

APPLIED STUDIES

1. Nutrition and Food Science (NFS)
2. Design and Technology (DT)
3. Elements of Business Skills (EBS)



COURSE	G3	G2	G1
SUBJECTS OFFERED	<ul style="list-style-type: none"> Nutrition and Food Science (NFS) 	<ul style="list-style-type: none"> Design and Technology (DT) Nutrition and Food Science (NFS) 	<ul style="list-style-type: none"> Elements of Business Skills (EBS) Design and Technology (DT) Nutrition and Food Science (NFS)
ASSESSMENT FORMAT	<ul style="list-style-type: none"> NFS P1 Written Paper (40%) P2 Coursework (60%)	<ul style="list-style-type: none"> DT P1 Written Paper (40%) P2 Design Project (60%) <ul style="list-style-type: none"> NFS P1 Written Paper (40%) P2 Coursework (60%) <ul style="list-style-type: none"> Art P1 Visual Response (50%) P2 Portfolio (50%)	<ul style="list-style-type: none"> EBS P1 Written Paper (60%) P2 Coursework (40%) <ul style="list-style-type: none"> NFS P1 Written Paper (40%) P2 Coursework (60%)

	Art – Available at G2 level
CRITERIA, DESIRED DISPOSITIONS	<p>Students of Art should have:</p> <ul style="list-style-type: none"> • a strong interest in visual arts and culture, with curiosity about diverse art forms, artists and real-world contexts • creativity and a willingness to experiment with ideas and processes • Self-direction and perseverance in developing, refining and realising their artistic intentions
SKILLS & COMPETENCIES TO BE DEVELOPED	<p>Students of Art will be able to:</p> <ul style="list-style-type: none"> • engage in art-making processes that encourage inquiry, experimentation, and creative problem-solving • develop proficiency in a range of artistic media, techniques, and visual languages to effectively express ideas and concepts • critically evaluate and interpret artworks by considering visual elements, intent and context
POST-SECONDARY OPPORTUNITIES	<p>Students of Art will develop visual literacy, critical and reflective thinking, and an understanding of how art communicates ideas across cultures and contexts — capabilities valued in creative, cultural and arts-related fields.</p>

Art Coursework



Preparatory
Studies



Final Work

Example of student's work in Art coursework

	Nutrition and Food Science (NFS) - Available in G1, G2 and G3 level
CRITERIA, DESIRED DISPOSITIONS	<p>Students of Nutrition and Food Science should have:</p> <ul style="list-style-type: none"> • A natural curiosity about food, nutrition, and their impact on health to lead a healthier lifestyle proactively • An interest in promoting health and well-being through nutrition
SKILLS & COMPETENCIES TO BE DEVELOPED	<p>The syllabus provides opportunities for students to develop a wide range of skills:</p> <ul style="list-style-type: none"> • Learning to conduct nutritional assessments such as dietary analysis to evaluate one's diet and build awareness and appreciation of cultural diversity in food practices and dietary preferences • Developing proficiency in conducting research studies, collecting and analysing data and interpreting experimental finding to provide evidence-based recipe modification, cultivating critical and adaptive thinking • Gaining hands-on experience in food preparation techniques, culinary skills, recipe development, and menu planning
POST-SECONDARY OPPORTUNITIES	<p>Students of NFS would have a strong grasp of the nutrition, diet and health. The ability to read analytically, think critically and communicate clearly will be needed in various fields:</p> <p>Healthcare, Nutrition and dietetics, Applied sciences and STEAM-related areas</p>

Research

Sauces are often added to dishes. Plan and prepare a range of **sauces** with **sauces** that would **add to the appeal** of the dish. You should include a **pasta dish** in your choices. Investigate the **effects of different types of flour** to achieve a good quality sauce for a pasta dish.

