

# Food and Nutrition

## Singapore-Cambridge General Certificate of Education Ordinary Level (2021) (Syllabus 6087)

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## **AIMS**

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1. To develop candidates' understanding of the concepts of nutrition and meal planning
2. To develop candidates' understanding of the link between diet and health
3. To develop candidates' understanding of the principles of food science
4. To equip candidates with the knowledge and skills to make informed decisions concerning food and nutrition

## **ASSESSMENT OBJECTIVES**

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The assessment objectives for this subject are classified into two main areas:

### **(i) Knowledge and Understanding (Paper 1)**

Candidates should be able to demonstrate knowledge and understanding of the following.

1. The principles of nutrition and the concept of a balanced diet in meal planning
2. The relationship between nutrition and health
3. Making informed food choices regarding a healthy diet
4. The scientific principles underlying food preparation, processing and safety

### **(ii) Analysis, Planning, Application and Evaluation in a given Coursework Task (Paper 2)**

Candidates should be able to demonstrate the following process skills in a given coursework task.

1. Define and analyse task question/problem situation
2. Gather, manage and process information
3. Investigate and develop ideas towards a solution
4. Use appropriate nutritional tools in meal planning and evaluating food products
5. Observe, measure and record data accurately
6. Interpret, evaluate and establish validity of the observations and experimental data
7. Make informed decisions with appropriate justifications
8. Demonstrate good organisational and time management skills in planning for an investigation or a task
9. Apply food preparation techniques and use different cooking methods in preparing dishes/meals for different situations
10. Demonstrate proficient use of equipment and good management of resources in food preparation
11. Demonstrate the ability to evaluate the process/outcome of the task
12. Communicate ideas effectively

## SCHEME OF ASSESSMENT

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There will be **TWO** papers.

Paper 1	40% (100 marks)
Paper 2	60% (100 marks)

### Paper 1 (2 hours) – Written Paper

This will test the candidates' knowledge of theory and practice in response to the assessment objectives. Candidates are to answer all questions in Sections A and B. Candidates are to answer three questions in Section C consisting of two compulsory questions and either part (a) or (b) of the final question.

Section A: consisting of short-answer type questions	(25 marks)
Section B: consisting of structured type questions	(30 marks)
Section C: consisting of open-ended type questions	(45 marks)

### Paper 2 – Coursework

Candidates will be given an assignment at the beginning of the examination year which must be conducted under teacher supervision. It should be completed for assessment by the end of July or early August of the examination year. The assignment requires a problem-solving and investigative approach, with an emphasis on experimental work. A total of **15–20 hours** of curriculum time must be assigned to discuss, facilitate and carry out the experimental and practical work required.

Assessment will focus on the analysis of the task; development of a plan; recording and interpreting experimental results; decision; and a methodical approach in the production and presentation of the final products. The evaluation will require candidates to draw conclusions by interpreting the findings and evaluating the outcomes.

Task Analysis		(10 marks)
Research and Development	– information gathering	(12 marks)
	– investigation	(10 marks)
	– information synthesis	(12 marks)
Decision Making		(10 marks)
Planning		(10 marks)
Execution	– organisation and management	(8 marks)
	– manipulation	(8 marks)
	– product and presentation	(8 marks)
Evaluation		(12 marks)
		<b>(100 marks)</b>

### Presentation of Coursework Folio

Concise written accounts of the task for the coursework are to be submitted. The coursework folios should be securely bound or filed in a flat A4 folder. Ring folders should not be used. Documentation can either be handwritten or word processed. The recommended typeface is Arial, minimum font size 11, or Times New Roman, minimum font size 12. Only A4 plain white or lined sheets should be used. All pages should be clearly numbered. The folio must not exceed **50** pages. Centres must submit the folios for moderation by the end of August of the examination year.

