evaluation of the data making some recommendations for improvement.</p> <p>Some decisions to accept or reject recommendations for change are vague or lack relevance.</p> <p>Included a report that is presented with some use of technically correct language and included some accurate data.</p>

Band	Mark	Descriptor
1	1–3	<p>The student has carried out a taste-test.</p> <p>Provided an evaluation of the data with limited justification or relevance.</p> <p>Given few recommendations for improvement or reason(s) for no change is (are) irrelevant.</p> <p>Decisions to accept or reject recommendations for change may have some but limited relevance.</p> <p>Presented information with use of everyday (rather than technical) language and included inaccurate data.</p> <p>Taste test must have:</p> <ul style="list-style-type: none"> • used a minimum of 6 participants • included at least at least 1 sensory characteristic • recorded data from all participants (in line with GDPR legislation) • determined a grade for the product
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content

The taste test must have:

- used a minimum of 6 participants
- included at least 2 sensory characteristics
- recorded data from all participants (in line with GDPR legislation)
- determined a grade for the product

Content mapping:

S2.33: Present information on a sustainability analysis of a new product (for example, using a presentation, written report, graphs, tables)

Task 5: provide details of recipe formulation

Band	Mark	Descriptor
3	7–9	The student has produced a detailed, clear and logical justification of how the recipe formulation contributes to the desired organoleptic properties and has evaluated the impact of potential alternative ingredients.
2	4–6	The student has produced a credible explanation of how the main elements of the recipe formulation contribute to the desired organoleptic properties and described potential alternative ingredients.
1	1–3	The student has produced a limited description of how some elements of the recipe formulation contribute to the desired organoleptic properties and has listed a potential alternative ingredient.
0	0	No creditworthy material as described in bands 3 to 1.

Indicative content:

- refer to specific ingredients and/or quantities (for example: the addition of 500g double cream per batch contributes to the creamy and indulgent mouthfeel, the addition of 100g mixed spice, including paprika, helps to give the curry sauce a really spicy heat kick)
- consider potential ingredient substitutions with reasons (for example: vegetable oils may replace animal fats to reduce the saturated fat content, a spice mix may be used to enhance flavour instead of salt, soy protein may replace meat protein)
- state whether the alternatives would improve/lower/have no effect on the quality of the product

Content mapping:

S2.27: Formulate a recipe from first principles

K2.4: Different consumer trends which may drive the design of a new product

K2.6: The first principles of recipe balance

K2.10: A range of raw material alternatives that can be used when formulating a recipe

Task 6: processes and development

Band	Mark	Descriptor
4	10–12	<p>The student has analysed the specific processes in the development of the product, concluding on the advantages and disadvantages of each and their impact on the product's shelf-life, nutritional content and organoleptic properties.</p> <p>Made logical and significant links between specific processes and the product.</p> <p>Demonstrated a comprehensive breadth and/or depth of understanding of the related content.</p>
3	7–9	<p>The student has explained specific processes in the development of the product, including the advantages and disadvantages of each process and their impact on the product's shelf-life, nutritional content and organoleptic properties. The explanation used coherent reasoning, making clear links between specific processes and the product.</p> <p>Demonstrated a sound breadth and/or depth of understanding of the related content.</p>
2	4–6	<p>The student has described specific processes in the development of the product, including some generic advantages and disadvantages of each process and their impact on the product's shelf-life, nutritional content and organoleptic properties.</p> <p>Made limited links between specific processes and the product.</p> <p>Demonstrated some breadth and/or depth of understanding of the related content.</p>
1	1–3	<p>The student has listed information on specific processes in the development of the product, including some reference to advantages and disadvantages of the processes and their impact on the product's shelf-life, nutritional content and organoleptic properties.</p> <p>Demonstrated a superficial breadth and/or depth of understanding of the related content.</p>
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content:

- shelf life (for example: freezing greatly increases product shelf life because micro-organisms are inactivated, and enzymes are largely inactivated at frozen temperatures)
- nutritional content (for example: baking increases the concentration of all nutrients in the product because some of the product moisture evaporates during baking)
- organoleptic properties (for example: simmering the meat pie filling for a long-time resulting in a break down in the meat structure resulting in very tender meat that falls apart when eaten)
- specific processes (giving examples of energy transfer, heat processing, heat removal and ambient temperature processing as appropriate)

