

# THE CASE STUDY

## The eating habits of Canadians are changing

OTTAWA (CP) – A survey conducted by Maison Tendance for Health Canada reveals that four out of five Canadians are more careful about food choices. The main reasons offered for watching nutrition are illness, allergies, participation in a fitness regimen and the desire to maintain good health. The Minister of Health has greeted these results favourably by stating: “The various educational campaigns that have been launched to encourage Canadians to adopt healthier eating habits have been successful.”

Trois-Rivières, January 5, 2009

### Subject: Invitation to tender for a new frozen dessert

To whom it may concern,

I am pleased to outline a development project aimed at marketing a new range of frozen desserts.

The eating habits of Canadians have changed, prompting us to offer new frozen desserts that better meet their needs.

Several clientele groups have been targeted. We are looking for a tasty frozen dessert that is better adapted to their nutritional requirements than the products currently available on the market. You will be required to conduct a market research study and analyze how desserts produced by competitors take into account the nutritional requirements of the target groups. You will then choose the target group for whom the frozen dessert will be prepared. We would like you to make the dessert, list all ingredients used in the recipe, create a Nutrition Facts table and come up with a marketing slogan. Your goal is to demonstrate that your dessert suits the nutritional requirements of the target group better than existing products.

Profiles of the target groups are included as well as the nutritional information about frozen desserts currently available.

Sincerely,

*Jocelyne Dufresne*

Jocelyne Dufresne

Vice-President, Alimpro Product Development

encl.: Profiles of the target groups and nutritional information regarding frozen desserts available on the market.

In this case study, you must respond to this call for tenders.



Name: \_\_\_\_\_

Group: \_\_\_\_\_

## THE CASE STUDY *(continued)*

### Target groups

Below are the nutritional requirements of the seven target groups.

<b>Group 1</b>	These young people have started an intensive sports training regimen. They must follow a protein-rich diet.
<b>Group 2</b>	These people must follow a weight-loss regimen prescribed by their doctor. They must limit their intake of fat and carbohydrates.
<b>Group 3</b>	These young people suffer from juvenile diabetes and must limit their daily sugar intake.
<b>Group 4</b>	These people suffer from high blood pressure. A doctor has recommended that they watch their weight and avoid sodium-rich foods.
<b>Group 5</b>	These residents of the Saguenay–Lac-Saint-Jean region suffer from a hereditary disease that elevates their cholesterol levels. They must avoid foods that are high in cholesterol.
<b>Group 6</b>	These people suffer from anemia. They must consume foods rich in vitamins and iron.
<b>Group 7</b>	These people suffer from osteoporosis, an illness that affects bone density. Doctors recommend that they eat foods rich in calcium and that they watch their weight.



# THE CASE STUDY *(continued)*

## Frozen desserts available on the market

The following tables represent the nutritional information of certain desserts available on the market.

Frozen dessert 1: Homemade ice cream	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> cream, evaporated skim milk, sugar, sweetened concentrated milk, liquid egg yolk, corn syrup, sodium bicarbonate, salt and natural flavour	Calories	300	Protein	5 g
	Fat	18 g	Vitamin A	20%
	Cholesterol	105 mg	Vitamin C	2%
	Sodium	100 mg	Calcium	15%
	Carbohydrates	30 g	Iron	2%
	Fibre	0 g		
	Sugar	30 g		

Frozen dessert 2: Old-fashioned ice cream	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> milk, cream, sugar, powdered skim milk, artificial flavours and aromas, stabilizer (mono and diglycerides), carob gum, dextrose, carboxymethyl cellulose, guar gum, polysorbate 80 and carrageenan.	Calories	130	Protein	2 g
	Fat	6 g	Vitamin A	8%
	Cholesterol	25 g	Vitamin C	2%
	Sodium	40 mg	Calcium	8%
	Carbohydrates	16 g	Iron	0%
	Fibre	0 g		
	Sugar	12 g		

Frozen dessert 3: Natural ultra-creamy ice cream	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> milk ingredients, sugar, modified milk ingredients, glucose, natural vanilla flavour, mono and diglycerides, carboxymethyl cellulose, guar gum, polysorbate 80, carrageenan and ground vanilla bean.	Calories	130	Protein	1 g
	Fat	7 g	Vitamin A	6%
	Cholesterol	15 mg	Vitamin C	0%
	Sodium	65 mg	Calcium	4%
	Carbohydrates	16 g	Iron	0%
	Fibre	0 g		
	Sugar	15 g		



