

NUTRITION AND FOOD SCIENCE

TEACHING AND LEARNING SYLLABUS

Upper Secondary

Normal (Technical) Course

Implementation starting with
2022 Secondary Three Cohort



Ministry of Education
SINGAPORE

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SECTION 1:

INTRODUCTION

Value of Nutrition and Food Science Education
Framework for 21st Century Competencies and Student Outcomes
Framework and Big Ideas of Nutrition and Food Science Curriculum
Syllabus Aims

1. INTRODUCTION

The Nutrition and Food Science Normal (Technical) [NFS N(T)] syllabus is designed to pique students' curiosity to learn about the world around them. Through the use of their five senses of smell, touch, taste, hear and see, students are encouraged to discover about their interests and develop a sense of awareness of the world around them. The body of knowledge within the discipline is constantly evolving and the subject presents an opportunity for students to be active contributors to the field. Students will learn to take action to apply knowledge and skills they acquire through the course of study.

The syllabus considers the VUCA nature of the world that our students will need to be prepared for in the future. The shifts in landscape brings about both challenges and opportunities for our students. These changes can be largely summarized as technological developments, changing social attitudes and the existential challenge of the climate change. Our students need to be ready to take advantage of technological advancement as these shifts will affect the future of work for them. This is especially so as the food science industry is a growing sector that may provide exciting new careers for our students. With changing lifestyle and attitudes towards health, diet and nutrition, it is important for students to be equipped with the knowledge and skills to discern the impact of these changes on themselves and their community. Lastly, the existential challenge of climate change is an issue that will affect our students. There is growing awareness among governments and corporates to consider the impact of policies on the environment. In 2021, Singapore announced the Singapore Green Plan 2030 to advance the national agenda on sustainable development. These plans will impact every Singaporean and students must take personal ownership to contribute to these efforts as stewards of the environment with sustainability conscious mindsets and habits.

The NFS N(T) syllabus develops problem-solving skills in our students to design solutions and make informed decisions based on sound judgement and logical reasoning. For instance, students are taught to consider meal planning factors related to nutritional needs of different age groups as well as the effect of food on health. This would contribute towards Singapore's effort to lower the prevalence of diet-related health problems such as obesity and coronary heart disease¹. In making decisions on how much and what to purchase, students are taught to avoid food wastage and reduce carbon footprint to mitigate the impact on the environment. The action to reduce food wastage would also support Singapore's effort towards minimising food waste².

Through the acquisition of knowledge in diet and nutrition, food literacy and food science, students develop critical and inventive thinking. NFS N(T) students will think critically about issues on food, health and nutrition when they engage in discussions on moral and ethical issues during their study. This develops social awareness and moral reasoning in students, a skill to navigate the challenges of the future. Students apply their food science knowledge by experimenting with recipes to improve sensory and nutritional qualities. Students also apply creativity to design and create new food products to meet consumers' demand³. NFS N(T) students are not just passive consumers of knowledge, but also active participants in the creation of new knowledge in the development of food science. The learning experiences in the NFS N(T) curriculum will encourage students to take risks and discover more about the world around them.

¹ https://www.moh.gov.sg/content/moh_web/home/statistics/Health_Facts_Singapore.html

² <https://www.towardszerowaste.gov.sg/zero-waste-masterplan/chapter2/sustainable-consumption/>

³ In the food manufacturing sector in 2013, there were 844 food-related establishments and these accounted for 0.7% of Singapore's Gross Domestic Contribution with a value-add of \$2,828 million. Source: Economic Development Board & SPRING Singapore (2013)

Value of Nutrition and Food Science Curriculum

The study of NFS is important as it builds a strong foundation in understanding how diet and nutrition relate to our health. Students are empowered to make informed food choices and develop an awareness of the impact of their choices on their health and environment. Food sustainability in Singapore is a growing issue that is of concern to Singaporeans and students need to be aware of the problem and possible solutions. The application of food science principles in food preparation and cooking also allow students to review and refine their diet as well as create new recipes to meet different needs.

1. **Develop Food Literacy.** Food literacy extends beyond nutrition and cookery lessons to include fostering connections between food, people, health and the environment both theoretically and practically⁴. When students develop food literacy, they understand the impact of food choices on health, the environment and the economy. According to a study on Australia's Nutrition and Food Systems Education⁵, subjects related to nutrition and food science can help students make healthier food choices; develop health promoting life skills; and make informed food choices that protect the environment. The practical emphasis of the NFS N(T) syllabus ensures that students are equipped, not only with knowledge on nutrition, but also skills to plan and prepare sustainable and healthier meals to meet an individuals' and/or family's needs.
2. **Promote Nutrition and Health Education.** According to Bloomberg Healthiest Country Index, Singapore was named the world's healthiest country⁶ in 2015. Singapore continues to be in the top 10 position in the most recent 2019 report⁷. However, Singapore is still at risk as highlighted by Prime Minister Lee during the 2017 National Day Rally. He stressed that diabetes is a 'very serious' problem in Singapore. Data by Health Promotion Board⁸ revealed that about 440,000 Singapore residents who were 18 years and above had diabetes in 2014. If not controlled, this number is estimated to grow to 1,000,000 in 2050, which may result in an overwhelming economic and social issue in the future. NFS N(T) students are empowered to make wise food choices when they learn about diabetes and other diet-related health problems.
3. **Develop Awareness in Food Sustainability.** It is necessary for Singapore to tackle various issues of food sustainability, which includes reducing food wastage⁹ and maintaining food security¹⁰. The amount of food waste generated in Singapore has increased by around 20% over the last 10 years¹¹. When food is wasted, resources that are used to grow and bring food to our table are also wasted. It is also essential to reduce food waste to reduce waste disposal and landfill space in a land-scarce Singapore. Efforts to reduce food waste are important to reduce carbon footprint, and it also contributes to efforts to tackle global warming and climate change. As a small city-state with limited resources, Singapore imports more than 90% of its food. Safeguarding food security is therefore paramount to Singapore to ensure that a regular supply of food remains safe

⁴ Colatruglio, Sarah & Slater, Joyce. (2014). Food Literacy: Bridging the Gap between Food, Nutrition and Well-Being.

⁵ Sadegholvad, S., Yeatman, H., Parrish, A. M., & Worsley, A. (2017). What Should Be Taught in Secondary Schools' Nutrition and Food Systems Education? Views from Prominent Food-Related Professionals in Australia. *Nutrients*, 9(11), 1207. doi:10.3390/nu9111207

⁶ <https://www.weforum.org/agenda/2015/10/which-are-the-worlds-healthiest-countries/>

⁷ <https://www.bloomberg.com/news/articles/2019-02-24/spain-tops-italy-as-world-s-healthiest-nation-while-u-s-slips>

⁸ <https://www.healthhub.sg/a-z/diseases-and-conditions/626/diabetes>

⁹ <https://www.towardszerowaste.sg/foodwaste/>

¹⁰ <https://www.sfa.gov.sg/food-farming/sgfoodstory>

¹¹ <https://www.towardszerowaste.sg/foodwaste/>

and affordable. To buffer food supply disruption, Singapore launched its 30 by 30 vision¹². This initiative encourages local farms to increase research and development efforts to increase productivity. NFS N(T) students can become active contributors to Singapore's effort to battle against food wastage and become the driver of the 30 by 30 vision when they understand their role in supporting fresh local produce.

4. **Promote Food Innovation.** Trends such as a growing demand for healthier options, alternative protein sources and increasing demand for eco-friendly packaging are driving the food industry to be innovative in their products and solutions¹³. In 2018, a new government initiative, FoodInnovate, was launched to drive food innovation and help local firms adapt to industry disruptions¹⁴ and to meet the increasing demands of consumers. These include the use of new ingredients and developing niche products catered to the needs of specific target groups. Several multinational foodtech companies had also set up food laboratories and research centres in Singapore in recent years¹⁵. The NFS N(T) syllabus prepares students for career in these companies. Students are given opportunities in their course of study to innovate and explore dishes to meet the evolving nutritional and sensory needs of the society.

5. **Promote Local Food Culture.** Singapore's hawker culture has been officially added to the Unesco Representative List of the Intangible Cultural Heritage of Humanity in 2020¹⁶. It is a move towards letting the rest of the world know more about our local food and multicultural heritage. Within Singapore, cross-cultural awareness can be promoted through food, a common theme amongst all groups of Singaporeans. Students are exposed to local recipes and dishes that celebrate our local food culture in the syllabus. The heightened awareness foster harmony amongst Singaporeans as we learn to respect and appreciate cultural differences.

¹² <https://www.sfa.gov.sg/food-farming>

¹³ <https://www.businesstimes.com.sg/opinion/how-singapores-food-industry-is-shaking-things-up>

¹⁴ <https://www.straitstimes.com/singapore/health/new-government-strategy-will-drive-food-innovation>

¹⁵ <https://www.businesstimes.com.sg/opinion/how-singapores-food-industry-is-shaking-things-up>

¹⁶ <https://www.straitstimes.com/singapore/singapores-hawker-culture-added-to-unesco-list-of-intangible-cultural-heritage>

Framework for 21st Century Competencies and Student Outcomes

The NFS curriculum offers opportunities for students to develop 21st Century Competencies (21CC) and Student Outcomes through:

- a) **Civic, Global and Cross-cultural Literacy.** Students will have the opportunity to learn about current needs and future trends in related fields. For instance, students learn how food choices may have an impact on the environment and the development of sustainability-conscious mindsets and habits. They may plan meals based on the nutritional needs of the target group while considering food sources that produce less carbon footprint. The selection of food from sustainable sources may drive the demand of alternative food in future.
- b) **Critical, Adaptive and Inventive Thinking.** Students will have the opportunity to engage in hands-on or experiential learning and be equipped with skills to apply knowledge in authentic scenarios. These occur through coursework-based assessment where students carry out background study, make informed decisions of suitable dishes to prepare, and explore and innovate the dishes based on the task requirements.
- c) **Communication, Collaboration and Information Skills.** Students will have the opportunities to collaborate with one another and communicate their thoughts during practical sessions and class discussions. The report writing component in coursework further develops their written communication skills as they present the information gathered in an organised manner.

The knowledge, skills and attitudes in the NFS syllabus support the development of 21CC and student outcomes in all domains – Civic, Global and Cross-cultural Literacy, Critical, Adaptive and Inventive Thinking, and Communication, Collaboration and Information Skills. Table 1 shows how the NFS syllabus correspond to MOE's 21CC Standards and Developmental Milestone.

