Analyzing a Food Nutrition Label for Sodium Intake

Content Analysis Report

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We, the undersigned, hereby certify our equal contribution in effort to the conceptualization, information collection and analysis, and writing of this paper. We understand that we are responsible for all the contents, and we will be evaluated as a group for the total project.

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Instructional Goal

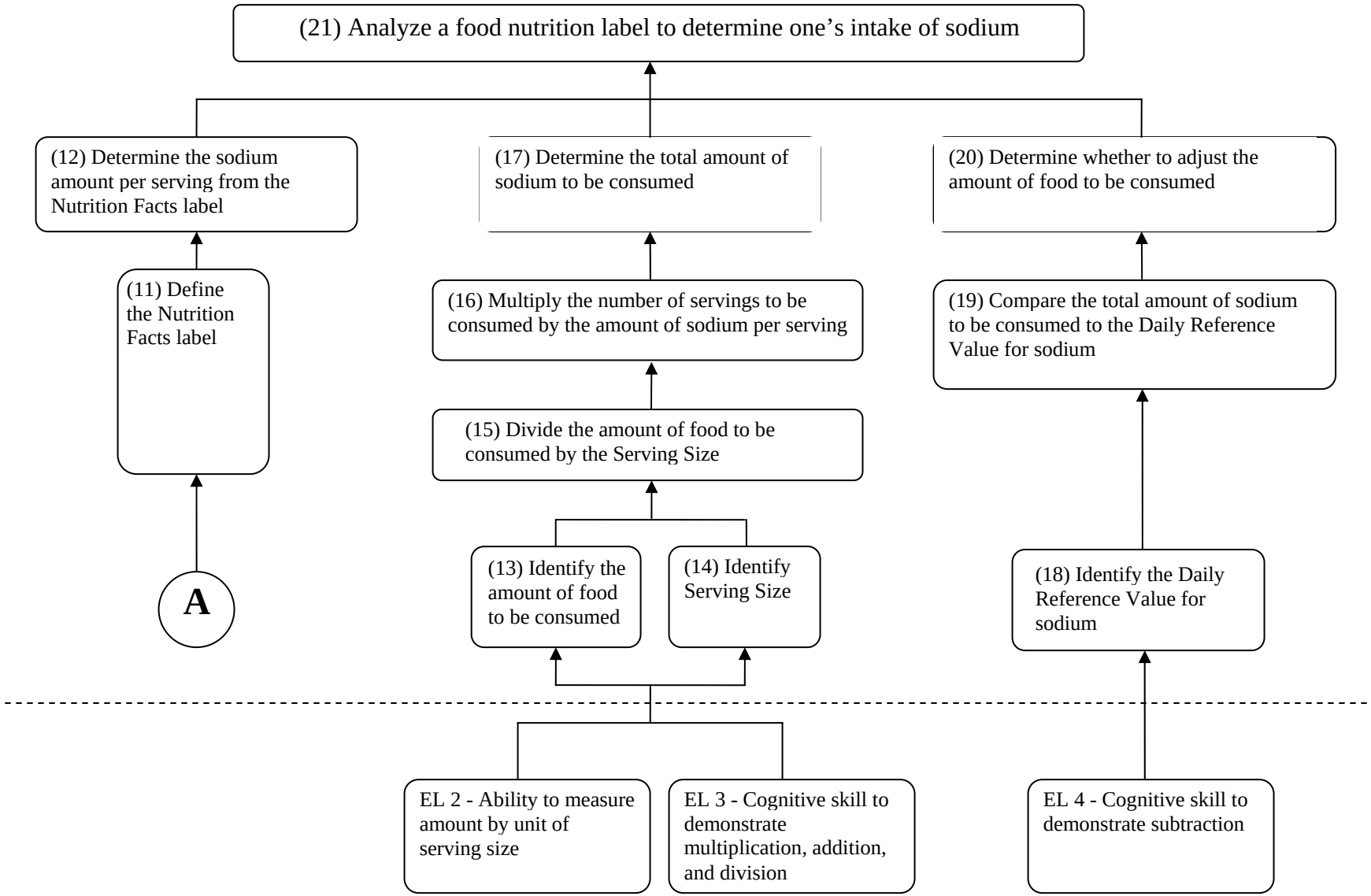
Although it is commonly known that excess sodium intake can lead to serious health problems such as heart attack, stroke, heart failure, and kidney failure, many people do not take adequate steps to regulate their sodium intake. Part of the problem is that sodium is ingested from many sources, making it difficult to assess the actual amount of sodium consumed. The average American consumes sodium from processed and prepared foods as well as condiments, which have high sodium-containing compounds for preservation, or taste and texture enhancement. Sodium is also found in natural sources of food like vegetables, meat, and dairy products. In this instructional unit, learners will be able to determine their sodium content from a food nutrition label and compare their intake with established acceptable standards. Although this is just one source of sodium in the diet, it can help learners with food choices, and in turn, help them minimize their risk of serious health problems.