RESEARCH

Sauces are used in dishes to enhance the flavor and appearance of food. It is usually a liquid form that is colored and flavored into a sweet, spicy, tangy, fruity and many more. The ingredients used in sauces varies the flavor of the sauce. For example, when tomatoes are added into the sauce, it will result in a tangy tomato-flavored sauce. Strawberry, vanilla are commonly used to counteract the flavor of the sauce base itself and at the same time, create a color contrast against the dessert itself. Therefore, sauces play an important role and a color contrast against the dessert itself. Therefore, sauces play an important role and a color contrast against the dessert itself.

There are 2 types of sauces. Firstly, roux sauce which is a mixture of cooked flour and fat in equal quantities forming a roux. When both the butter (fat) and flour is heated up, the water in butter evaporates, leaving a fat-flour mixture called roux, which is commonly used for thickening. The fat coats the starch granules individually which prevents them from clumping together. When liquid is added in the roux to make a sauce, the presence of liquid and thickening. The roux is heated up to cook the starch granules consisting of amylose and amylopectin. Heat, the individual fat-coated starch granules undergo gelatinization, resulting in a smooth and thick sauce. Gelatinization occurs when starch granules are heated up and needs to be amylopectin are heated in the presence of liquid. Roux mixture is heated up and needs to be amylopectin are heated in the presence of liquid. Roux mixture is heated up and needs to be amylopectin are heated in the presence of liquid.

Generally, in roux sauce, milk is added in to create a light roux sauce such as béchamel is used to make light-colored sauces like béchamel sauce in pasta dishes. Flour and butter are heated up in equal amounts until a cream-colored flour-butter mixture, called roux is formed. Generally, in roux sauce, milk is added in to create a light roux sauce such as béchamel is used to make light-colored sauces like béchamel sauce in pasta dishes. Flour and butter are heated up in equal amounts until a cream-colored flour-butter mixture, called roux is formed.

Sauces typically **add to the appeal** of the dish. The roux is heated up to cook the starch granules consisting of amylose and amylopectin. Heat, the individual fat-coated starch granules undergo gelatinization, resulting in a smooth and thick sauce. Gelatinization occurs when starch granules are heated up and needs to be amylopectin are heated in the presence of liquid. Roux mixture is heated up and needs to be amylopectin are heated in the presence of liquid.

Evaluation

EVALUATION



This tart crust has a slightly uneven yet smooth golden-brown surface. As I took it out of the oven, I can smell the buttery scent of the tart. The crust is creamy yellow and is smooth, thick of a light consistency and not lumpy. This can be seen when the strawberry tart is cut in half while the custard stayed in place and does not ooze out completely. The custard had a sweet and milky aroma when made which makes the tart have a sweet scent. This dish is served with a béchamel sauce, which is a translucent pinkish-purple in color. The mixed berries sauce has a sour yet sweet berry scent. When the tart is eaten with a dip of the sauce, it really helps to add a sweet yet slightly sour flavor in contrast of the sweet and milky custard and the strawberry tart. It is garnished with pinkish-red sliced strawberries on the tart and on the sides of the plate, with a touch of greens from the mint leaves and a spread of mixed berries sauce underneath to make it look appealing for school children. As I take into the strawberry tart, the pastry crust has a buttery flavor as the milky, sweet and creamy custard oozes out. The tart has a chunky texture whereas the custard has a light and smooth texture. The sauce used to garnish this dish provides a smooth texture and a slightly sour yet sweet flavor which when eaten together provides a good balance. Lastly, the strawberry used to garnish is also firm and juicy and is slightly sweet and sour. Overall, the dish has a variety of various textures and flavors. In this dish, I used a white plate so that the vibrant colors in the dish are visually more attractive to school children. I chose to make the mixed berries sauce since it is healthy and school children enjoys having a sweet dish. However, since sugar can be unhealthy and is less nutritious, I decided to reduce the amount of sugar used and depend on the natural sweetness berries. Overall, I think I can improve on the garnishes of the dish by clearing the excess splashes of sauce on the sides to make it look cleaner and simpler.