Table 1. Knowledge, Skills and Attitudes in NFS N(T) and the Corresponding 21CC Developmental Milestone for Upper Secondary

Knowledge, Skill and Attitude in NFS	Corresponding 21CC Development Milestone
Civic, Global and Cross-Cultural Literacy	
<ul style="list-style-type: none"> ▪ Consider social factors when planning meals for different ethnic and/or religious groups 	<p>1.4 The student can convey and critically evaluate knowledge to co-construct new understandings and complex ideas persuasively and with impact, while considering the specific purpose and context of communication.</p>
<ul style="list-style-type: none"> ▪ Work well and show respect with other socio-cultural groups during lessons and collaborative learning 	<p>6.4 The student can contribute to information and perspectives shared in constructive and ethical ways, and manage their online reputation and relationships responsibly.</p>
Critical, Adaptive and Inventive Thinking	
<ul style="list-style-type: none"> ▪ Understand the relationship between nutrition/diet and health and makes connections and ideas to solve issues ▪ Makes decisions, with supporting justifications, to incorporate food sustainability 	<p>1.4 The student can use evidence and adopt different viewpoints to explain their reasoning and decisions, having considered the implications of the relationship among different viewpoints.</p> <p>5. The student can generate ideas that are unique or modified substantially from existing ones and explore different pathways that lead to solutions.</p>
<ul style="list-style-type: none"> ▪ Understand the scientific principles underlying food preparation and safety ▪ Explore, adapt and modify ideas and/or recipes to meet the task requirement ▪ Manages complexities and ambiguities by adjusting one's perspective and strategies ▪ Assesses different contexts and situations to make connections and draw new insights 	<p>2.4 The student can plan, organise and evaluate their thinking strategies to monitor their learning. They suspend judgement, reassess conclusions and consider alternatives to refine their thoughts, attitudes, behaviour and actions.</p> <p>4.4. The student can draw on different perspectives and strategies to adjust their approach when required, adapting learnt knowledge and skills in new and unexpected contexts to solve complex and unexpected problems.</p> <p>3.4 The student can draw on the similarities and differences between different contexts or situations to extract new insights to inform their perspective or approach.</p>
Communication, Collaboration and Information Skills	
<ul style="list-style-type: none"> ▪ Effectively communicates information and co-constructs meaning 	<p>1.4 The student can convey and critically evaluate knowledge to co-construct new understandings and complex ideas persuasively and with impact, while considering the specific purpose and context of communication.</p>

<ul style="list-style-type: none"> Employs effective strategies to locate digital and non-digital information and resources, and exercises discernment by evaluating the accuracy, credibility, and relevance of information 	<p>5.4 The student can refine search results, organise information systematically and manage information sensitively, and evaluate the accuracy, credibility and relevance of information.</p>
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Framework and Big Ideas of Nutrition and Food Science Curriculum

The design of the Nutrition and Food Science syllabus is guided by the Nutrition and Food Science Education Framework. This framework is organised according to the three student outcomes: *Health Ambassador*, *Discerning Consumer* and *Food Innovator*, which stem from the value of the subject. The middle ring shows the 3 main attitudes; **Appreciate**, **Advocate** and **Apply**, in which the curriculum should be anchored upon. The main strands of the subject, Nutrition & Health, Food Literacy¹⁷ & Consumer Literacy and Food Science were included in the framework to guide the overarching content.

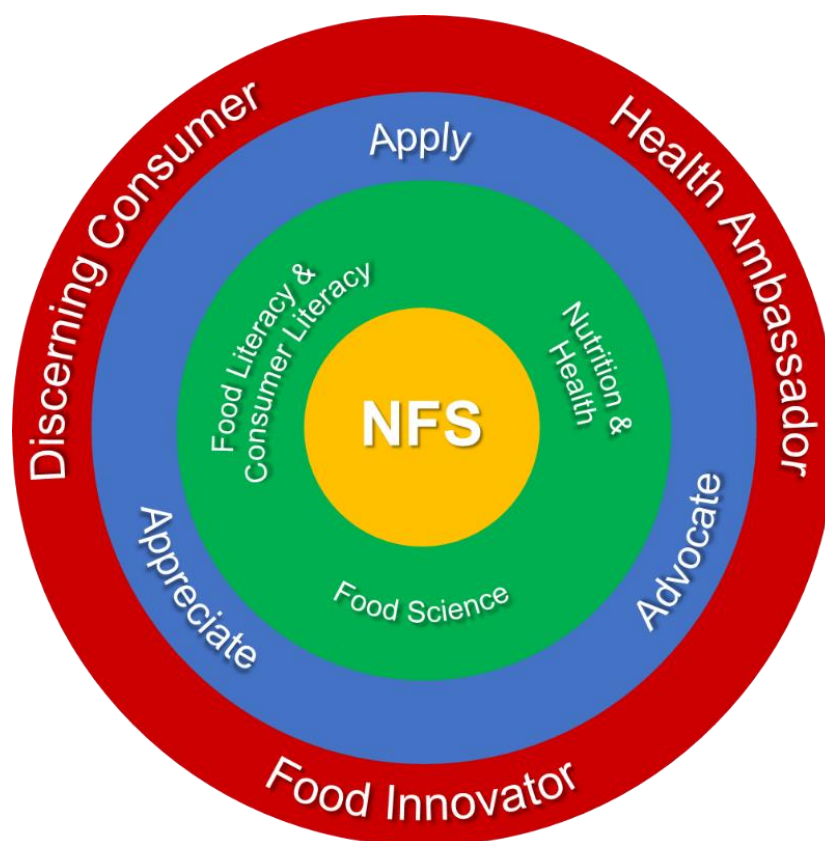


Figure 1: Nutrition and Food Science Education Framework

¹⁷ Lai-Yeung, T (2015) *Food Literacy to Integrate Declarative and Procedural Food Skills into School of Community Based Healthy Eating Programs*, Dept of Health & Physical Education, HK Institute of Education

The focus of each strand is elaborated below:

- a) **Nutrition and Health.** The topics like Nutrients and Diet & Health provide the foundation for students to understand the importance of good nutrition that will lead to proper growth and physical development of a person. It provides the basis for selecting and preparing food for consumption. When students understand the needs of proper nutrition, they would be able to link the causes of various diet-related health problems to the diet and nutritional needs of individuals.

- b) **Food Literacy and Consumer Literacy.** The topics like Food Management and Smart Consumer provide the fundamental concepts for developing a discerning person, capable of planning a balanced meal and making responsible decisions in food selection. Selecting food from sustainable source is an important aspect in the Singapore food scene as Singapore imports more than 90% of its food. Students will also be taught to reduce food wastage through proper food management and consumer decisions so that they can play an active role in ensuring food sustainability.

- c) **Food Science.** The science behind basic food preparation and cooking is covered in this strand. It allows students to learn food preparation and culinary skills for the application of food science concepts. Students can use their knowledge in culinary food science to innovate food items to meet various human nutritional needs. For example, exploring the use of different cooking methods and ingredients to create a healthier version of *Nasi Lemak*, or exploring the amount of fat used in creamed cakes and how it might affect its appearance, taste and texture.

As NFS students understand the concepts learnt in the curriculum, they would be able to advocate nutrition and health for self, family and the community. They will better appreciate the importance of using a variety of food in food management and the issues of food security, including food safety and sustainable food consumption. NFS students also have the opportunities to apply scientific principles during food preparation and cooking, thereby achieving the student outcomes of a health ambassador, a discerning consumer and a food innovator.

The big ideas of the subject can be found in Table 2 as follows:

Table 2. NFS Big Ideas

Strand	Big Idea
Nutrition and Health	Right amount of nutrients is essential for proper growth and development. Excessive or deficiency in nutrient intake can lead to diet-related health problems.
Food Literacy	A balanced diet is achieved through proper meal planning. Appropriate food choices contribute to sustainable food consumption. A discerning consumer makes informed decisions for self, family and community.
Food Science	Food will deteriorate in quality if not handled or stored properly. Sensory qualities of food are altered during preparation and cooking. Application of food science principles can culminate in unlimited combination of food possibilities that can meet human nutritional needs.

Syllabus Aims

The syllabus aims to develop students to:

- lead a healthier lifestyle proactively through proper diet and nutrition;
- advocate sustainable food consumption by planning and making appropriate food choices; and
- apply principles of culinary science creatively in food preparation and cooking.

The content of NFS N(T) syllabus is aligned to the NFS O and N(A) syllabuses. However, the instructional words and scoping of Learning Outcomes (LOs) ensures that the demand of the syllabus remains accessible to N(T) students. The fundamental concepts from Food Studies were also kept, with a continued emphasis on hands-on tasks to achieve the syllabus aims of NFS N(T).

SECTION 2:

CONTENT

Overview of Content Structure
Proposed Teaching and Learning Plan

2. CONTENT

Overview of Content Structure

The NFS syllabus content comprises three strands, Nutrition and Health, Food Literacy and Consumer Literacy and Food Science. An overview of the organisation of the syllabus content is presented in [Table 3](#).

Table 3. Content Structure of NFS Syllabus

Strands	Topics	Remarks
Nutrition and Health	Nutrients Diet and Health	This strand is about the importance of macronutrients, micronutrients, water and dietary fibre in the diet and their relationship to health. Students will understand how diet may affect health.
Food Literacy and Consumer Literacy	Food Management Smart Consumer	This strand focuses on factors to consider when planning meals for various groups of people. Students will also learn the use of convenience food and how to interpret information found on food labels. This develops students to be discerning consumers who make right food choices.
Food Science	Food Safety The Science in Food Preparation Reactions in Food During Preparation and Cooking Sensory Evaluation of Food	This strand covers topics such as food safety, the reasons for cooking food, and the science behind food preparation and cooking. Understanding how different cooking methods work and the key procedures when preparing and cooking can foster students to be inquisitive and create new food products, while sensory evaluation of food helps students evaluate their creation.

Proposed Teaching and Learning Plan

The NFS N(T) syllabus is a two-year syllabus with a total of 43 curriculum weeks¹⁸. It is recommended that schools offering students with 6-subjects and 5-subjects combination allocate a minimum of five periods and six periods (about 35-40 minutes per period) of NFS lessons per week respectively.

An overview of the proposed teaching and learning plan is presented in *Table 4* to aid teachers in the implementation of the syllabus. The proposed teaching and learning plan was designed with the students' learning needs in mind. It includes learning activities, culinary food science practical sessions and coursework skills within the stipulated curriculum weeks. The learning activities allow students to construct knowledge actively and encourage the development of thinking skills and disposition. Most food commodities, methods of cooking and culinary skills, which are part of the LOs were infused in the proposed plan.

As assessment leads to meaningful learning, regular gathering of quantitative and qualitative information about the students' progress and development is integral. It is ideal that formative assessment such as Assessment for Learning (AfL) is used to check students' understanding and provide opportunities to address students' learning gaps during lessons.

¹⁸ This is after deducting time needed for school events, examinations and CAs, but includes time for white space.