Target Population

The target audience for this unit is comprised of learners at the University of Hawaii Manoa. Located in Honolulu, Hawai'i, there are about 18,500 undergraduate and graduate students at the University of Hawaii Manoa. It is a four-year co-ed university whose student population includes many different ethnic groups with average ages of 18-50 years old. Our learners have obtained a high school diploma or an equivalent certification and are expected to think critically in their course work for academic success. They are able to obtain and apply information by using reading, listening, and writing skills at the college level, as well as apply basic mathematical formulas like addition, subtraction, division, and multiplication. Most learners are capable of using basic psychomotor skills to rotate and classify objects by a defined criterion. Also within the population are learners with physical challenges and diverse learning styles. These students are covered by the Individuals with Disabilities Education Act and need accommodations for their learning. Attendance at the University of Hawai'i at Manoa assumes that the students are motivated, social, and always seeking knowledge.

Instructional Analysis

The terminal objective for this self-instructional unit is for the higher education student to analyze a food nutrition label to determine one's daily intake of sodium. The major steps involve 1) Determining the sodium amount per serving from the Nutrition Facts label, 2) Determining the total amount of sodium content consumed, and 3) Determining whether to adjust the amount of food to be consumed. They will learn rules to solve the problem such as defining, demonstrating, and calculating the components in a Nutrition Facts label. It is also essential for our learners to utilize entry-level behaviors to understand the specific concepts and identify the components of a Nutrition Facts label.


(21) Analyze a food nutrition label to determine one's intake of sodium
(12) Determine the sodium amount per serving from the Nutrition Facts label
(17) Determine the total amount of sodium to be consumed
(20) Determine whether to adjust the amount of food to be consumed
(11) Define the Nutrition Facts label
(16) Multiply the number of servings to be consumed by the amount of sodium per serving
(19) Compare the total amount of sodium to be consumed to the Daily Reference Value for sodium
(15) Divide the amount of food to be consumed by the Serving Size
A
(13) Identify the amount of food to be consumed
(14) Identify Serving Size
(18) Identify the Daily Reference Value for sodium
EL 2 - Ability to measure amount by unit of serving size
EL 3 - Cognitive skill to demonstrate multiplication, addition, and division
EL 4 - Cognitive skill to demonstrate subtraction