## THE CASE STUDY *(continued)*

Frozen dessert 4: Low-fat ice cream	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> milk ingredients, sugar, modified milk ingredients, glucose, cocoa, vanilla extract, mono and diglycerides, carob gum, carboxymethyl cellulose, guar gum, carrageenan and dextrose.	Calories	140	Protein	3 g
	Fat	5 g	Vitamin A	6%
	Cholesterol	20 mg	Vitamin C	0%
	Sodium	50 mg	Calcium	8%
	Carbohydrates	20 g	Iron	10%
	Fibre	1 g		
	Sugar	15 g		
Frozen dessert 5: Frozen dessert with no added sugar	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> milk ingredients, modified milk ingredients, maltodextrine, polydextrose, sorbitol, cocoa, mono and diglycerides, guar gum, carob gum, potato starch, carboxymethyl cellulose, carrageenan, artificial flavour and sucralose.	Calories	90 g	Protein	3 g
	Fat	1.0 g	Vitamin A	0%
	Cholesterol	5 mg	Vitamin C	0%
	Sodium	60 mg	Calcium	8%
	Carbohydrates	19 g	Iron	0%
	Fibre	0 g		
	Sugar	5 g		
Frozen dessert 6: Frozen yogurt	Nutritional value per 125-mL (125 g) serving			
<b>Ingredients:</b> modified milk ingredients, sugar, glucose, cocoa, mono and diglycerides, carob gum, guar gum, carrageenan, natural flavour and bacterial culture.	Calories	100	Protein	2 g
	Fat	2.5 g	Vitamin A	2%
	Cholesterol	5 mg	Vitamin C	0%
	Sodium	75 mg	Calcium	6%
	Carbohydrates	19 g	Iron	0%
	Fibre	0 g		
	Sugar	14 g		

# CREATING THE CONTEXT

## I ask myself questions

1. The clientele for whom you are creating a frozen dessert must take nutritional constraints into account. What is a nutritional constraint?

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2. What is a Nutrition Facts table? Where is it found?

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3. What would the market research in this case study consist of?

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4. Who are the actors in this case study?

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5. The people for whom you are creating a frozen dessert must take nutritional requirements into account. What questions should they ask themselves when choosing their dessert?

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6. What questions should the maker developing a frozen dessert ask so as to meet the nutritional requirements of a target clientele group more effectively than the competition?

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Name: \_\_\_\_\_

Group: \_\_\_\_\_

## CREATING THE CONTEXT *(continued)*

### I must

7. Reformulate the goal of this case study.

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### I think

8. In your opinion, how can a frozen dessert take into account the nutritional requirements of target clientele groups?

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### What I already know and what I need to find out

9. Write down the information you already have and the information you need to find.

What I know . . .	What I need to research . . .
<hr/>	<hr/>

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### I prepare my work

10. In chronological order, list the main steps to follow when carrying out the case study.

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<hr/>	<hr/>

### Reflection

Do I clearly understand what I need to accomplish?

Yes

☐

No

☐

Name: \_\_\_\_\_

Group: \_\_\_\_\_

# GATHERING INFORMATION

## I do research

1. Define the role of nutrients contained in the Nutrition Facts table of a frozen dessert. Name the foods used to make frozen desserts that contain these nutrients. Specify which target clientele groups must consume more or less of these substances to respect their nutritional requirements.

Nutrients	Roles	Foods	Target clientele groups
Carbohydrates			
Protein			
Fat			
Vitamins			
Minerals			



Name: \_\_\_\_\_

Group: \_\_\_\_\_

# GATHERING INFORMATION *(continued)*

## I apply my research results

2. Analyze the nutritional value of desserts made by the competition. Indicate the amount of nutrients contained in a 125-mL serving of frozen dessert.

**Table comparing the nutritional value of frozen desserts available on the market**

Dessert	Nutritional value per 125-mL serving											
	Cal.	Fat (g)	Chol. (mg)	Na (mg)	Carb. (g)	Fibre (g)	Sugar (g)	Prot. (g)	Vitamins			
									A (%)	C (%)	Ca (%)	Fe (%)
1												
2												
3												
4												
5												
6												





Name: \_\_\_\_\_

Group: \_\_\_\_\_

## GATHERING INFORMATION *(continued)*

3. Which dessert best takes into account the nutritional requirements of each target clientele group?  
Explain your answer.

### Analysis of products made by the competition

Target clientele group	Chosen frozen dessert	Explanation
<b>Group 1</b> Clientele actively participating in a sport		
<b>Group 2</b> Clientele on a weight-loss regimen		
<b>Group 3</b> Clientele with diabetes		
<b>Group 4</b> Clientele with high blood pressure		
<b>Group 5</b> Clientele with a high cholesterol level		
<b>Group 6</b> Clientele with anemia		
<b>Group 7</b> Clientele with osteoporosis		

### Reflection

Do I clearly understand the meaning of:

- the caloric value of nutrients?
- the types of nutrients?