Table 4. Proposed Teaching and Learning Plan

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
Sec 3 Term 1									
S3 T1W1	Subject Introduction								
S3 T1W2	NUTRITION AND HEALTH A. Nutrients, Water and Dietary Fibre	<p>Carbohydrates</p> <p>(a) List the food sources of carbohydrates</p> <p>(b) State the function of carbohydrates in the body (provide energy)</p> <p>(c) Define:</p> <ul style="list-style-type: none"> • simple carbohydrates and give food examples • complex carbohydrates and give food examples 	<p><u>Teaching Area: Arousing Interest</u> <u>Teaching Action 2: Discrepant Event</u> Teacher shares about the definition and types of simple and complex carbohydrates. Students will then taste food such as candies, honey, sweet bread, apple and brown rice, <i>bee hoon</i> and derive the type of carbohydrate (simple/complex/both) dominant in these foods. Teacher to ask students to explain why certain food has both simple and complex carbohydrates based on the taste test.</p> <p>In groups, students identify all the ingredients in various recipes that are good sources of carbohydrates and state the type carbohydrate they belong to.</p> <p><u>Teaching Area: Facilitating Collaborative Learning</u> <u>Teaching Action 4: Think-Pair-Share</u> Students to evaluate the observations of the <i>Ondeh-Ondeh</i> fillings in pairs and record these observations. They will then decide which filling is the most suitable for a selected target group with appropriate justifications.</p>	<i>Ondeh-Ondeh</i> with various fillings	Shaping	Boiling	Cereal (Rice) Fruit (Coconut)	Exploration Execution	Students may use different fillings such as chocolate lava, <i>gula Melaka</i> , <i>kaya</i> , red bean paste, etc.
S3 T1W3&4	NUTRITION AND HEALTH A. Nutrients, Water and Dietary Fibre	<p>Fats</p> <p>(a) List the food sources of fats</p> <p>(b) State the functions of fats in the body (rich source of energy; keep the body warm; protect internal organs)</p> <p>(c) Define:</p> <ul style="list-style-type: none"> • fats and give food examples • oils and give food examples <p>(d) State the uses of fats and oils in food preparation and cooking</p>	<p><u>Teaching Area: Arousing Interest</u> <u>Teaching Action 2: Discrepant Event</u> Students to hunt for different types of fats and oils in the food laboratory in groups. They will then identify the name of the fat and discuss for the uses of these fat. They will present their discussion to the class.</p> <p>Students to modify a wholemeal cupcake recipe to reduce the fat content and prepare a simple time plan by including the preparation details such as baking duration, quantity of ingredients and type of equipment used.</p> <p>They then bake the original and reduced-fat cupcake recipe, followed by conducting a simple sensory evaluation with guided questions. Through this practical, students will derive the following functions of fat in food preparation:</p> <ul style="list-style-type: none"> • gives colour and flavour • traps air to give volume • provides moisture and tenderness 	Wholemeal Cupcake with varied amounts of fats	Creaming	Baking	Fats and Oils Wheat	Planning of execution Execution	Add different fillings/flavouring to make the cupcakes interesting, e.g., fruits, cookies or other colourful ingredients

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
S3 T1W5	NUTRITION AND HEALTH A. Nutrients, Water and Dietary Fibre	<p>Proteins</p> <p>(a) List the food sources of protein</p> <p>(b) State the functions of proteins in the body (growth of body and repair of cells)</p> <p>(c) Define:</p> <ul style="list-style-type: none"> high biological value proteins and give food examples low biological value proteins and give food examples 	<p><u>Teaching Area: Arousing Interest</u> <u>Teaching Action 1: Using Stories and Images</u> Teacher to show students a photograph of a teenager with protein-energy malnutrition (PEM) and a picture of a healthy teenager. The teacher will tell the students that the teenager with PEM is due to protein deficiency. Get students to discuss and predict the functions of proteins in the body.</p> <p>Teacher to show common hawker dishes and get students in groups to identify the type of protein present in the dishes. Students will present their responses to the class.</p> <p><u>Teaching Area: Activating Prior Knowledge</u> <u>Teaching Action 4: Think-Pair-Share</u> Teacher to expose students to different sensory descriptors after the practical and get students to select the appropriate descriptors for their baked rice. Teacher then asks students to think in pairs and share areas for improvement of their dish.</p>	Curry Baked Brown Rice using different good sources of proteins (Chicken/Tofu/Fish/Beef)	Roux Sauce	Baking Boiling	Poultry/Meat/Seafood/Tofu Vegetables (Carrot) Cereal (brown rice)	Sensory Evaluation Execution	Different rice products such as <i>Bee Tai Mak</i> or brown rice <i>Laksa Bee Hoon</i> can be used to replace brown rice
S3 T1W6&7	NUTRITION AND HEALTH A. Nutrients, Water and Dietary Fibre	<p>Vitamins</p> <p>(a) Classify vitamins into fat-soluble vitamins (A and D) and water-soluble vitamins (B group and C)</p> <p>(b) List the food sources of the following vitamins: A, B group, C and D</p> <p>(c) State the functions of vitamins A, B-group, C and D in the body (A: for healthy skin and eyes; B group: releases energy from food; C: for strong immunity; D: helps body to absorb calcium)</p> <p>Minerals</p> <p>(a) List the food sources of the following minerals: calcium, iron, sodium chloride</p> <p>(b) State the functions of calcium, iron, sodium chloride in the body (calcium: forms strong bones and teeth; iron: makes red blood cells; sodium chloride: maintains fluid balance)</p>	<p><u>Teaching Area: Facilitating Collaborative Learning</u> <u>Teaching Action 2: Jigsaw</u> Teacher to group students and each group will be an expert in one vitamin and/or mineral. Teacher to provide reading materials and manipulatives (e.g., food labels, assorted images of various foods) to each group according to the assigned vitamin and/or mineral. Each group will then consolidate their expert knowledge from the resources and present to the class.</p> <p><u>Teaching Area: Checking for Understanding and Providing Feedback</u> <u>Teaching Action 4: Share My Learning</u> Students to get into groups to play a game of Food-a-boo. They will need to guess the different food sources, mineral or vitamin (e.g., carrot, iron, vitamin A) based on the description given by their group members. The description should be based on what they have learnt in the lessons. They will then choose some of the food mentioned in the game as ingredients for making wholemeal quiche.</p> <p>Students can also guess the functions of vitamins/minerals (e.g., forms strong bones and teeth) based on gestures in Charades.</p>	Wholemeal Quiche with varied ingredients (egg, cheese, chicken) Choice of filling to include food sources with different vitamins/minerals (include healthier ingredients)	Shortcrust pastry	Baking (Pastry)	Cereal (whole wheat) Meat/Poultry/Egg/Cheese Vegetables	Background Study Execution	Sweet wholemeal quiche instead of savoury, e.g., fruits, sweet potato, pumpkin sauce, custard sauce

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
S3 T1W8	NUTRITION AND HEALTH A. Nutrients, Water and Dietary Fibre	<p>Water</p> <p>(a) State the factors that affect water intake: state of health, diet, level of activity and environment</p> <p>(b) List the food sources of water in the diet</p> <p>(c) State the functions of water in the body (maintains body temperature; removes waste; transports nutrients)</p>	<p><u>Teaching Area: Facilitating Collaborative Learning</u> <u>Teaching Action 4: Think-Pair-Share</u></p> <p>Teacher to show different occupations to students and get them to discuss which job needs a higher water intake. Students will engage in think/pair/share.</p> <p>Teacher to share article '8 ways to increase your fibre intake' from The Straits Times and get students to identify the sources of dietary fibre.</p>	<p>Fruit/Vegetable Wholemeal Fritters</p> <p>Savoury: Enoki mushroom, lady's finger</p> <p>Sweet: Apple, banana, jackfruit</p>	Thick batter	Shallow frying	<p>Fruit</p> <p>Vegetables</p> <p>Cereal (whole wheat)</p>	<p>Background Study</p> <p>Exploration</p> <p>Execution</p>	Different choices of fruit/vegetable to make fritters
S3 T1W9&10	White space								
Sec 3 Term 2									
S3 T2W1&2	Coursework: Background Study								
S3 T2W3	FOOD SCIENCE B. Reactions in Food during Preparation and Cooking	<p>Methods of Cooking</p> <p>(a) Explain how heat is transferred (conduction, convection and radiation) in the different methods of cooking (grilling, baking, dry-frying, stir-frying / sautéing, shallow-frying, deep-frying, boiling, simmering, steaming, microwave cooking)</p> <p>(b) State the advantages and disadvantages of each method of cooking</p>	<p><u>Teaching Area: Encouraging Learner Engagement</u> <u>Teaching Actions 2: Explore, Engage, Apply</u></p> <p>Students will be in pairs and each pair will draw lots to prepare a stated food ingredient (chicken/egg/broccoli/capsicum) using different MOC. They will then compare the same food item cooked using different MOC and share their findings via gallery walk. In the sharing, they should include a short introduction to the MOC and its advantages and disadvantages.</p>	NIL	NIL	Various MOCs	<p>Poultry</p> <p>Egg</p> <p>Vegetables</p>	NIL	NIL

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
S3 T2W4	FOOD SCIENCE C. Evaluation of Food	Sensory Evaluation (a) State sensory properties (texture, flavour, appearance, aroma) that are used to conduct sensory evaluation of food products (b) Evaluate the sensory properties (texture, flavour, appearance, aroma) of food products	<u>Teaching Area: Arousing Interest</u> <u>Teaching Action 2: Discrepant Event</u> Bus Stop Activities: 1. Students will be in groups to guess the flavour of different flavoured coloured syrups (e.g., yellow colouring in strawberry flavoured syrup) after tasting. 2. Students will be in groups and half of them will be blindfolded. The other half is supposed to feed them with a food item such as a piece of apple to the blindfolded classmates. They will need to taste the food and guess the food based on its texture and flavour. 3. Students will be in groups to guess the different foods in covered boxes based on their sense of smell (e.g., cinnamon powder; vinegar; tomato ketchup) in a covered box 4. Students will be in groups and they are required to chew on jellybeans of different colours for at least thirty seconds with their nose pinched. They will be required to guess the flavour based on the flavour release from their nose after 30 seconds. Students to conduct a sensory evaluation on their executed dish, Chicken brown rice vermicelli with Gravy.	Chicken Brown Rice <i>Bee Hoon</i> with Gravy	Blended Sauce	Stir-frying Boiling	Vegetables Cereal (rice) Poultry	Execution Sensory Evaluation of executed dish	Replace conventional soya sauce-based gravy with barbecue sauce or sweet and sour sauce
S3 T2W5&6	NUTRITION AND HEALTH B. Diet and Health Problems	Diet and Health Problems (a) State the common health problems associated with an excessive or insufficient intake of some nutrients in Singapore: • obesity • hypertension • type 2 diabetes • coronary heart disease	<u>Teaching Area: Facilitating Collaborative Learning</u> <u>Teaching Action 5: Scouting for Information</u> Students in their expert group conduct research on ingredient substitution to make dishes healthier using simplified resources/articles prepared by the teacher. They then use the knowledge to suggest meal modification (with reference to My Healthy Plate) and present their findings to the class using Microsoft PowerPoint/Google Slide/Butcher sheet. Students to decide on the more suitable MOC/filling for the wanton with justifications. They then prepare and cook wanton using the chosen MOC/filling to suit seniors with different health problems. Students to identify their strengths, weaknesses and areas for improvement after the practical.	Wonton	Wrapping	Frying/ Baking/ Boiling/ Steaming	Wheat Meat/Poultry Vegetables	Background Study Decision Making Execution Sensory Evaluation	Adding different seasonings to <i>wanton</i> filling, e.g., curry powder, black pepper, pesto, <i>sambal</i> , <i>char siew</i> sauce, <i>rendang</i> , cheese
S3 T2W7&8	Coursework: Exploration								
S3 T2W9&10	White space								