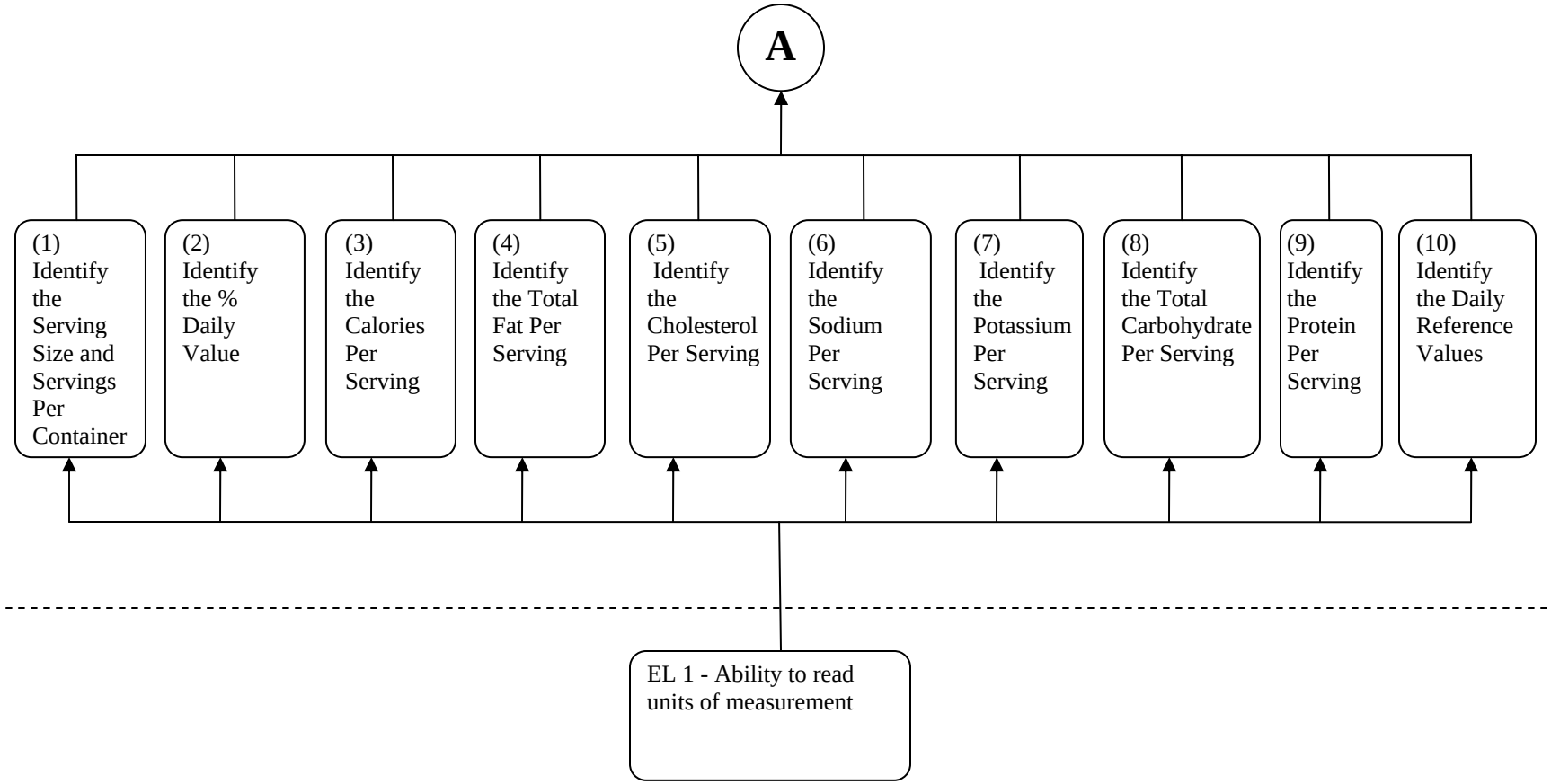

A
(1) Identify the Serving Size and Servings Per Container
(2) Identify the % Daily Value
(3) Identify the Calories Per Serving
(4) Identify the Total Fat Per Serving
(5) Identify the Cholesterol Per Serving
(6) Identify the Sodium Per Serving
(7) Identify the Potassium Per Serving
(8) Identify the Total Carbohydrate Per Serving
(9) Identify the Protein Per Serving
(10) Identify the Daily Reference Values
EL 1 - Ability to read units of measurement