Decision Making

DECISION MAKING

Dish 1: Strawberry tart with mixed berries sauce Methods of cooking: Baking, boiling

Culinary skill used: pastry, sauce, shrimp Cutting styles: slice, dice

Mixed berries sauce is used in this dish to add more color to the dish since I will be spreading the sauce at the side of the plate. Since the sauce will be purple in color, it creates a color contrast against the creamy yellow custard filling of the tart, and the greens of the mint leaf used to garnish. It also adds flavor to the strawberry tart since it is sweet, sour and milky, while the tart will taste creamy and milky. The mixed berries sauce will be made by heating up the berries before blending it into a puree. The cornstarch slurry (1:1 starch and water ratio) will then be added into the mixture to thicken the sauce when gelatinization occurs. The texture of the sauce will be smooth, thick and smooth, adding more textures to the country short crust pastry and creamy custard filling. Therefore, the mixed berries sauce plays a big role in adding texture and flavor of the dish, making it more appealing.

This dish is suitable since it consists of numerous nutrients. By using the **strawberries and blueberries** in the berries sauce, it provides the source of dietary fiber which helps to lower blood sugar. The antioxidants in the blueberries can keep the brain functioning well. **Strawberries and blueberries** are rich in **vitamin C, folate and antioxidants** which make healthy red blood cells, protect body cells against free radicals which causes health problems such as heart diseases and cancer. The egg yolk used in the custard is rich in **vitamins A, D, E, K, B12, biotin** which promotes growth, reproduction and health, and **protein** which improves eye health and reduces the risk of developing coronary heart disease as school children grow up. **Milk** used in the custard are high in **calcium** which works together with vitamin D and phosphorus for the formation and maintenance of bones and teeth of school children since they are still going through rapid growth and development. They also contain the water-soluble **vitamins B1, B2, B3, B6 & B12**, which mainly helps with the energy production in the body and is involved in the chemical reactions that releases energy from food. Milk is also **both biological value protein**, which is essential to support their growth and maintenance of cells. **Plain flour and whole wheat flour** used in the short crust pastry acts as a source of **complex carbohydrates** which mainly provides energy for school children. The **unsalted butter** helps to lower the chance developing cancer. It is also a source of fat, which helps to provide warmth to the body. Unsalted butter is used to reduce their sodium intake as the amount of butter required in this dish is quite high. Reducing their sodium intake prevents them from developing high blood pressure, coronary heart disease and stroke later in adult life when consumed excessively.

This dish suits with the My Healthy Plate guidelines as the strawberries and mixed berries sauce are under the fruits and vegetables segment. The tart itself is made of plain flour and whole wheat flour, which is under the brown rice and whole meal bread segment. Lastly, the custard is made of milk and egg yolk which are high biological value of proteins and fats under the 'meat and others' segment.

This dish is **appealing** to school children since there are several of colors used to present the dish. The redness of the strawberries, color blue of the mixed berries sauce and green from the mint leaf used to present the dish will complement the light pink tart filling. The tart will also have a buttery and sweet aroma. By using the fruit and milk, the tart will be sweet and creamy. With the use of a variety of colors, flavors and aroma, it attracts the **attention** and at the same **time**, stimulates the appetite of school children.

Exploratory Study

Exploratory Study

Task: Investigate the **effects of different types of flour** to achieve a good quality sauce for a pasta dish.

Aim: To investigate how 20g of different types of flour (plain flour, wholegrain flour and rice flour) affect the taste, appearance and texture of the béchamel sauce in the Béchamel Mushroom Pasta with prawns.