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
Sec 3 Term 3									
S3 T3W1, 2&3	FOOD LITERACY A. Food Management	Diet & Meal Planning (a) Explain the term balanced diet (b) Explain the factors to consider when planning meals: <ul style="list-style-type: none"> age (school children, teenagers, adults and elderly) gender level of physical activity religions (Buddhism, Christianity, Hinduism, Islam) vegetarianism (vegetarians, vegans) budget (including considerations for sustainability e.g., buying just enough, buying ugly produce at a discounted price, buying from nearby or local at cheaper price) 	<u>Teaching Area: Setting Meaningful Assignments</u> <u>Teaching Action 1: Show and Tell</u> Students to take a photo of one of their meals and explain to the class whether their meal meet My Healthy Plate guidelines. <u>Teaching Area: Using Questions to Deepen Learning</u> <u>Teaching Action 4: Generating Questions</u> Students to work on authentic task on a specific person, analyse their nutritional needs and food preferences through interviews, and 'shop' for suitable ingredients based on a given budget and other meal planning factors. They will need to justify their choices and present their findings to the class. Teacher is to provide guiding questions using Revised Bloom's Taxonomy to aid students to deepen their learning. Questions may include ways to minimise food wastage and retain nutrients.	Wholemeal <i>Roti Jala</i> with a side dish (e.g., keema)	Thin batter	Pan-frying	Cereal (Wheat)	Decision Making Planning of execution Execution	Students can make different coloured <i>Roti Jala</i> using colourings from red cabbage juice, turmeric powder or blue pea flower dye
		Meal Analysis (a) Plan and modify recipes / meals using the food guide recommended by HPB to meet different dietary / nutritional needs	Students to decide (with justifications) on <i>Roti Jala</i> and a selected side dish which is suitable for an adult who is physically active. Students then plan the execution for both the chosen side dish and <i>Roti Jala</i> using a time plan. The students will be executing the dish with reference to the time plan during the practical lesson.						
S3 T3W4&5	FOOD SCIENCE A. The Science of Food Preparation and Cooking	Preparation and Cooking of Food (a) State the reasons for cooking food (makes food easier to chew and digest; improves appearance and flavour of food; makes food safe to eat) (b) State types and uses of the following food commodities: <ul style="list-style-type: none"> meat poultry seafood eggs dairy products cereals fruit vegetables pulses and legumes (c) Identify the structure of meat, eggs and cereals	<u>Teaching Area: Encouraging Learner Engagement</u> <u>Teaching Action 2: Explore, Engage, Apply</u> <u>Teaching Area: Providing Clear Explanation</u> <u>Teaching Action 3: Models as Teaching Aids</u> Bus stop Activities: <ol style="list-style-type: none"> Students to learn about the structure of meat/ egg/wheat using structures e.g., raw spaghetti and lotus root to simulate the muscle fibre of meat Identify different unlabelled dairy products (milk of different fat content/different types of cheese) Sorting different types of fruit and vegetables Taste and observe a well-boiled egg and overboiled egg and evaluate the points to consider when boiling eggs 	NIL	NIL	NIL	Meat Poultry Seafood Eggs Dairy products Cereals Fruit Vegetables Pulses and Legumes	NIL	NIL

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
		(d) Explain the points to note when preparing and cooking the food commodities	<u>Teaching Area: Encouraging Learner Engagement</u> <u>Teaching Actions 2: Explore, Engage, Apply</u> Bus stop Activities: <ol style="list-style-type: none"> Students will learn how to store different food commodity by sticking models of different food on a soft board showing an image of kitchen Watch SLS Video on meat tenderising and answer some questions Identifying different types of rice and other cereals Students will be exposed to different dishes and match the different uses of eggs to these dishes <u>Teaching area: Using Questions to Deepen Learning</u> <u>Teaching Action 5: Challenge Me</u> Students to make creative pizzas for children using different food commodities as pizza toppings. They then conduct a sensory evaluation after the execution of pizza.	Pizza	Yeast dough	Baking		Sensory Evaluation	To garnish the pizza for serving to children (e.g., smiley face pizza)
S3 T3W6,7&8	Coursework: Decision Making, Planning and Execution								
S3 T3W9&10	White space								
Sec 3 Term 4									
S3 T4W1	Coursework: Sensory Evaluation of executed dishes								
S3 T4W2-4	Revision & Summative Assessment								

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
Sec 4 Term 1									
S4 T1W1	FOOD LITERACY B. Smart Consumer	<p>Convenience Food</p> <p>(a) List the different types of convenience food (ready-to-cook and ready-to-eat: bottled / canned food, dried food, frozen / chilled food)</p> <p>(b) Explain the advantages and disadvantages of convenience food</p> <p>(c) State the types of information found on food and nutrition labels</p> <p>(d) Interpret and apply information found on food and nutrition labels</p>	<p><u>Teaching area: Setting Meaningful Assignments</u> <u>Teaching Action 3: Practice for Mastery</u></p> <p>Each student will bring a convenience food packaging of their choice and they will use a guided worksheet prepared by the teacher to decipher the different information on the food packaging using their knowledge gained from the SLS videos. They will submit both the food packaging and worksheet at the end of the activity.</p>	NIL	NIL	NIL	NIL	NIL	NIL
S4 T1W2&3	FOOD SCIENCE B. Reactions in Food during Preparation and Cooking	<p>Reactions in Food during Preparation and Cooking</p> <p>(a) Demonstrate the skills required in the preparation and cooking of the following products (including local dishes):</p> <ul style="list-style-type: none"> • cakes, biscuits (creaming, rubbing-in, whisking) • shortcrust pastry • batters (thin and thick) • sauces (roux and blended) <p>(b) State the reasons for the following procedures:</p> <ul style="list-style-type: none"> • Creamed cakes: cream butter and sugar in creamed cakes to incorporate air into the mixture • Rubbed-in cakes, biscuits and shortcrust pastry: use hard fat to achieve a breadcrumb consistency • Whisked cakes: whisk eggs and sugar until light and fluffy to introduce air; fold in flour gently to whisked egg whites to prevent air bubbles in the mixture from being knocked out • Batters: add liquid to flour gradually while stirring to prevent lumps • Sauces: cook on low heat with constant stirring to prevent lumps <p>(c) State the common faults and causes of the following:</p> <ul style="list-style-type: none"> • Cakes: cracked cake, sunken cake, sunken fruits • Biscuits: flat biscuit, hard and dry biscuits • Batters: soggy texture, undercooked food within the cooked batter • Pastries: tough and hard pastry, shrunken pastry • Sauces: lumpy sauce, dried sauce 	<p><u>Teaching Area: Encouraging Learner Engagement</u> <u>Teaching Actions 2: Explore, Engage, Apply</u></p> <p>Students will be working in pairs and some pairs will be given a flawed recipe, which may cause faults such as cracked cake or sunken fruits while some pairs will be given the original recipe. They will execute the dish and explore the differences between the original and flawed recipe. From there, students will derive the causes of some cake faults.</p>	<i>Pandan</i> Sponge Cake	Whisking	Baking	Egg Wheat Fruit	Sensory Evaluation	Students will be tasked to garnish their whisked cake to make it creative for teenagers.

Year / Term / Week	Strands and Topic	Learning Outcomes	Learning Activity	Proposed Culinary Food Science	Skills	MOC	Commodities	Coursework Process Skills	Food Innovation
S4 T1W4	FOOD SCIENCE A. The Science of Food Preparation and Cooking	Food Safety (a) State how to avoid and reduce the risk of food spoilage and food contamination when preparing, cooking and storing food (including hygienic practices)	<u>Teaching Area: Supporting Self-directed Learning</u> <u>Teaching Action 2: Role Play</u> Students will be putting on the hat of an SFA food hygiene officer and evaluate photos of different food preparation areas. They will be given a list of offences and fines extracted from the SFA website as a reference to identify hygiene lapses. They will then present their 'investigation findings' using a skit to educate food handlers on food safety issues. Teacher to conduct a revision on the various coursework processes.					Coursework Revision	
White Space Summative Assessment N Level Coursework									

SECTION 3:

PEDAGOGY

The Singapore Curriculum Philosophy
Pedagogical Considerations
Teaching Processes
Teaching and Learning Strategies

3. PEDAGOGY

The Singapore Curriculum Philosophy

The Singapore Curriculum Philosophy (SCP) guides teachers to think about the teaching and learning of the curriculum, while placing our students' interest at heart.

The beliefs of SCP are:

- (i) We believe in holistic education.
- (ii) We believe that every child wants to learn and can learn. We focus on students' learning needs when designing learning experiences.
- (iii) We believe that learning flourishes:
 - in caring and safe environments,
 - when students construct knowledge actively,
 - through the development of thinking skills and dispositions, and
 - when assessment is used to address students' learning gaps.

NFS teachers should use these beliefs when designing and implementing lesson ideas to enhance the learning experiences of the students. This can help students find more meaning and make connections in the knowledge and skills gained through the curriculum.

Pedagogical Considerations

Learner-centred approach that involves students in doing and evaluating their work support the applied learning nature in the NFS N(T) syllabus. In the study of NFS N(T), it is important that students find meaning in learning the subject matter and this can be enacted with appropriate strategies to develop students' interest. Activity-based Learning (ABL) such as Inquiry-Based Learning (IBL) and Experiential Learning (ExL) are strategies that support the applied learning nature in the NFS N(T) syllabus. They are learner-centred approaches that involve students in doing, reflecting and evaluating the processes and products. These teaching and learning strategies encourage students to take ownership of their learning. Students also construct their own knowledge when they generate explanations, elaborate and/or evaluate using their theoretical and practical understanding on the outcomes they observed or experienced.

ABL encourages collaborative and active learning. For example, in an ABL lesson on meal planning, students may conduct interviews on their peers and teachers to find out the needs of different age groups. They may then form groups to discuss their findings and select/modify suitable dishes from the school canteen as part of a healthy diet. By doing so, it brings about better knowledge retention as the students learn by doing, reflect on what they observe, construct knowledge using both theoretical and practical understanding and apply their learning to solve the task. When students work together in small groups towards a common goal, it promotes interpersonal skills that are essential for the 21st century.

IBL and ExL can be incorporated in the teaching and learning of NFS N(T) when students evaluate their findings from their exploration component of the coursework to determine the appropriate ingredients, temperature, preparation time or quantity of ingredients that would produce the best outcomes for a food product. Another example could be giving students recipes with missing key

ingredients and having them evaluate the end product and identify the function of the missing key ingredient.