Table 1. Performance Objectives

	SKILL	PERFORMANCE OBJECTIVE
EL 1	Ability to read units of measurement	Given a sample of a Nutrition Facts label, the learner will accurately read the units of measurement listed
EL 2	Ability to measure amount by unit of serving size	Given four choices, the learner will accurately select the measuring amount by unit of serving size on a sample of a Nutrition Facts label
EL 3	Cognitive skill to demonstrate multiplication, addition, and division	Given a list of mathematical formulas, the learner will accurately identify them as multiplication, addition, or division
EL 4	Cognitive skill to demonstrate subtraction	Given a list of mathematical formulas, the learner will accurately identify subtraction
1	Identify the Serving Size and Servings Per Container	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Serving Size and Servings Per Container
2	Identify the % Daily Value	Given a list of components from a Nutrition Facts label, the learner will accurately identify the % Daily Value
3	Identify the Calories Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify Calories Per Serving
4	Identify the Total Fat Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify Total Fat Per Serving
5	Identify the Cholesterol Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify Cholesterol Per Serving
6	Identify the Sodium Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify Sodium Per Serving
7	Identify the Potassium Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify Potassium Per Serving
8	Identify the Total Carbohydrate Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Total Carbohydrate Per Serving
9	Identify the Protein Per Serving	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Protein Per Serving
10	Identify the Daily Reference Values	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Daily Reference Values
11	Define the Nutrition Facts label	Given four choices, the learner will select the correct definition of a Nutrition Facts label
12	Determine the sodium amount per serving from the Nutrition Facts label	Given a list of four choices, the learner will accurately select the best example of the sodium amount per serving from a sample of a Nutrition Facts label
13	Identify the amount of food to be consumed	Given the food selected, the learner will identify the amount of food to be consumed

14	Identify the serving size from the Nutrition Facts label	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Serving Size
15	Divide the amount of food to be consumed by the Serving Size	Given a list of four choices, the learner will identify the amount of food to be consumed in the units of measurement noted by the serving size
16	Multiply the number of servings to be consumed by the amount of sodium per serving	Given a list of four choices, the learner will select the correct solution from an equation that multiplies the number of servings to be consumed by the amount of sodium per serving
17	Determine the total amount of sodium to be consumed	Given an measurable portion of food and its Nutrition Facts label, the learner will correctly select the total amount of sodium to be consumed
18	Identify the Daily Reference Value for sodium	Given a list of components from a Nutrition Facts label, the learner will accurately identify the Daily Reference Values
19	Compare the total amount of sodium to be consumed to the Daily Reference Value for sodium	Given four pairs of choices, the learner will select the pairs which have higher, lower, and equal total amounts of sodium than the Daily Reference Value for sodium
20	Determine whether to adjust the amount of food to be consumed	Given a Nutrition Facts label, the learner will accurately choose the best example that portrays whether or not the sodium intake to be consumed should be increased or decreased
21	Analyze a food nutrition label to determine one’s intake of sodium	Given a packaged food, the learner will determine one's intake of sodium based on the Nutritional Facts label. The food's label provides its components including the amount of sodium, serving size, and the Daily Reference Value

Table 2. Sequence and Clustering of Objectives

CLUSTER	OBJECTIVES	TIME
1 Sodium amount per serving	1. Identify the Serving Size and Servings Per Container 2. Identify the % Daily Value 3. Identify the Calories Per Serving 4. Identify the Total Fat Per Serving 5. Identify the Cholesterol Per Serving 6. Identify the Sodium Per Serving 7. Identify the Potassium Per Serving 8. Identify the Total Carbohydrate Per Serving 9. Identify the Protein Per Serving 10. Identify the Daily Reference Values 11. Define the Nutrition Facts label 12. Determine the sodium amount per serving from the Nutrition Facts label	15 Minutes
2 Total amount of sodium	13. Identify the amount of food to be consumed 14. Identify Serving Size 15. Divide the amount of food to be consumed by the Serving Size 16. Multiply the number of servings to be consumed by the amount of sodium per serving 17. Determine the total amount of sodium to be consumed	15 Minutes
3 Adjust the amount of food	18. Identify the Daily Reference Value for sodium 19. Compare the total amount of sodium to be consumed to the Daily Reference Value for sodium 20. Determine whether to adjust the amount of food to be consumed	15 Minutes
4 Terminal Goal	21. Analyze a food nutrition label to determine one's intake of sodium	5 Minutes