## ASSESSMENT CRITERIA FOR PAPER 2: COURSEWORK

Process/Tasks	Indicators The candidate:			
	NO MARKS	LOW	MEDIUM	HIGH
<b>TASK ANALYSIS</b>	<ul style="list-style-type: none"> <li>No evidence of task analysis</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Identifies few key and related factors with no elaboration</li> <li>Identifies few priorities for the task question</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Identifies some key and related factors with little elaboration</li> <li>Sets some priorities for the task question but lacks clarity</li> <li>Shows some understanding of the task requirements</li> </ul> <p>4–7 marks</p>	<ul style="list-style-type: none"> <li>Identifies majority of the key factors and provides a comprehensive and relevant list of related factors with sufficient elaboration</li> <li>Sets clear priorities for the task question</li> <li>Shows clear understanding of the task requirements</li> </ul> <p>8–10 marks</p>
<b>RESEARCH AND DEVELOPMENT</b> – <i>Information Gathering</i>	<ul style="list-style-type: none"> <li>No evidence of information gathering</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Conducts a shallow research of the factors and priorities identified</li> <li>Selects and uses a limited amount of relevant information</li> <li>Includes information that is irrelevant</li> <li>Shows no interaction with information gathered</li> <li>Shows little or no focus in the research</li> <li>Shows little development of ideas not used to forward the task</li> <li>Shows poor organisation and communication of ideas and concepts</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Conducts an adequate research of the factors and priorities identified</li> <li>Selects and uses some relevant information from a range of sources</li> <li>Shows some ability to summarise information gathered</li> <li>Shows some interaction with the information gathered</li> <li>Shows some relevance of the research information to the task</li> <li>Shows some development of ideas that are used to forward the task</li> <li>Shows some linkage between the information gathered and the development of the task</li> <li>Organises and communicates ideas and concepts adequately</li> </ul> <p>4–8 marks</p>	<ul style="list-style-type: none"> <li>Conducts a thorough research of the factors and priorities identified</li> <li>Selects and uses relevant information from a range of sources</li> <li>Shows ability to summarise information effectively</li> <li>Shows ability to interact effectively with relevant information gathered</li> <li>Shows clearly the relevance of the research information to the task</li> <li>Shows good development of ideas that are used effectively to forward the task</li> <li>Shows clearly the link between the information gathered and the development of the task</li> <li>Organises and communicates ideas and concepts clearly and effectively</li> </ul> <p>9–12 marks</p>

## 6087 FOOD AND NUTRITION GCE ORDINARY LEVEL SYLLABUS (2021)

Process/Tasks	Indicators The candidate:			
	NO MARKS	LOW	MEDIUM	HIGH
<b>RESEARCH AND DEVELOPMENT</b> <i>Investigation</i>	<ul style="list-style-type: none"> <li>No evidence of investigation</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Shows little development of experimental ideas that are used to forward the task</li> <li>Carries out experimental investigations with some assistance</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Shows some development of experimental ideas that are used to forward the task</li> <li>Carries out experimental investigations quite proficiently and methodically</li> <li>Shows appropriate handling of equipment</li> </ul> <p>4–7 marks</p>	<ul style="list-style-type: none"> <li>Shows good development of experimental ideas that are used effectively to forward the task</li> <li>Carries out experimental investigations proficiently and methodically</li> <li>Shows skilful handling of equipment</li> </ul> <p>8–10 marks</p>
<b>RESEARCH AND DEVELOPMENT</b> <i>– Information Synthesis</i>	<ul style="list-style-type: none"> <li>No evidence of information synthesis</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Records observations, readings or measurements that are irrelevant, invalid and/or inaccurate</li> <li>Shows little or no linkage between the experimental investigation results and the development of the task that are based on: <ul style="list-style-type: none"> <li>little or no interpretation of the results</li> </ul> </li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Records few observations, readings or measurements that are relevant, valid and accurate</li> <li>Shows some linkage between the experimental investigation results and the development of the task that are based on: <ul style="list-style-type: none"> <li>interpretation of some of the results through application of some relevant knowledge</li> </ul> </li> </ul> <p>4–8 marks</p>	<ul style="list-style-type: none"> <li>Records a range of observations, readings or measurements that are relevant, valid and accurate</li> <li>Shows clearly the linkage between the experimental investigation results and the development of the task that are based on: <ul style="list-style-type: none"> <li>thorough interpretation of results through good application of relevant content and knowledge</li> </ul> </li> </ul> <p>9–12 marks</p>
<b>DECISION MAKING</b>	<ul style="list-style-type: none"> <li>No evidence of decision making</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Makes limited decisions and choices that are partly appropriate for the task question</li> <li>Shows little or no justification on the decisions and choices made</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Makes some decisions and choices that are appropriate for the task question</li> <li>Justifies decisions and choices with some reasons that are based on: <ul style="list-style-type: none"> <li>interpretation of some of the results obtained from experimental investigations</li> <li>some factors related to the task and previous research</li> </ul> </li> </ul> <p>4–7 marks</p>	<ul style="list-style-type: none"> <li>Makes decisions and choices that are appropriate for the task question</li> <li>Justifies decisions and choices with well-supported reasons that are based on: <ul style="list-style-type: none"> <li>a thorough interpretation of the results obtained from experimental investigations</li> <li>a wide range of factors related to the task and previous research</li> </ul> </li> </ul> <p>8–10 marks</p>