Yes      No

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Name: \_\_\_\_\_

Group: \_\_\_\_\_

# COMPLETING THE CASE STUDY

## I make suggestions

1. For which target group are you creating a frozen dessert?

\_\_\_\_\_

2. How would you change your frozen dessert to meet the nutritional requirements of your target group better than your competition's products?

\_\_\_\_\_

3. In the following table, write the chosen ingredients. Explain you choices.

**Table of frozen dessert ingredients**

	Chosen ingredients	Explanation
1		
2		
3		
4		
5		

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Name: \_\_\_\_\_

Group: \_\_\_\_\_

## COMPLETING THE CASE STUDY *(continued)*

4. While preparing your recipe, write the quantity of each ingredient used in the table below. Then, calculate the total mass of your recipe.

**Table of ingredient quantities**

	Chosen ingredients	Initial quantity	Additional quantity	Total
1				
2				
3				
4				
5				
Total mass				

### Reflection

Did you try out several possibilities when preparing your recipe?

Yes

☐

No

☐

Name: \_\_\_\_\_

Group: \_\_\_\_\_

# VALIDATING THE CASE STUDY

## I justify my approach

1. Calculate the nutritional value of the frozen dessert you have prepared. Remember to take into account the quantity used when calculating the nutritional value of each ingredient.

### Nutritional value of ingredients used

Nutrients	Ingredient 1	Ingredient 2	Ingredient 3	Ingredient 4	Ingredient 5	Total
Quantity used						
Calories						
Fat						
Cholesterol						
Sodium						
Carbohydrates						
Fibre						
Sugar						
Protein						
Vitamin A						
Vitamin C						
Calcium						
Iron						

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Name: \_\_\_\_\_

Group: \_\_\_\_\_

## VALIDATING THE CASE STUDY *(continued)*

2. Note the ingredients you used, and create the Nutrition Facts table for your frozen dessert. Calculate the approximate nutritional value for a 125-g serving of your dessert. Indicate the nutritional value of each element in the column on the right. Keep in mind that the density of your dessert is about one gram per millilitre.

**Ingredients and Nutrition Facts table**

Frozen dessert for clientele group	Nutritional value per 125 mL (125 g) serving	
Ingredients: _____	Calories	_____
	Fat	_____
	Cholesterol	_____
	Sodium	_____
	Carbohydrates	_____
	Fibre	_____
	Sugar	_____
	Protein	_____
	Vitamin A	_____
	Vitamin C	_____
	Calcium	_____
	Iron	_____

3. Compare your frozen dessert's Nutrition Facts table with those of competing products.

a) What are the advantages of your frozen dessert? Justify your answer.

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b) How could you improve your dessert?

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c) Create a marketing slogan you could use to convince the target group to buy your dessert.

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Name: \_\_\_\_\_

Group: \_\_\_\_\_

# MY EVALUATION

Use the evaluation grid on the following page to do a self-evaluation. Write A, B, C, D or E in the appropriate box in the table below.

<b>SSC2 Makes the most of his/her knowledge of science and technology</b>				
<b>Criteria*</b>	<b>Observable indicators</b>	<b>Me</b>	<b>Teacher</b>	<b>Comments</b>
<b>1</b>	<b>Creating the context</b>		<input type="checkbox"/> With help	
	Identification of steps for performing the case study			
<b>2</b>	<b>Gathering information</b>		<input type="checkbox"/> With help	
	Selection of frozen desserts			
<b>3</b>	<b>Completing the case study</b>		<input type="checkbox"/> With help	
	Selection of ingredients according to the nutritional requirements of the target clientele			
<b>4</b>	<b>Validating the case study</b>		<input type="checkbox"/> With help	
	Production of a Nutrition Facts table and description of the benefits of the newly invented frozen dessert			

## \* Evaluation criteria

- 1 Formulation of appropriate questions
- 2 Appropriate use of scientific and technological concepts, laws, models and theories
- 3 Relevant explanations or solutions
- 4 Suitable justification of explanations, solutions, decisions or opinions