INGREDIENTS

Variation 1: Plain flour	Variation 2: Wholegrain flour	Variation 3: Rice flour	Total
<ul style="list-style-type: none"> 50g spaghetti 20g plain flour 20g unsalted butter 300ml low-fat milk 1 tsp black pepper 1 tsp salt 1 tsp thyme 5 small prawns 25g baby Bella mushrooms 2 tsp of canola oil 1 tsp paprika 1 stalk of basil 2 slices of lemon 	<ul style="list-style-type: none"> 50g spaghetti 20g wholegrain flour 20g unsalted butter 300ml low-fat milk 1 tsp black pepper 1 tsp salt 1 tsp thyme 5 small prawns 25g baby Bella mushrooms 2 tsp of canola oil 1 tsp paprika 1 stalk of basil 2 slices of lemon 	<ul style="list-style-type: none"> 50g spaghetti 20g rice flour 20g unsalted butter 300 ml low-fat milk 1 tsp black pepper 1 tsp salt 1 tsp thyme 5 small prawns 25g baby Bella mushrooms 2 tsp of canola oil 1 tsp paprika A few pieces of basil 2 slices of lemon 	<ul style="list-style-type: none"> 100g spaghetti 20g plain flour 20g wholegrain flour 60g unsalted butter 900 ml low-fat milk 3 tsp salt 3 tsp Thyme 3 tsp Black pepper 15 small prawns 75g baby Bella mushrooms 6 tsp of canola oil 3 tsp paprika A few pieces of basil 1 whole lemon

EQUIPMENTS

Equipment	Qty.	Equipment	Qty.	Equipment	Qty.
Measuring cup	1	Medium saucepan	2	Measuring spoons	1
Big blender	1	Cutting board	2	Canola oil	1
Chef knife	1	Frying plate	1	Balloon whisk	1
Small colander	1	Colander	1	Ladle	1

Execution



Data Collection



After carrying out the investigation, I have collected the results of the effects of different types of flour (plain flour, wholegrain flour and rice flour).

In variation 1 where plain flour is used, the viscosity of the sauce is **22.9 units** which means that it coats the spaghetti very well. The sauce also has no lumps and coats the rest of the spoon evenly and is thick. According to my research, plain flour contains 70% starch and 30% protein. Due to the high content of starch, it makes the sauce thick. Since plain flour is a source of amylopectin than amylose in plain flour, it makes the sauce thick. The sauce together with the spaghetti, it coats the pasta evenly. Other than that, the sauce with the high starch content, it coats the pasta evenly. Other than that, the sauce with the high starch content, it coats the pasta evenly. Other than that, the sauce with the high starch content, it coats the pasta evenly.

Planning

Duration	Dish	Instructions
5 minutes	NIL	Collected and wash all equipment and prepare workstation.
5 minutes	Dish 1	1. Boil in large pot of water for 8 minutes. Close the lid to prevent water spillage.
5 minutes	Dish 2	1. Wash, peel the skin of potatoes thoroughly to prevent too much nutrient loss and food wastage. 2. Cut the potatoes into small cubes. 3. Place potatoes in the large pot of boiling water with 1 tsp salt and bring to a boil over medium heat for 10 minutes. Once the water starts to boil, cover the pot with a lid.
10 minutes	Dish 1	1. In a large bowl, mix in 100g plain flour & 20g whole meal flour. 2. Cut 50g of unsalted butter into small cubes. 3. Rub in the butter in flour with fingertips until the mixture resembles fine breadcrumbs (working as quickly as possible to prevent the butter from melting). 4. Add in 2 tbsp. of cold water to the mixture. Stir with a spatula until the pastry dough binds together. 5. Form the pastry dough into a ball. 6. Place the pastry dough in the large bowl and wrap the bowl with plastic wrap and let it sit in the refrigerator for 5 minutes. 7. The 1:1 fat to flour ratio is also added consistently when making the sauce. Milk is added consistently to prevent the flour from being overly thick and lumpy. Lastly, the color of the sauce is creamy white with hints of yellow. Therefore, the
5 minutes	Dish 2	1. Drain potatoes well and leave them in the pot. Add 1 tsp salt into the potatoes. 2. Gradually add in the milk while mashing the potatoes using a potato masher. 3. Set aside the mashed potatoes.
10 minutes	Dish 1	1. Preheat oven to 180 degrees Celsius. 2. Spread 1 tbsp. of plain flour evenly on the surface of silicon mat and rolling pin. 3. Place the pastry dough onto the silicon mat. 4. Roll the pastry dough with the rolling pin and carefully lay the pastry dough into a pastry case. 5. Place in the pastry dough evenly in the pastry case neatly. Arrange the pastry on a baking tray. 6. Place the baking tray into the medium shelf of the oven and bake it at 180 Degree Celsius for 15 minutes.
5 minutes	Dish 2	1. In a medium saucepan, fill in water and bring it to boil on a medium heat. 2. Once the water starts boiling, add in 5 equal eggs and boil them for 3 minutes. 3. Once equal eggs are boiled, peel and chill them in a small bowl.
5 minutes	NIL	PROGRESSIVE WASHING
5 minutes	Dish 1	1. Lightly wash the baby Bella Mushrooms to remove excess dirt. Drain the mushrooms with a drainer. 2. Cut off stems of the baby Bella Mushrooms and dice them with a kitchen knife on a cutting board. 3. Set aside the mushrooms on a small bowl.
5 minutes	Dish 1	1. Remove the pastry shells out of the oven and place them on a cooling rack.