Content mapping:

S2.34: Contribute to continuous improvement to drive down costs and drive up quality by following the Deming cycle

K2.1: The stages and principles of the product development process from concept to launch

K2.2: Why an existing product may need to be changed

K2.21: The considerations of process limitations (for example, bottlenecks)

Task 7: product packaging mock-up

Criteria	Available marks
Packaging mock-up is relevant to selected product.	1 mark for mock-up of product that matches the detail of packaging selected in assignment 1, or their revised product.
Packaging type and material suitability.	4 marks for packaging type is suitable for product <ul style="list-style-type: none"> • materials (1 mark) • size and weight (1 mark) • transit protectiveness or shelf readiness (1 mark) • sustainability considerations (1 mark)
Packaging includes mandatory labelling requirements.	3 marks for packaging that contains all mandatory labelling requirements. 2 marks for one omission. 1 mark for 2 omissions. (maximum 3 marks) (Any non-mandatory labelling included is not marked)
Total marks	8 marks

Content mapping:

S2.30: Recommend packaging when developing a new food product, considering innovations in packaging, to reduce plastic waste and increase opportunities for recycling

S2.31: Carry out a product costing on a new product and on a modification to an existing product by:

- calculating individual component costs and production run costs to give a total cost

K2.3: How the process for changing an existing product would differ to that of a new product development process

K2.12: How individual costs of different components contribute to the overall product costs

Task 8: sustainability study of the product

Band	Mark	Descriptor
4	10–12	<p>The student has analysed evidence relating to all relevant sustainability issues and prioritised the issues relevant to the product.</p> <p>Recommended fully justified mitigation strategies with reference to cost and practicability which are supported by fact rather than by opinion.</p> <p>Produced a report which has a logical structure, is accessible and informative, using accurate technical terms throughout.</p>
3	7–9	<p>The student has explained evidence relating to relevant sustainability issues and highlighted the issues relevant to the product.</p> <p>Recommended mitigation strategies with reference to cost and practicability and in most cases are supported by fact rather than by opinion.</p> <p>Produced a report which is accessible and informative and uses technical terms.</p>
2	4–6	<p>The student has described some evidence relating to sustainability issues relevant to the product.</p> <p>Recommended a mitigation strategy with reference to cost and practicability.</p> <p>Produced a report which is informative and uses some technical terms.</p>
1	1–3	<p>The student has listed some evidence relating to a sustainability issue that impacts the product.</p> <p>Recommended a mitigation strategy with reference to general statements or assertions that do not demonstrate occupational knowledge.</p> <p>Produced a report which is informative and uses everyday (rather than technical) language.</p>
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content:

The report gives detailed consideration of:

- raw materials, for example procuring raw materials from non-sustainable sources, mitigated by procuring, for example, palm oil from sustainable sources
- packaging, for example, using non re-useable/non-recyclable materials, mitigated by avoiding use of plastic where possible, and using recyclable materials
- reuse of waste, for example, generating waste for landfill, mitigated by sending used oil for biomass energy
- energy usage, for example using excess energy, mitigated by making only full batches so saving on energy per consumer unit
- transportation, for example transporting heavy and bulky products, mitigated by using minimal packaging to reduce weight, size and costs, or locally sourced products

Content mapping:

S2.26: Perform an impact assessment of consumer trends on the design of both a new product development and an existing product development

S2.27: Formulate a recipe from first principles

S2.30: Recommend packaging when developing a new food product, considering innovations in packaging, to reduce plastic waste and increase opportunities for recycling

S2.32: Carry out a sustainability analysis on a new product by identifying the social, environmental and economic implications of the:

- raw materials
- packaging
- reuse of waste
- energy usage
- transportation

K2.1: The stages and principles of the product development process from concept to launch

K2.2: Why an existing product may need to be changed

K2.3: How the process for changing an existing product would differ to that of a new product development process

K2.11: A range of packaging innovations used to reduce plastic waste/increase opportunities for recycling

K2.13: How to calculate total production run costs

K2.16: Ways in which to re-use waste

K2.17: Ways in which to reduce energy usage in developing a new product

K2.18: How to reduce the effect of transportation on the environment

K2.20: Ways to maximise equipment efficiency

K2.22: How to manage the 8 types of waste within a food and drinks manufacturing process