Teaching Processes

The Singapore Teaching Practice (STP) is a model that makes explicit how effective teaching and learning can be achieved in our Singapore classrooms. One of the components of the STP, the Pedagogical Practices, comprises four Teaching Processes that outline what teachers ought to reflect on and put into practice before, during and after their interactions with students in all learning contexts.

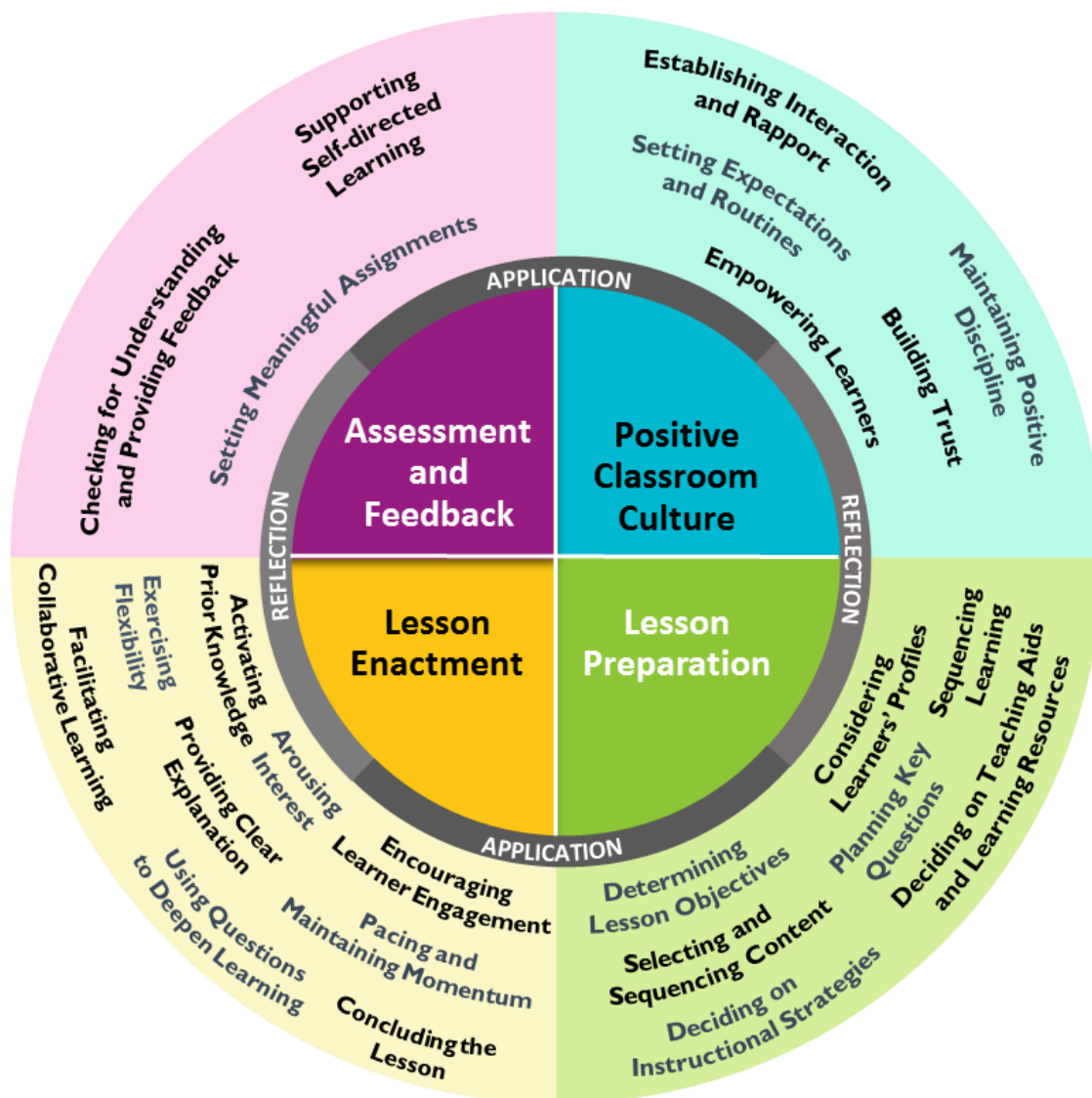


Figure 2: Diagram of the Pedagogical Practices

As we value every child as an individual with diverse learning needs, experiences, beliefs, knowledge and skills, there is a need to customise and adapt the enactment of the Teaching Areas and Teaching Actions to bring about developmentally appropriate teaching of NFS N(T). Each of the 24 Teaching Areas include a set of important considerations or Teaching Actions that helps enact it.

Table 5 presents the four Teaching Processes which are further expanded into 24 Teaching Areas:

Table 5. Teaching Areas

<p>Assessment and Feedback</p> <ul style="list-style-type: none"> • Checking for understanding and providing feedback • Supporting self-directed learning • Setting meaningful assignments 	<p>Positive Classroom Culture</p> <ul style="list-style-type: none"> • Establishing interaction and rapport • Maintaining positive discipline • Setting expectations and routines • Building trust • Empowering learners
<p>Lesson Enactment</p> <ul style="list-style-type: none"> • Activating prior knowledge • Arousing interest • Encouraging learner engagement • Exercising flexibility • Providing clear explanation • Pacing and maintaining momentum • Facilitating collaborative learning • Using questions to deepen learning • Concluding the lesson 	<p>Lesson Preparation</p> <ul style="list-style-type: none"> • Determining lesson objectives • Considering learners’ profiles • Selecting and sequencing content • Planning key questions • Sequencing learning • Deciding on instructional strategies • Deciding on teaching aids and learning resources

* For more information on STP, refer to the STP website, housed in [OPAL](#).

As we value every child as an individual with diverse learning needs, experiences, beliefs, knowledge and skills, there is a need to customise and adapt the enactment of the Teaching Areas and Teaching Actions to bring about developmentally appropriate teaching of NFS N(T). Each of the 24 Teaching Areas include a set of important considerations or Teaching Actions that helps enact it.

Teaching and Learning Strategies

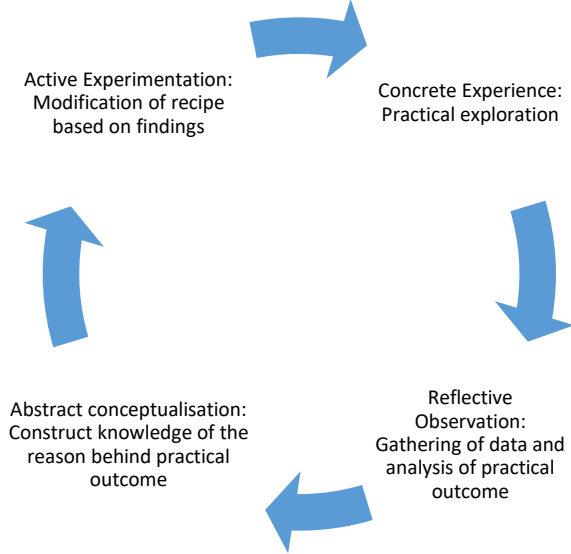
In addition to the learning activities presented in the Teaching and Learning Plan ([Table 4](#)), the following suggested lesson examples ([Table 6](#)) are pegged to the Teaching Areas of the STP that could be used in the NFS N(T) lessons.

Table 6. Teaching and Learning Strategies in NFS N(T)

Teaching Area	Teaching Action	Lesson Example
<p>Activating prior knowledge / Facilitating collaborative learning</p>	<p>Teaching Action 1: Think-Pair-Share</p> <p>Based on the task, students consider a question on their own before proceeding to discuss with their peers. This way, they learn from one another and deepen their understanding and application on their learning when given such opportunities.</p>	<p>Prepare two egg dishes to show the different uses of eggs when cooking for a teenager.</p> <p>Students to take part in peer review by evaluating the suitability of the dishes for the task:</p> <ul style="list-style-type: none"> • nutritional content • attractiveness of meal for teenagers • uses of eggs in the selected dishes
<p>Arousing interest</p>	<p>Teaching Action 1: Using Stories and Images</p> <p>The use of stories and images can help students make connection to the theory and real-life context. This could trigger students to put in effort to explore the content and deepen their understanding of the topic(s).</p> <p>Real-life examples and real-world problems could be presented to students to allow them to discuss, identify the problems and provide possible solutions.</p>	<p>A video on over-preparation of food in Singapore can be shared with the students. Teachers can get the class to share how over-buying food can lead to food wastage and increase in budget.</p> <p>To further engage the students, teachers could get students to:</p> <ul style="list-style-type: none"> • discuss how they can reduce their budget when planning meals.

<p>Encouraging learner engagement</p>	<p>Teaching Action 2: Explore, Engage, Apply</p> <p>When students are involved in authentic tasks and able to connect what they have learnt, they will be more motivated to complete the tasks.</p> <p>IBL can be used in this instance to get students excited as they play a part in the discovery of their own knowledge.</p>	<p>An example of how an NFS N(T) lesson can be anchored using the 5E instructional model:</p> <p>Engagement: excite the students by bringing variations of milk (regular, low-fat and skimmed) into the classroom (use number code to label the milk samples), allow students to taste the milk and get students to indicate their preference.</p> <p>Exploration: split the students into groups based on their preference and get them to study the food labels of the different variations of milk and guess which food label belongs to their preferred milk.</p> <p>Explanation: get the students to research on the fat content in milk and explain how the fat content of the different variations of milk affects their sensory properties.</p> <p>Elaboration: students will further explain on the uses of milk in cooking and how milk of different fat contents are suitable for different groups of people. They should link them to topics such as diet-related health problems and uses of milk in cooking.</p> <p>Evaluation: get the students to prepare a poster presentation to share how to read a food label and be a discerning consumer. Students could also check their own progress through a set of post-lesson quiz.</p> <p><i>5E model adapted from: Biological Sciences Curriculum Study (BSCS)</i></p>
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Facilitating collaborative learning	<p>Teaching Action 3: Reciprocal Teaching</p> <p>This involves two or more students teaching one another. In the process, the students monitor their own and their peers' learning and thinking.</p>	<ol style="list-style-type: none"> 1. Students are tasked to prepare a time plan for two recipes. 2. Exchange time plan with partner. 3. Partner will execute out each other's time plan in a practical lesson. 4. Peer review/evaluate time plan and give feedback on how to improve.
	<p>Collaborative Learning</p> <p>Working together to complete a shared goal maximises students' learning. In the process of accomplishing the given goal, students search for solutions together and make sense of the information as a group. Such behaviours allow them to deepen their understanding of the concept learnt.</p>	<p>Task: Plan and prepare three suitable dishes for schoolchildren.</p> <p><u>Instruction:</u></p> <ol style="list-style-type: none"> 1. Get students to form into groups of three. 2. Submit a plan with the following information: <ol style="list-style-type: none"> a) Background Study b) Decision Making (justify the choice of dishes) c) Time Plan (division of work and order of food preparation) 3. Prepare three dishes. <p>Task: Prepare a poster/brochure with that encourages seniors to consume more calcium in their diet.</p> <p><u>Instruction:</u></p> <ol style="list-style-type: none"> 1. Work in pairs. 2. Research and prepare the poster/brochure.