Table 3. Pre-instructional, Assessment, and Follow-Through Activities

PRE-INSTRUCTIONAL ACTIVITIES
Motivation: Learners participating in this module will be able to improve their health by knowing how to determine the amount of sodium consumed by using the nutritional labels on food containers. Sodium comes from many sources of food, and as adults, college students are responsible for their diets. This module will help learners to take control of a critical element in their diet. Images of various sources of sodium and related health issues will be presented to introduce the topics to learners. Examples will come from common and local foods familiar to the university community. An introduction consisting of a set of questions to introduce the topic and the need for the learner to know this information will be used as the initial motivation for the module.
Objectives: In this self-instructional paper module, University of Hawaii undergraduates and graduates will to analyze a food nutrition label to determine one's daily intake of sodium. The major steps involve 1) Determining the sodium amount per serving from the Nutrition Facts label, 2) Determining the total amount of sodium content consumed, and 3) Determining whether to adjust the amount of food to be consumed. They will learn rules to solve the problem such as defining, demonstrating, and calculating the components in a Nutrition Facts label. It is also essential for our learners to utilize entry level behaviors to understand the specific concepts and identify the components of a Nutrition Facts label. **Prerequisite Skills:** Learners will possess four entry level skills which include EL 1 - the ability to read units of measure, EL 2 - the ability to measure amount by unit of serving size, EL 3 - cognitive skills of multiplication, addition, and division, and EL 4 - cognitive skill of subtraction.
ASSESSMENT
Pretest: At the beginning of instruction, learners will participate in a pre-test of five multiple choice items.
Practice Tests: Throughout the module, learners will participate in practice exercises and embedded test questions similar to the pre-test items.
Post Test: At the end of the module, learners will take a post test of five multiple test questions to help the learner determine whether they have achieved the target objective.
FOLLOW-THROUGH ACTIVITIES
Memory Aids: Repetition of certain symbols and images will be used to help the learner remember the content.
Transfer: At the end of the module, learners will have an opportunity to apply their knowledge to track their daily intake of sodium as a way to promote a health-conscious lifestyle.

Table 4. Gagne's Nine Events of Instruction Worksheet

Brief description of lesson: In this module learners will learn to analyze a food nutrition label to determine one's daily intake of sodium. The major steps involve determining the Nutrition Facts label information, showing the total amount of sodium content consumed, and showing the difference between the total amount of sodium content consumed and the Daily Reference Value.
(1) Gain attention: Learners will be presented with various sources of sodium and a question to draw them in to the learning. ("Did you know . . .")
(2) Inform learners of the objective: A section describing the purpose and process of the module will be provided for the learner at the beginning of the lesson.
(3) Stimulate recall: Learners will be presented with a number of questions with images in order to help them think about what they already know about sodium and its effects on the body.
(4) Present stimulus materials: Learners will be presented with information for each objective as they progress through the module.
(5) Provide learner guidance: Learners will be provided with examples (images) and rules (formulas) for each step as they progress through the module.
(6) Elicit performance: Learners will have opportunities for each step to practice.
(7) Provide feedback: Feedback will be provided with the practice so that learners can self-check their work as they go.
(8) Assess performance: Learners will be given a post test to determine whether they have successfully achieved the objective.
(9) Enhance retention and transfer: Learners will have an opportunity to apply their knowledge to track their daily intake of sodium as a way to promote a health-conscious lifestyle.