## 6087 FOOD AND NUTRITION GCE ORDINARY LEVEL SYLLABUS (2021)

Process/Tasks	Indicators The candidate:			
	NO MARKS	LOW	MEDIUM	HIGH
<b>PLANNING</b>	<ul style="list-style-type: none"> <li>No evidence of planning</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Develops an overall work plan with few details and no evidence of forward planning</li> <li>Develops a simple time plan with insufficient work for the time allocated</li> <li>Prepares an incomplete list of the ingredients, materials, equipment, and methods to be used</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Develops a clear overall work plan with some details and shows some forward planning</li> <li>Develops a clear time plan with some sequencing and sufficient work for the time allocated</li> <li>Lists in some detail the ingredients, materials, equipment and methods to be used</li> </ul> <p>4–7 marks</p>	<ul style="list-style-type: none"> <li>Develops a detailed, logical overall work plan that shows forward planning</li> <li>Develops a well-sequenced, detailed and logical time plan showing efficient use of the time allocated</li> <li>Lists in detail the ingredients, materials, equipment and methods to be used</li> </ul> <p>8–10 marks</p>
<b>EXECUTION</b> – <i>Organisation and Management</i>	<ul style="list-style-type: none"> <li>No evidence of organisation and management</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Works in an organised manner when provided with assistance</li> <li>Shows poor use of time and resources</li> </ul> <p>1–2 marks</p>	<ul style="list-style-type: none"> <li>Works in an organised manner with some initiative</li> <li>Shows fairly effective and economical use of time and resources</li> </ul> <p>3–5 marks</p>	<ul style="list-style-type: none"> <li>Works independently with a high level of organisation and initiative</li> <li>Shows effective and economical use of time and resources</li> </ul> <p>6–8 marks</p>
<b>EXECUTION</b> – <i>Manipulation</i>	<ul style="list-style-type: none"> <li>No evidence of manipulation</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Applies processes and methods appropriately when preparing food products but requires some assistance</li> <li>Handles equipment appropriately when provided with some assistance</li> </ul> <p>1–2 marks</p>	<ul style="list-style-type: none"> <li>Shows a moderate level of proficiency in the selection, application of processes and methods in the preparation of food products</li> <li>Shows a moderate level of proficiency in the selection, use and handling of equipment</li> </ul> <p>3–5 marks</p>	<ul style="list-style-type: none"> <li>Selects and shows a high level of proficiency in the application of processes and methods in the preparation of food products</li> <li>Selects and shows a high level of proficiency in the handling and use of equipment</li> </ul> <p>6–8 marks</p>
<b>EXECUTION</b> – <i>Product and Presentation</i>	<ul style="list-style-type: none"> <li>No evidence of food products presented</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Produces food products that meet a basic standard</li> <li>Presents food products appropriately when provided with some assistance</li> </ul> <p>1–2 marks</p>	<ul style="list-style-type: none"> <li>Produces food products that are of a satisfactory quality and standard</li> <li>Presents food products appropriately</li> </ul> <p>3–5 marks</p>	<ul style="list-style-type: none"> <li>Produces food products that are well-prepared and of a high quality and standard</li> <li>Presents food products attractively and appropriately, meeting the requirements of the task question</li> </ul> <p>6–8 marks</p>

## 6087 FOOD AND NUTRITION GCE ORDINARY LEVEL SYLLABUS (2021)

Process/Tasks	Indicators The candidate:			
	NO MARKS	LOW	MEDIUM	HIGH
<b>EVALUATION</b>	<ul style="list-style-type: none"> <li>No evidence of evaluation</li> </ul> <p>0 marks</p>	<ul style="list-style-type: none"> <li>Provides a weak review of the work done</li> <li>Identifies few strengths and weaknesses of the processes and outcomes of the task</li> <li>Shows little or no comments on how well the requirements of the task are met</li> </ul> <p>1–3 marks</p>	<ul style="list-style-type: none"> <li>Provides an adequate review of some aspects of the work done</li> <li>Identifies and explains some strengths and weaknesses of the processes and outcomes of the task</li> <li>Explains briefly how well the requirements of the task are met</li> </ul> <p>4–8 marks</p>	<ul style="list-style-type: none"> <li>Provides a detailed and thorough review of all aspects of the work done</li> <li>Identifies and explains in detail the strengths and weaknesses of the processes and outcomes of the task</li> <li>Establishes how well the requirements of the task are met</li> </ul> <p>9–12 marks</p>