<p>Using questions to deepen learning</p>	<p>Teaching Action 2: Pumping</p> <p>This encourages students to generate ideas based on reasoning and prior knowledge. It uses a series of questions to prompt and guide students' thinking in the form of feedback chain.</p> <p>ExL is the process of learning through experiences where students learn by reflecting on what they are doing or have done with the teacher being a facilitator.</p> <p>In NFS practical sessions, students conduct exploration on skills, ingredients or cooking methods. They then analyse results and record their observations based on their theoretical and practical understanding. Teachers often guide the students in the construction of their own knowledge by asking questions.</p>	 <pre> graph TD A["Active Experimentation: Modification of recipe based on findings"] --> B["Concrete Experience: Practical exploration"] B --> C["Reflective Observation: Gathering of data and analysis of practical outcome"] C --> D["Abstract conceptualisation: Construct knowledge of the reason behind practical outcome"] D --> A </pre>
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e-Pedagogy

Teachers can leverage digital technologies to accelerate and deepen learning of NFS by making learning more active and personalised. e-Pedagogy is the practice of teaching with technology for active learning that creates a **participatory, connected, and reflective classroom** to nurture the future-ready learner.

Designing lessons with technology is intentional and principle-based, informed by what learning sciences tells us about how people learn. [Figure 3](#) explains how the principles of learning sciences guide the way teachers design for **active learning with technology**.

Principles from Learning Sciences	Tapping on Prior Knowledge Students have preconceptions about how the world works. These must be engaged and harnessed for conceptual change.		
	Building Schema Students must be supported to understand ideas in the context of a conceptual framework and re-organise knowledge according to their own structures for retrieval and application.		
	Thinking about Thinking Students need support to take control of their learning by defining learning goals, monitoring their own progress in achieving them and thinking about their own thinking and actions.		
Active Learning Processes	Activate Learning How will students' focus and interest be oriented towards the learning objectives?	Promote Thinking and Discussion How will students think about ideas and concepts? What skills and processes will students perform? How will students build on their current understanding?	Facilitate Demonstration of Learning How will students demonstrate their understanding and new learning?
	Monitor and Provide Feedback How can students' learning be advanced?		

Figure 3: How learning principles inform the lesson design processes

Teachers should continue to be cognisant of the NFS curricula intent when designing and developing lessons using technology. The four elements of e-Pedagogy (see [Figure 4](#)) serve as a good guide for:

a) Constructive Alignment

Ensures that students are constructing meaning for themselves through relevant learning activities, and the learning outcomes, learning activities and assessment tasks are coherent.

b) Learning Experience

Consider how the learning activities are pulled together meaningfully to achieve the intended learning outcomes.

c) Active Learning Processes and Interactions

Learning sciences principles tell us that learning interactions are at the heart of the active learning processes, where the focus is on how students learn with teachers, peers, community and resources.

d) Key Applications of Technology

Consider the affordances of technology that can be harnessed to enhance the learning processes.



Figure 4: Elements of e-Pedagogy in EdTech PS

EdTech Pedagogical Scaffold

e-Pedagogy is the practice of teaching with technology for active learning that creates a participatory, connected, and reflective classroom to nurture the future-ready learner.

The EdTech Pedagogical Scaffold (PS) supersedes SLS PS 2.0 as the tool to guide teachers in applying e-Pedagogy. It translates e-Pedagogy into five key actions that guide teachers in designing and facilitating active learning with technology.

The following resources are provided for teachers' use:

- The online *Guide to e-Pedagogy* <https://go.gov.sg/enedagogyguide> (iCON login is required) provides details and examples for teachers who wish to learn more about the EdTech PS and is designed for navigation based on teachers' interest and readiness levels.
- The *Quick Guide to EdTech PS* <https://go.gov.sg/edtechps> helps teachers to understand and start applying the EdTech PS for lesson design.

Example of e-Pedagogy NFS Lesson

Figure 5 captures the relationship between the sequences of e-Pedagogy (e.g., acquisition) and STP teaching moves (e.g., activate learning) in a NFS lesson.

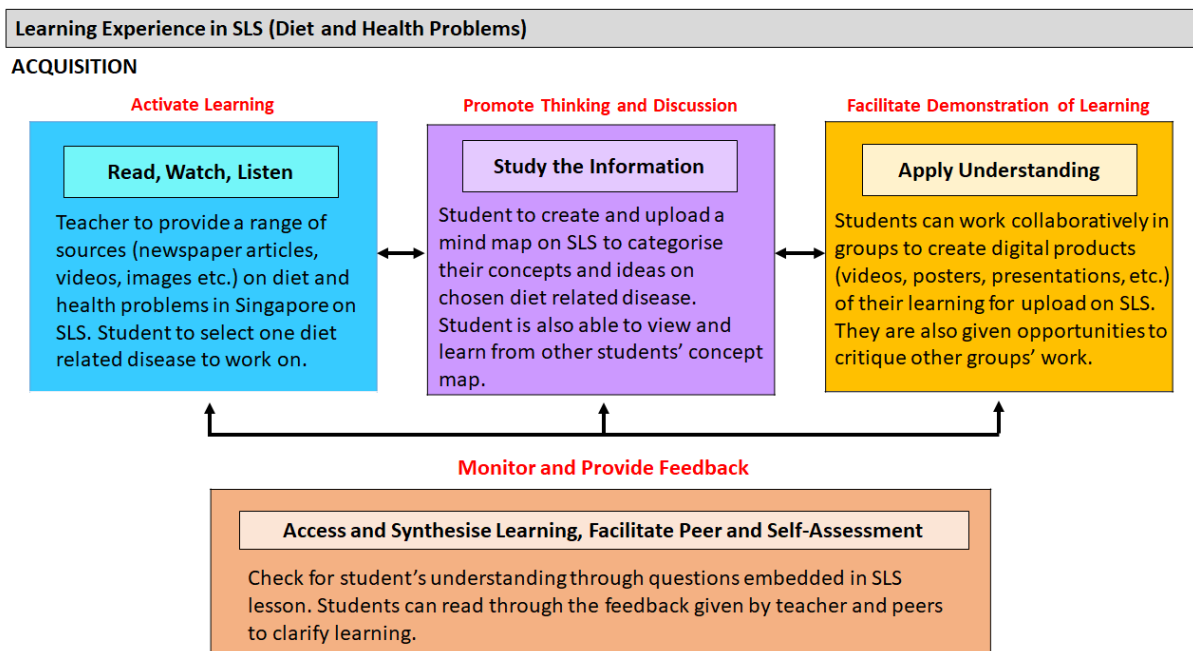


Figure 5: Elements of e-Pedagogy in a NFS lesson

Blended Learning

Why Blended Learning

Blended Learning in MOE's context transforms our students' educational experience by seamlessly blending different modes of learning. The key intents are to nurture (i) self-directed and independent learners; and (ii) passionate and intrinsically motivated learners.

An aspect of Blended Learning is the integration of home-based learning (HBL) as a regular feature of the schooling experience. HBL can be a valuable complement to in-person schooling. Regular HBL can equip students with stronger abilities, dispositions and habits for independent and lifelong learning, in line with MOE's Learn for Life movement.

Blended Learning presents an opportunity to re-think and innovate on curriculum, pedagogies and assessment for a more effective and student-centric educational experience. It gives students more ownership and agency over how they learn, at a pace they are comfortable with. It also offers scope for teachers to tap the advantages of both in-person learning and distance learning to plan lessons best suited to each mode of learning opportunity.

What is Blended Learning

Blended Learning provides students with a broad range of learning experiences (see [Figure 6](#)).



Figure 6: Examples of Blended Learning experiences

Table 7: Elaboration of possible Blended Learning experiences

Possible Blended Learning Experiences	What this means
Structured/Unstructured learning	A combination of structured time for students to learn within a given time frame and unstructured time for students to learn at their own pace and exercise self-management.
Synchronous/Asynchronous learning	A combination of in-person schooling, live online lessons and online/offline learning where students learn remotely and at their own pace.
Within-curriculum/Out-of-curriculum learning	Opportunities for students to learn from and beyond the formal curriculum.
Distance/In-person learning	Opportunities for students to learn during face-to-face lessons with teachers and peers in school, complemented by out-of-school learning activities.
ICT-mediated/Non-ICT-mediated learning	Opportunities for students to learn through a combination of ICT-mediated and non-ICT-mediated learning experiences.

What are the Design Considerations for Blended Learning Experiences

For effective Blended Learning experiences, traditional in-class learning should be thoughtfully integrated with other learning approaches such as technology-based approaches. Teachers should be intentional and selective with the aspects of the curriculum to be delivered in school or at home, and leverage technology where it is meaningful and helpful for learning.

Some useful questions to consider when planning for Blended Learning include:

- *What do I want to teach and what are the learning outcomes?*
- *What is the prior knowledge or experience my students have?*

- *Is it safe to carry out the activity at home?*
- *Does everyone have access to the resources required for home-based learning?*
- *What is the best way to organise the learning experiences?*
- *How do I capitalise on the benefits of in-person and home-based learning? How can I plan the activities for classroom learning and home-based learning such that they complement or supplement each other? Which content is more optimally taught in-person, and which, remotely?*
- *Have I integrated Universal Design for Learning principles into my face to face and online lessons, activities and assessments to ensure that all students can access content and participate in the learning opportunities?*
- *How do I assess my students' learning?*
- *How can I provide my students with feedback on the lesson?*
- *How do I help my students organise their knowledge to form a rich set of connections across the Blended Learning experiences?*

Important point to note:

Do not support preparation of food and the conduct of food science experiments at home unless they are conducted under adult supervision. Safety is of utmost importance as these activities may involve open flame, high temperature, sharp objects and food safety.

Link to NFS OPAL2.0 wikipage on Blended Learning

(<https://www.opal2.moe.edu.sg/csl/content/perma?id=162904>)

Ensuring a Positive Classroom Culture for Blended Learning

As teachers consider how best to design meaningful learning experiences for Blended Learning, there is also a need to create a caring and safe environment for students, both in the physical and virtual spaces. Teachers can bear in mind the following considerations for a positive classroom culture in the Singapore Teaching Practice:

- Foster positive teacher-student and peer relationships through building a culture of care, trust and mutual respect.
- Use preventive and intervention strategies for effective behaviour management and discipline.
- Encourage and reinforce good behaviour by establishing and applying expectations and routines.
- Develop a sense of curiosity and inquiry for lifelong learning.
- Encourage students to take responsibility for their own learning, be involved in decision-making, regard mistakes as learning opportunities and express their views confidently.

For more information, teachers may refer to [The Singapore Blended Learning Guide for Educators](#) on OPAL2.0.