Name: \_\_\_\_\_

Group: \_\_\_\_\_

# EVALUATION GRID

## SSC2 **Makes the most of his/her knowledge of science and technology**

Criteria*	Observable indicators	A	B	C	D	E
<b>1</b>	<b>CREATING THE CONTEXT</b> Identification of steps for performing the case study	The main steps to perform the case study are very well defined. The chronological order is respected.	The main steps to perform the case study are well defined.	The main steps to perform the case study are more or less defined.	The main steps to perform the case study are not defined.	The work needs to be redone.
<b>2</b>	<b>GATHERING INFORMATION</b> Selection of frozen desserts	The selected frozen desserts take into account nutritional requirements and explanations provided are pertinent.	The selected frozen desserts take into account nutritional constraints, but not all explanations provided are pertinent.	The selected frozen desserts take a few nutritional requirements into account, but not all explanations provided are pertinent.	The selected frozen desserts do not take nutritional requirements into account, and the explanations provided are not pertinent.	The work needs to be redone.
<b>3</b>	<b>COMPLETING THE CASE STUDY</b> Selection of ingredients according to the nutritional requirements of the target clientele	All selected ingredients take into account nutritional requirements of the target clientele and explanations provided are coherent.	All selected ingredients take into account nutritional requirements of the target clientele and most explanations provided are coherent.	Selected ingredients more or less take into account nutritional requirements of the target clientele OR explanations provided are more or less coherent.	Selected ingredients more or less take into account nutritional requirements of the target clientele AND explanations provided are more or less coherent.	The work needs to be redone.
<b>4</b>	<b>VALIDATING THE CASE STUDY</b> Production of a Nutrition Facts table and description of the benefits of the newly invented frozen dessert	All nutritional data is correct. Benefits of the frozen dessert are clearly identified.	Most nutritional data is correct. Benefits of the frozen dessert are clearly identified.	Most nutritional data is correct OR benefits of the frozen dessert are more or less clearly identified.	Most nutritional data is correct AND benefits of the frozen dessert are more or less clearly identified.	The work needs to be redone.

### \* Evaluation criteria

- 1 Formulation of appropriate questions
- 2 Appropriate use of scientific and technological concepts, laws, models and theories
- 3 Relevant explanations or solutions
- 4 Suitable justification of explanations, solutions, decisions or opinions

# INFORMATION SHEET 1

## Nutritional values of ingredients used in this recipe

### 1. Table of the nutritional values of basic ingredients

Ingredients	Nutritional value per one gram serving											
	Cal.	Fats (g)	Chol. (mg)	Na (mg)	Carb. (g)	Fibre (g)	Sugar (g)	Prot. (g)	Vitamins			
									A (%)	C (%)	Ca (%)	Fe (%)
<b>Soymilk</b>	0.33	0.005	0	0.63	0.02	0	0.02	0.03	0.04	0.02	0.12	0.02
<b>Skim milk</b>	0.31	0	0	0.44	0.05	0	0.05	0.03	0.04	0	0.12	0
<b>2% milk</b>	0.50	0.02	0.08	0.43	0.05	0	0.05	0.03	0.04	0	0.12	0
<b>Plain yogourt</b>	0.46	0	0.03	0.32	0.06	0	0.06	0.05	0.06	0.01	0.11	0
<b>Evaporated skim milk</b>	0.62	0	0	0.93	0.11	0	0.11	0.07	0.11	0.22	0.22	0
<b>3.25% milk</b>	0.62	0.03	0.12	0.43	0.05	0	0.05	0.03	0.04	0	0.12	0

### 2. Table of the nutritional values of ingredients used to add flavour

Ingredients	Nutritional value per one gram serving											
	Cal.	Fats (g)	Chol. (mg)	Na (mg)	Carb. (g)	Fibre (g)	Sugar (g)	Prot. (g)	Vitamins			
									A (%)	C (%)	Ca (%)	Fe (%)
<b>Cocoa</b>	3.0	0.2	0	7	0.4	0.4	0	0.2	0	0	0	0.8
<b>Vanilla extract</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Granulated (white) sugar</b>	4	0	0	0	1	0	1	0	0	0	0	0
<b>Fructose</b>	4	0	0	0	1	0	1	0	0	0	0	0
<b>Brown sugar</b>	3.75	0	0	0	1	0	1	0	0	0	0	0



# INFORMATION SHEET 2

## Frozen dessert recipe

Follow these instructions when preparing your frozen dessert.

1. In a clean glass, measure 80 g of your dessert's basic ingredient.
2. Record the mass.
3. Add the ingredients for flavour (one at a time).
4. After each addition, record the mass of the ingredient you added.
5. Pour mixture into a resealable freezer bag.
6. Seal the bag.
7. Place bag into a large resealable freezer bag.
8. Spread 1 L of ice cubes around the smaller bag inside the large bag.
9. Add about 160 g of salt.
10. Seal the large bag.
11. Vigorously shake the bag to obtain the desired texture for the frozen dessert.
12. Taste the dessert.
13. Adjust the recipe if necessary.
14. Record the mass of any ingredient that you add.