Task 9(a) and 9(b): test method selection and rationale

Band	Mark	Descriptor
4	10–12	The student has evaluated relevant test methods applied at each stage of the process, giving accurate judgements about how these methods ensure compliance with raw material and finished product specifications. Explained clearly how all components of the monitoring activity work together to ensure compliance.
3	7–9	The student has explained test methods applied at each stage of the process, giving reasonable judgements about how these methods ensure compliance with raw material and finished product specifications. Described how most of the components in the monitoring activity ensure compliance.
2	4–6	The student has described test methods applied during the process, including how these methods ensure compliance with raw material and/or finished product specifications. Described how some of the components in the monitoring activity ensure compliance.
1	1–3	The student has listed test methods applied during the process, including general statements or assertions (rather than occupational knowledge) about how these methods ensure compliance with raw material and/or finished product specifications.
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content:

One, or more, relevant test method needs to be stated for each stage of the process to demonstrate compliance with the raw material specification and/or finished product specification as well as product organoleptic, safety and quality compliance.

For example:

- final product check, for example, nutritional analysis to ensure compliance with finished product nutritional data
- final product check, for example, taste panel to ensure compliance with customer organoleptic attributes
- final product check, for example, gluten free test to ensure meets gluten free status
- goods in, salmonella test on incoming chocolate to ensure salmonella free
- final product check, for example water activity to ensure meets safety criteria

The monitoring activity needs to include the relevant test method, frequency, and sampling method. For example: a 100g sample from each batch of chocolate received on site is to be taken aseptically on the day of receipt and sent to the micro lab for a salmonella analysis; whilst the result is awaited the chocolate is to be marked up as 'do not use'. Once a salmonella clear result has been received the batch can be released to production.

Content mapping:

S2.36: Select a suitable test method, depending on the purpose of the test

S2.37: Analyse test results to confirm nutritional requirements and ensure product safety

K2.25: The purpose of different test methods that can be used to test new food products and/or identify and resolve issues in the food supply chain

Task 10: product formulation and processing conditions

Band	Mark	Descriptor
4	10–12	The student has produced a complete and thorough assessment of the product formulation and processing conditions, evaluating all areas of the process with recommendations for improvement clearly justified throughout.
3	7–9	The student has assessed the product formulation and processing conditions, explaining most areas of the process, and giving well-reasoned recommendations for improvement.
2	4–6	The student has reviewed the product formulation and processing conditions, describing areas of the process that went well and those that need to be improved, and providing some recommendations for improvement.
1	1–3	The student has given a basic overview of the product formulation and processing conditions, listing some areas of the process without providing recommendations to aid future practice.
0	0	No creditworthy material as described in bands 4 to 1.

Indicative content:

The assessment needs to consider the formulation and processing conditions and identify what worked well and any areas for improvement. For example: the recipe formulation was a success, resulting in a soup that had good taste panel feedback with a good consistency and mouthfeel and a nice hot spicy flavour. The blending was carried out for too long resulting in a biscuit mix that was too fine for the cheesecake base, a reduced blend resulting in a less fine biscuit crumb would give a preferred crunchier and more textured mouthfeel.

Content mapping:

S2.33: Present information on a sustainability analysis of a new product (for example, using a presentation, written report, graphs, tables)

S2.34: Contribute to continuous improvement to drive down costs and drive up quality by following the Deming cycle

K2.19: How to use workplace organisational techniques for continuous improvement

K2.23: The relationship between the drivers for cost and quality and improving value

Performance outcome grid

Task	PO1	PO2	PO3	PO4	Total
1	0	12	0	0	12
2	0	14	0	0	14
3	0	9	0	0	9
4	0	12	0	0	12
5	0	9	0	0	9
6	0	12	0	0	12
7	0	8	0	0	8
8	0	12	0	0	12
9	0	12	0	0	12
10	0	12	0	0	12
Total marks	0	112	0	0	112
% Weighting	0%	100%	0%	0%	100%

Document information

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Owner: Head of Assessment Design

Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Post approval, updated for publication.		January 2021
v1.1	NCFE rebrand.		September 2021