SECTION 4:

ASSESSMENT

Formative Assessment
Summative Assessment
National Examination

4. ASSESSMENT

Assessment is integral to the learning process and helps students become self-directed learners. As such, we design assessments with clarity of purpose, to provide learners and teachers with feedback to address learning gaps and improve teaching practices.

It is necessary that assessment is closely aligned with curricular objectives, content and pedagogy. In the assessment of NFS N(T) curriculum, both formative and summative assessment could be used during school-based assessment to check for students' understanding and provide opportunities for them to apply the knowledge and skills they had learnt.

Formative Assessment

Formative Assessment (FA) is carried out during the instructional process to provide feedback to adjust ongoing teaching and learning in order to improve students' achievement of intended instructional outcomes. It may involve informal methods such as observation and oral questioning, or the formative use of more formal measures such as quizzes, portfolios, or performance assessment.

Assessment for Learning (AfL) is an assessment that supports teaching and learning with the specific use of learner-centred approaches and strategies. Information obtained from AfL can help teachers identify gaps in students' learning and provide quality feedback for students on how to improve their work.

Teachers could refer to the Teaching Areas and use the Teaching Actions in the STP to carry out AfL during both classroom and practical lessons. Examples of Teaching Areas and Teaching Actions are found in [Table 8](#).

Table 8. Examples of Teaching Area and Teaching Action in NFS Classroom

Teaching Area	Teaching Action	Example
Using questions to deepen learning	Teaching Action 1: Initiate-Respond-Follow up or Feedback (IRF) Chains	To be used before, during and after lessons to check for understanding. Topic: Food Safety Beginning of lesson: Can I have a show of hands how many of you had experienced food poisoning? [allow students to respond] Can anyone share on what you know about food poisoning? During lesson: Are you able to give examples of the causes of food spoilage? Conclusion: How do you think we can avoid food spoilage when preparing food in our food lab?

Teaching Area	Teaching Action	Example
Checking for understanding and providing feedback	Teaching Action 1: Comment Only Feedback	<u>Examples of Teacher feedback</u> 1. Get students into groups to plan meals using cereals as a main ingredient for a specific group of people, each group presents the idea to the class and teacher could provide feedback on the suitability of the selected dishes. 2. Students to design posters on the information found on food labels and teacher could assess the poster by providing feedback on the content.
	Teaching Action 4: Share My Learning	<u>Examples of Peer feedback</u> 1. Improve on each other's work, e.g., short answer type questions and time plan, etc. 2. Evaluate the sensory qualities and discuss suitability of dish(es)/ meal(s) prepared for a target group.

Schools are encouraged to do a series of practical sessions and coursework assignments in Secondary Three to prepare students for the national coursework assessment in Secondary Four. Schools should assess students' application of theoretical knowledge through authentic tasks, such as justifying dishes chosen for a specific group of people. Teachers and students could use the coursework assessment rubrics (i.e., execution) to ascertain the students' level of competency. Teachers could also help students understand the assessment rubrics so that students can continue to progress to the next level of achievement/attainment. This would also aid teachers in familiarising with the coursework assessment rubrics and give students an insight on the coursework expectations.

Schools could consider developing students with coursework process skills through assigning bite-sized projects/assignments when they are in Secondary Three. These assignments could include the various coursework skills required for coursework assessment such as background study, recording of observations in exploration, and overall evaluation of practical outcomes. While the bite-sized assignments need not build on one another, the development of these process skills requires the teachers to carefully plan and design such that the desired skills can be acquired. This would give students opportunities to apply their learning of various topics and make connections across the different topics.

Summative Assessment

The purpose of summative assessment (SA) is to provide information on students' mastery of content, knowledge and skills, and assigning grades or certifying students' proficiency. In Secondary Three, there should be no more than one weighted assessment (WA) per term, in addition to end-of-year examination (EYE). There will not be mid-year examination (MYE) in Secondary Three. In Secondary Four, there should be no more than one WA per term, in addition to MYE and EYE.

Table 8 shows different possible assessment weighting distribution for both Secondary Three and Four.

Table 9. Examples of Possible Assessment Weighting for NFS N(T)

Secondary Three						
	Term 1		Term 2	Term 3		Term 4
Assessment Type	WA	WA	MYE	WA	WA	EYE
Example 1	10%	15%	-	15%	10%	50%
Example 2	10%	15%	-	15%	-	60%
Example 3		15%	-	15%	-	70%
Secondary Four						
	Term 1		Term 2	Term 3		Term 4
Assessment Type	WA	WA	MYE	WA	WA	EYE /Prelims
Example 4	-	-	25%	15%	-	60%
Example 5	5%	-	30%	15%	-	50%
Example 6	10%	10%	20%	10%	10%	40%

In NFS N(T), WA and/or examinations could be aimed to assess students' understanding and application of the concepts learnt rather than on recall of knowledge. Table 8 shows varied item types recommended for NFS (NT) WA and/or examinations. Other than written form of assessment, schools could also consider alternative modes of assessment in SA such as practical skills and coursework process skills.

National Assessment

The examination papers are designed according to the assessment objectives. The assessment objectives are classified into three main areas:

AOA Knowledge with understanding

Candidates should be able to demonstrate knowledge and understanding of facts, concepts, and terminology in relation to:

- (i) nutrition and health
- (ii) food literacy and consumer literacy
- (iii) food science

AOB Handling and applying information

Candidates should be able to:

- locate and select information
- interpret information
- present reasoned explanations

AOC Application of skills, knowledge and understanding in a variety of contexts

Candidates should be able to extend the learnt knowledge to carry out coursework involving the following processes:

- define, gather and process information on the coursework task
- justify selection of three appropriate dishes
- observe, record and provide explanation on the learning acquired from exploring one dish
- demonstrate good organisational and time management skills
- apply various food preparation techniques and use different cooking methods in preparing dishes/meals for different situations
- demonstrate proficient use of equipment and good management of resources in food preparation
- demonstrate the ability to evaluate the sensory outcome of the dishes

The assessment weighting for GCE N(T) Level syllabus are stated in the following table.

Table 10. Examination weighting of N(T) Level

Paper	Assessment Objectives			Total
	AOA	AOB	AOC	
1 (Written Examination)	~25%	~15%	N.A.	40%
2 (Coursework)	~10%	~10%	~40%	60%
Overall	35%	25%	40%	100%

All students will offer Paper 1 and Paper 2 and all questions are compulsory in both papers.

Paper 1 - Written Paper (1.5 hours)

This will test the candidates’ knowledge of theory and practice in response to the assessment objectives. Candidates are to answer all questions.

- Section A: 16 marks (multiple choice type questions)
- Section B: 32 marks (short answer type questions)
- Section C: 32 marks (structured type questions)
- Sub-total: 80 marks


Setting Paper 1 Written Paper

Written class test and/or examinations could aim to assess student’s understanding and application of the concepts learnt rather than on recall of knowledge. Table 10 shows suggested item types for NFS written class test and/or examinations.

Table 11. Item types recommended for NFS N(T)

Item Type	Question
Multiple choice question	<p>1. Which of the following is a good source of fat?</p> <ul style="list-style-type: none"> (a) *Butter (b) Egg white (c) <i>Kailan</i> (d) Plain flour <p>2. Which of the following will cause sunken cupcakes?</p> <ul style="list-style-type: none"> (a) Adding too little sugar to the cake mixture (b) *Adding too much liquid to the cake mixture (c) Incorporating too little air during creaming (d) Setting the oven temperature too high <p>3. The following shows Bernard’s lunch.</p> <p style="padding-left: 40px;">1 palm-sized piece of baked fish fillet ½ bowl of stir-fried spinach 1 glass of plain water 1 small mango</p> <p>Which component of My Healthy Plate is missing based on Bernard’s lunch?</p> <ul style="list-style-type: none"> (a) *Brown Rice and Wholemeal Bread (b) Fruit (c) Meat and others (d) Vegetables

Item Type	Question
Short answer type question	<p>1. The following ingredients can be used to make a white sauce.</p> <p style="text-align: center;"><i>25g butter</i> <i>25g flour</i> <i>250 ml milk</i></p> <p>a. Identify the method to make this sauce.</p> <p>b. State two ways to prevent lumps forming when making a sauce.</p> <p>c. Suggest one ingredient that could be added to make this sauce savoury.</p> <p>2. Define the term 'balanced diet'.</p> <p>3. List two functions of water.</p> <p>4. State two advantages and two disadvantages of deep-frying.</p>
Structured question	<p>1. Fish is a common food commodity used in cooking.</p> <p>a. Give two differences between white and oily fish.</p> <p>b. Name one example of white fish and one example of oily fish.</p> <p>c. State two advantages of steaming as a method of cooking fish.</p> <p>2. List and explain four factors to consider when planning meals for seniors.</p> <p>3. The following ingredients is used to make a rubbed-in cake.</p> <p style="text-align: center;"><i>100g plain flour</i> <i>500g hard fat</i> <i>75g sugar</i> <i>1 egg</i></p> <p>a. Suggest one way that can prevent the fat from melting during the rubbing-in process.</p> <p>b. Explain why hard fat is used in this recipe.</p> <p>c. Name one type of rubbed-in cake.</p>

Item Type	Question																				
	<p data-bbox="403 232 1249 262">4. Refer to the food label below and answer the following questions.</p> <div data-bbox="477 271 1200 786" style="border: 1px solid black; padding: 5px;">  <table border="1" data-bbox="735 271 1200 786"> <thead> <tr> <th colspan="2" data-bbox="743 282 1192 315">Nutrition Information</th> </tr> <tr> <th colspan="2" data-bbox="743 315 1192 349">Serving size 28 g (about 10 chips)</th> </tr> <tr> <th colspan="2" data-bbox="743 371 1192 405">Amount Per Serving</th> </tr> </thead> <tbody> <tr> <td data-bbox="743 427 1002 461">Calories</td> <td data-bbox="1010 427 1192 461">120 kcal</td> </tr> <tr> <td data-bbox="743 483 1002 517">Fat</td> <td data-bbox="1010 483 1192 517">3 g</td> </tr> <tr> <td data-bbox="743 539 1002 573">Sodium</td> <td data-bbox="1010 539 1192 573">200 mg</td> </tr> <tr> <td data-bbox="743 595 1002 629">Total Carbohydrates</td> <td data-bbox="1010 595 1192 629">21 g</td> </tr> <tr> <td data-bbox="743 629 1002 663">Sugars</td> <td data-bbox="1010 629 1192 663">2 g</td> </tr> <tr> <td data-bbox="743 663 1002 696">Dietary Fibre</td> <td data-bbox="1010 663 1192 696">2 g</td> </tr> <tr> <td data-bbox="743 719 1002 752">Proteins</td> <td data-bbox="1010 719 1192 752">2 g</td> </tr> </tbody> </table> <p data-bbox="488 613 726 775">Ingredients: Dehydrated Potatoes, Modified Food Starch, Corn Oil, Sugar, Salt, Soy Lecithin, Leavening (Monocalcium Phosphate and Sodium Bicarbonate), and Dextrose. No Preservatives.</p> <p data-bbox="440 842 1289 994">a. Identify two pieces of information that are missing in the food label. b. Name the ingredient that is present in the largest amount. c. What is the total amount of fat in two servings of potato chips?</p> </div>	Nutrition Information		Serving size 28 g (about 10 chips)		Amount Per Serving		Calories	120 kcal	Fat	3 g	Sodium	200 mg	Total Carbohydrates	21 g	Sugars	2 g	Dietary Fibre	2 g	Proteins	2 g
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Dietary Fibre	2 g																				
Proteins	2 g																				

Paper 2 – Coursework (35 hours)

The GCE N(T) Level coursework task will be issued to schools at the beginning of the examination year. Teachers could get students to start on the coursework when the teaching is completed (e.g., in Feb or Mar). Students should be given sufficient time to have learnt the knowledge and skills before starting the coursework. Students should have the knowledge to cope with the coursework expectations.