**Total marks: 100**

# SUBJECT CONTENT

TOPIC	LEARNING OUTCOMES Candidates will be able to:
<b>1. Nutrition and Health</b>	
<b>1.1 Nutrients</b>	
(a) Proteins	<ul style="list-style-type: none"> <li>(i) State the elements of protein</li> <li>(ii) List the sources of protein</li> <li>(iii) Explain the functions of protein in the body</li> <li>(iv) Differentiate between:               <ul style="list-style-type: none"> <li>– essential and non-essential amino acids and give examples</li> <li>– high and low biological value proteins and give examples</li> </ul> </li> </ul>
(b) Carbohydrates	<ul style="list-style-type: none"> <li>(i) State the elements of carbohydrate</li> <li>(ii) List the sources of carbohydrate</li> <li>(iii) Explain the functions of carbohydrate in the body</li> <li>(iv) Differentiate between the types of carbohydrate (monosaccharide, disaccharide and polysaccharide) and give examples</li> </ul>
(c) Fats	<ul style="list-style-type: none"> <li>(i) State the elements of fat</li> <li>(ii) List the sources of fat</li> <li>(iii) Explain the functions of fat in the body</li> <li>(iv) Differentiate between saturated, monounsaturated and polyunsaturated fat and give examples</li> </ul>
(d) Vitamins	<ul style="list-style-type: none"> <li>(i) List the sources of the following vitamins: A, B, C, D, E and K</li> <li>(ii) Classify vitamins into fat-soluble vitamins (A, D, E, K) and water-soluble vitamin B (thiamine, riboflavin, nicotinic acid, folic acid, B<sub>6</sub>, B<sub>12</sub>) and vitamin C (ascorbic acid)</li> <li>(iii) Explain the functions of the different vitamins in the body</li> <li>(iv) Discuss the role of vitamin supplements in the diet</li> </ul>
(e) Minerals	<ul style="list-style-type: none"> <li>(i) List the sources of the following minerals: calcium, phosphorus, iron, sodium chloride, potassium and iodine</li> <li>(ii) Explain the functions of the different minerals in the body</li> <li>(iii) Discuss the role of mineral supplements in the diet</li> </ul>
(f) Water	Explain the importance of water in the body
(g) Dietary fibre	<ul style="list-style-type: none"> <li>(i) Define dietary fibre (non-starch polysaccharide)</li> <li>(ii) Classify dietary fibres and name their sources               <ul style="list-style-type: none"> <li>– soluble (non-cellulose, e.g. pectin and gums in fruit, vegetables, legumes and cereals)</li> <li>– insoluble (cellulose, e.g. stems, leaves of vegetables, coverings and seeds of grains)</li> </ul> </li> <li>(iii) Explain the functions of dietary fibre in the body</li> </ul>
<b>1.2 Diet and Health</b>	<ul style="list-style-type: none"> <li>(i) Define the term malnutrition (shortage/excess intake of particular nutrients)</li> <li>(ii) Explain the link between inadequate/excessive intake of nutrients and common health problems, e.g. obesity, hypertension, diabetes, colorectal cancer, coronary heart diseases, osteoporosis, anaemia</li> <li>(iii) List the causes and effects of common eating disorders, e.g. anorexia nervosa and bulimia nervosa</li> </ul>
<b>1.3 Energy Balance</b>	<ul style="list-style-type: none"> <li>(i) State the unit measurement for energy (kilojoules, kilocalories)</li> <li>(ii) Explain the factors that influence an individual's energy requirements</li> <li>(iii) Explain the concept of energy balance and how it can be achieved</li> </ul>