	Design and Technology - Available in G1 and G2 levels
CRITERIA, DESIRED DISPOSITIONS	<p>Students of Design and Technology should have:</p> <ul style="list-style-type: none"> • a strong grasp of design thinking protocol which enable them to be empathetic and adaptable to create suitable solutions which understand the perspectives, preferences and needs of end user • a strong creative flair and enjoys thinking outside the box • the ability to be adaptable and open to learning new skills and techniques to adapt their designs to meet changing requirements and constraints.
SKILLS & COMPETENCIES TO BE DEVELOPED	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Design projects with complex problems that require creative solutions. Students should be adept at analysing problems, identifying constraints, and developing effective design solutions which hones problem-solving skills • gain proficiency in design tools, software, and technical skills such as CAD programs, 3D printer, tabletop laser cutter and prototyping tools, to bring their designs to life. • critically evaluate their own designs as well as the work of others which involves assessing the functionality, usability, and aesthetics of designs to ensure they meet the needs of users and clients with the application of critical thinking
POST-SECONDARY OPPORTUNITIES	<p>Students of Design & Technology would have a sharpened grasp of the Design Thinking protocol with heightened sensitivity to the impact of design on meeting the needs of users. The ability to be empathetic, think critically and communicate clearly via their design solutions will be needed in various fields of Design, such as Architectural, graphic, industrial, game, user experience, product design and STEAM-related areas</p>

Example of student's work: Design and Technology coursework

Number 1: Find visuals

1 design opportunities are everywhere, get out there to seek and gather findings.



Internet: found pictures of messy school bags, shows how student do not have extra space for art materials that is big and has many different separate component. >>problem

When I was taking art in lower secondary, I had to buy many items for painting class, it is all big and inconvenient which led to me bringing an extra bag for art all the time. I have classmates facing problems of losing some component and they felt that its too expensive to purchase them all over again.

Using A4, C4, F4, H4, I
(3/15/2015)



	Elements of Business Skills – available for G1 level only
CRITERIA, DESIRED DISPOSITIONS	<p>Students of Elements of Business Skills should have</p> <ul style="list-style-type: none"> • confidence in their ability to learn new concepts and apply them to real-world business scenarios as the subject covers various sectors like Travel, Tourism, Hospitality, and Retail. • strong and effective communication skills as the subject often involves interactions within a business context and customer relations. • willingness to actively participate and contribute to projects and team activities is important.
SKILLS & COMPETENCIES TO BE DEVELOPED	<ul style="list-style-type: none"> • Students are expected to develop skills in marketing and customer relations, critical thinking, innovation, self-management, effective communication, and the use of ICT. • Students should develop the values and attitudes of: <ul style="list-style-type: none"> • integrity and responsibility in making decisions; • respect and social awareness in managing relationships with others; • an enterprising mindset; • resilience in overcoming challenges; and • passion to pursue lifelong learning.
POST-SECONDARY OPPORTUNITIES	<p>The syllabus prepares students for further studies in institutes of higher learning and careers in the service industry (Travel and Tourism, Hospitality, and Retail) which continues to be a significant sector in Singapore's economy.</p>