The national examination coursework must be completed under teachers' supervision and submitted for assessment. The coursework will be marked by the school coursework assessor and externally moderated by the Singapore Examinations and Assessment Board (SEAB). The table below shows the coursework format for NFS syllabus (GCE N(T) Level).

Assessment will focus on students' ability to demonstrate the following:

- Provide a comprehensive background study of the task;
- Apply sound decision making on the **three** final dishes based on the task in relation to the food preparation skills set list;
- Record observations and explain learning acquired from the outcomes of exploration;
- Record a methodical approach in the production and presentation of the final products;
- Record the sensory evaluation of the dishes prepared presented either in video or prose.

Table 12. Coursework Format for NFS N(T) Syllabus

N(T) Level		
Criteria (Marks)	Background Study	6
	Decision Making	6
	Exploration	6
	Planning	6
	Execution	30
	Evaluation	6
Weighting	60%	
Total Marks	60	
Duration	35 hours	
Slide Range	25 – 35 slides	
Font type/size	Arial, 18-22	

The coursework duration allocated includes time for students to research, plan and execute an exploration; analyse data; plan; execute; evaluate final products and subsequently write a report. The coursework is to be carried out in a controlled environment, and should be facilitated by coursework supervisors. The coursework duration should be spread out from January to July for discussion, facilitation and execution of students' work.

Target dates for providing guidance and facilitation as well as expected dates for the completion of the various stages of the task could be highlighted to the students. Progressive marking should be done to ensure that students are meeting stipulated deadlines.

Refer to Singapore-Cambridge GCE N(T) Examination Syllabus Guide from SEAB for more information on assessment criteria of coursework.

Developing and setting Coursework Tasks for Practice in Secondary Three

It is important to refer to the syllabus content before crafting a coursework task. Other than referring to AOC to design the coursework task for students offering the NFS N(T) syllabus, teachers could consider the following key points:

- Ensure relevance to NFS syllabus
- Use problem solving approach
- Set clear expectations
- Be purposeful and realistic
- Make it accessible to the full range of students
- Ensure the task is interesting

Providing Feedback on Students' Work

Teachers should give constructive feedback that focuses on what students have done well in addition to areas for improvement. The following questions may help teachers focus their feedback on students' work to enable them to identify the next steps to improve:

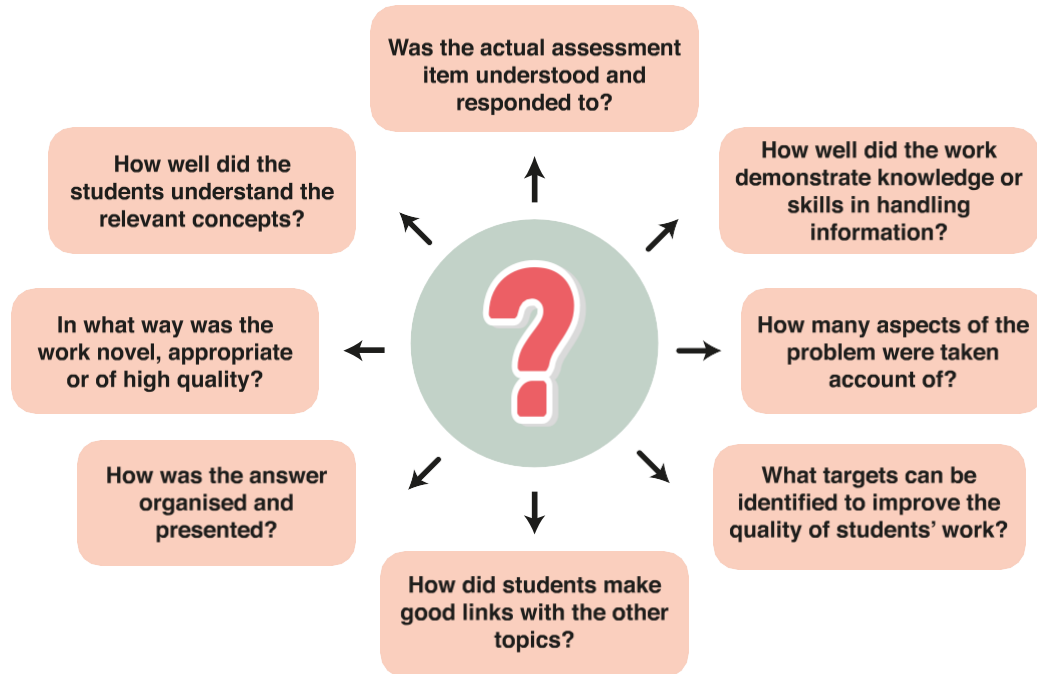


Figure 7: Questions to Ask when Providing Feedback

Coursework Task Expectations for N(T) Level

Table 13. Coursework Task Expectations for N(T) Level

Area of Assessment		Description
Background Study		<ul style="list-style-type: none"> ▪ Presents relevant research that is linked to the task ▪ Presents research gathered from a wide range of sources ▪ Includes relevant examples of dishes/ways to modify dishes to meet the requirements of the coursework task
Decision Making		<ul style="list-style-type: none"> ▪ Selects three final dishes that are appropriate ▪ Provides detailed justification based on a wide range of factors presented in the previous research
Exploration		<ul style="list-style-type: none"> ▪ Selects one dish from Decision Making to explore ▪ Presents a comprehensive observation on the sensory qualities of the exploration product with explanation
Planning		<ul style="list-style-type: none"> ▪ Includes all recipes with a thorough list of ingredients, materials, equipment and methods ▪ Time plan that is well- sequenced ▪ At least 2 progressive washing (including a final wash-up) ▪ In/out ▪ Shows efficient use of time
Execution	Organisation and Management	<ul style="list-style-type: none"> ▪ Works independently with a high level of organisation and initiative ▪ Shows effective and economical use of time and resources
	Manipulation	<ul style="list-style-type: none"> ▪ Carries out the execution processes independently without any assistance ▪ Demonstrates a high level of proficiency food preparation and cooking skills and the use of equipment ▪ Demonstrate a wide range of food preparation skills (refer to table 13)
	Product and Presentation	<ul style="list-style-type: none"> ▪ Presents food products that are very attractive and well-cooked for the target group ▪ Presents clear photographic evidence (including cross section, if necessary) of final dishes
Evaluation		<ul style="list-style-type: none"> ▪ Provides detailed sensory evaluation of all dishes, using appropriate sensory terms

Assessing Execution in Coursework

Both process skills and execution are critical components of coursework. Basic culinary skills are an integral part of NFS. Students should be taught a variety of food preparation and serving skills. Effective use of time and resources is an observable evidence of good organisation and management skills. Students should learn to allocate appropriate amount of time for the work to be done. They need to show good planning and efficiency on the use of materials and equipment. A student who scores high band in the Execution component of the coursework should have met the expectations of the food preparation skills found in Table 13.

Food Preparation Skills

Candidates are to select recipes that would allow them to demonstrate the range of food preparation skill sets listed below. The skill set mentioned in the Coursework Assessment Task (CAT) would be considered as 1 skill set.

Table 14. Food Preparation Skills Expectations

Skill Set 1			
Choose any <u>2</u>	Knife Skills (at least 2) May include: <ul style="list-style-type: none"> • slice, dice, julienne, chop, mince, carve (garnish), grate into appropriate sizes 	Prepare, Combine or Shape May include: <ul style="list-style-type: none"> • roll, wrap, skewer, coat, layer ingredients, marinate 	Setting or Finishing May include: <ul style="list-style-type: none"> • custard, jelly, pudding: using appropriate quantities of ingredients to achieve required texture setting • preparing and piping of frosting, fruit glaze
Skill Set 2			
Choose <u>1</u> only	Biscuits and Cakes To demonstrate: <ul style="list-style-type: none"> • proper techniques to achieve biscuits/cakes with desired sensory qualities 	Pastry To demonstrate: <ul style="list-style-type: none"> • proper techniques to achieve pastries with desired sensory qualities 	Dough (Yeast and Pasta) To demonstrate: <ul style="list-style-type: none"> • proper techniques to achieve yeast and pasta dough with desired sensory qualities
Skill Set 3			
Choose <u>1</u> only	Batters May include: <ul style="list-style-type: none"> • thick batter: thick consistency: able to coat/bind food • thin batter: pouring consistency 	Sauces May include: <ul style="list-style-type: none"> • starch-based (e.g., roux/blended sauce): free from lumps • reduction sauce (e.g. compote) • emulsified sauce (e.g. mayonnaise): stabilised emulsion, free from splitting • curry paste/<i>rempah</i>/<i>sambal</i> sauce 	

Internal Standardisation of Coursework

The purpose of internal standardisation is to establish a clear and common understanding of the requirements of the standards among all school assessors before marking begins, and not during marking.

Procedures for Internal Standardisation of Coursework

Step 1. Develop a comprehensive task structure with the unit/department and bring along the previous year's Centre Feedback Form on moderation. It is important for centres to calibrate their marking based on the feedback provided.

Step 2. For centres with one assessor, begin internal standardisation by going through previous year's coursework benchmarks and the assessment criteria. Select 3 pieces of the current year's high, medium and low benchmark scripts and start assessing based on task structure and calibrate using Centre Feedback Form on moderation.

For centres with more than one assessor, each assessor is to select 3 pieces of coursework (high, medium and low benchmarks) for their class. The coursework samples chosen from each class should be within a difference of +/- 3 marks. All assessors then discuss and establish a common understanding of the standards with reference to the assessment criteria and previous year's Centre Feedback Form on moderation.

Step 3. In the case where consensus cannot be reached among all assessors, the process of marking must be repeated done prior to submission for external moderation.

Step 4. When a common standard has been achieved for the school, the whole cohort will be marked in a single order of merit, from the highest mark to the lowest mark. The school assessor(s) will upload the candidates' coursework report, marks and comments via the e-coursework system.

Step 5. After the school assessor(s) and internal moderator(s) agree on the mark, the endorsement officer will review and submit marks to SEAB via the e-exam system.



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