TOPIC	LEARNING OUTCOMES Candidates will be able to:
<b>1.4 Digestion</b>	<ul style="list-style-type: none"> <li>(i) Describe briefly the process of digestion and absorption of food</li> <li>(ii) State the action of digestive juices and enzymes on nutrients</li> <li>(iii) Explain the absorption of nutrients in the small intestine</li> </ul>
<b>1.5 Meal Planning and Meal Analysis</b>	
(a) Balanced diet	<ul style="list-style-type: none"> <li>(i) Explain the term 'balanced diet'</li> <li>(ii) Elaborate on the importance of having a 'balanced diet'</li> </ul>
(b) Factors to consider	Identify the factors to consider when planning meals: <ul style="list-style-type: none"> <li>– physiological: age, gender, metabolic rate, level of physical activity, health status</li> <li>– psychological: individual preferences, emotional needs, food as punishment/reward</li> <li>– social: ethnic customs and traditions, religions, parental/peer/media influence</li> <li>– economic: value for money, demand and supply</li> </ul>
(c) Nutritional tools	<ul style="list-style-type: none"> <li>(i) Explain the uses of nutritional tools when planning recipes/meals, e.g. ABCs of Healthy Eating, Birth to Eighteen Years: Dietary Tips for Your Child's Wellbeing, My Healthy Plate, Recommended Dietary Allowances (RDA) and Food Composition Tables</li> <li>(ii) Use nutritional tools to analyse, modify, create and evaluate recipes/meals to meet different dietary needs</li> </ul>
<b>2. Food Choices</b>	
<b>2.1 Main Food Commodities</b>	<ul style="list-style-type: none"> <li>(i) List the nutritional composition of the following: meat, fish, eggs, dairy products, cereals, fruit, vegetables, pulses and legumes</li> <li>(ii) Explain the choice of food commodities (fresh and processed) in relation to cost, quality, quantity and nutritional value</li> <li>(iii) Explain how different food commodities should be stored</li> <li>(iv) Use a variety of food commodities in the preparation of meals</li> </ul>
<b>2.2 Food Labels</b>	<ul style="list-style-type: none"> <li>(i) Identify the basic information found on a food label</li> <li>(ii) Differentiate between a food label and a nutrition label</li> <li>(iii) Interpret and apply information found on nutrition labels, e.g. serving sizes, list of nutrients, % daily values, calorie conversion guide</li> <li>(iv) Differentiate and verify the following nutritional claims used on food labels:               <ul style="list-style-type: none"> <li>– 'free', e.g. sugar free, cholesterol free</li> <li>– 'low', 'light', 'lite', e.g. lightly salted, low cholesterol</li> <li>– 'less', 'reduced', 'lower in', e.g. less salt, reduced fat</li> <li>– 'increased', 'enriched', 'fortified', 'added', e.g. enriched with vitamin C, fortified with calcium</li> <li>– 'high in', 'rich in', e.g. high in fibre, rich in calcium</li> </ul> </li> </ul>

TOPIC	LEARNING OUTCOMES Candidates will be able to:
<b>3. Food Science</b>	
<b>3.1 The Science of Food Preparation and Cooking</b>	
(a) Reasons for cooking food	Explain the reasons for cooking food
(b) Heat transference	Describe how heat is transferred when food is cooked by conduction, convection and radiation
(c) Methods of cooking	<ul style="list-style-type: none"> <li>(i) Explain the principles of different methods of cooking (frying, steaming, stewing, baking, grilling and microwaving)</li> <li>(ii) Use a variety of cooking methods in the preparation of meals</li> </ul>
<b>3.2 Reactions in Food during Preparation and Cooking</b>	<ul style="list-style-type: none"> <li>(i) Define the following terms: foam, gel, emulsion, denaturation, coagulation, Maillard browning, gelatinisation, dextrinisation, caramelisation, enzymic browning, rancidity, smoking and melting points in fats and oils</li> <li>(ii) State the occurrences of the above reactions in the preparation and cooking of food</li> <li>(iii) Explain the properties and functions of the key ingredients found in a recipe or basic mixture: <ul style="list-style-type: none"> <li>– pastries: shortcrust and rough puff</li> <li>– cakes and biscuits: rubbed-in, creamed, one stage, whisked</li> <li>– sauces: roux, blended</li> <li>– batters: thin and thick</li> <li>– local cakes and desserts: steamed, baked, boiled, fried</li> </ul> </li> </ul>
<b>3.3 Evaluation of Food</b>	Compare and evaluate the sensory properties (texture, flavour, appearance, aroma) and nutritional value of food
<b>3.4 The Science of Food Processing</b>	
(a) Food safety and preservation	<ul style="list-style-type: none"> <li>(i) State causes of food spoilage such as microbial and chemical spoilage</li> <li>(ii) Explain how to avoid and reduce the risk of food spoilage when preparing and storing foods</li> <li>(iii) State the functions of food preservation</li> </ul>
(b) Food additives	<ul style="list-style-type: none"> <li>(i) List the additives commonly found in food such as: salt, sugar, vinegar, sodium nitrite, flavourings, and colourings</li> <li>(ii) Explain the advantages and disadvantages of these additives</li> </ul>