Table 5. Content Presentation and Learner Participation

Cluster 2: Total amount of sodium to be consumed

SKILL: Identify the amount of food to be consumed	#13
OBJECTIVE: The learner will correctly identify the amount of food to be consumed in the units of measurement noted by the serving size.	
CONTENT PRESENTATION	
Information Presentation: The amount of food to be consumed must be measured in the same units of measurement noted by the serving size. By measuring a food product according to its serving size measurement, the amount of food of concern can be reflected in terms of number of servings.	
Examples: Serving size for potato chips given in number of chips; person identifies amount of food as 20 chips. Serving size for chicken nuggets given in number of pieces; person identifies amount of food as 5 pieces.	
Non-Examples: Serving size for potato chips given in number of chips; person identifies amount of food as one sandwich bag full. Serving size for chicken nuggets given in number of pieces; person identifies amount of food as one pound.	
Pretest & Embedded:	Which of the following food serving sizes best describes the amount of food consumed? A. Half of a potato chip B. 1-1/2 Cup of rice* C. 1 plate of salad D. 2 scoops of potato salad
Feedback	A. Incorrect. *Half of a potato chip* is not an accurate or measurable unit. B. Correct! *1-1/2 Cup* is an accurate and measurable unit. C. Incorrect. *Plate* is not a unit of measurement. D. Incorrect. *A scoop* is not a unit of measurement.
Post Test	Which of the following is a unit of measurement? A. Dash B. Half C. Lump D. Tablespoon*

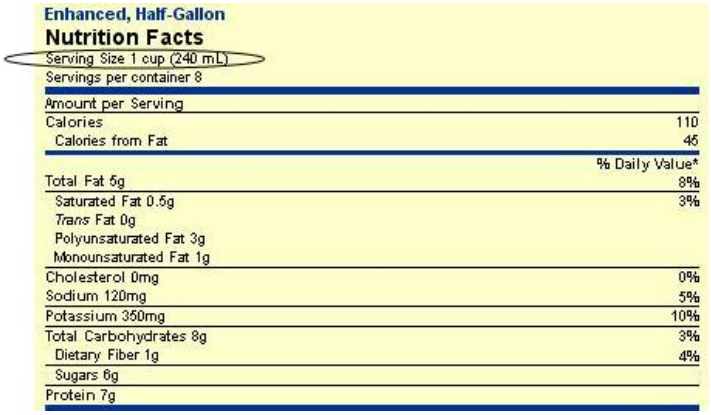
SKILL: Identify Serving Size	#14
OBJECTIVE: The learner will correctly identify the serving size from the nutrition facts label	

CONTENT PRESENTATION

Information Presentation:

The nutrition facts label identifies the serving size of a food product based upon a "reference amount customarily consumed per eating occasion," as specified by the US Food and Drug Administration. The serving size is listed near the top of the food product's nutrition facts label and is reflected in units conducive to measuring or counting the food product.

Examples:



Enhanced, Half-Gallon

Nutrition Facts

Serving Size 1 cup (240 mL)

Servings per container 8

Amount per Serving	
Calories	110
Calories from Fat	45
	% Daily Value*
Total Fat 5g	8%
Saturated Fat 0.5g	3%
Trans Fat 0g	
Polyunsaturated Fat 3g	
Monounsaturated Fat 1g	
Cholesterol 0mg	0%
Sodium 120mg	5%
Potassium 350mg	10%
Total Carbohydrates 8g	3%
Dietary Fiber 1g	4%
Sugars 6g	
Protein 7g	

Non-Examples:

Nutrition Facts:

Serving Size: 1 cup (52g/1.8 oz)

Servings Per Container: About 8

~~Amount/Serving~~	%Daily Value**
Calories 140	
Calories from Fat 10	
Total Fat 1g	2%
Saturated Fat 0g	0%
***Trans* Fat** 0g	0%
Cholesterol 0mg	0%
Sodium 85mg	4%
Potassium 480mg	14%
Total Carbohydrate 30g	10%
Dietary Fiber 10g	40%
Soluble Fiber 1g	
Insoluble Fiber 9g	
Sugars 6g	
Protein 13g	20%
Vitamin A	0%
Vitamin C	0%
Calcium	6%
Iron	10%
Phosphorus	20%

Pretest & Embedded:	Which of the following is a serving size? A.  B. 

	C.*  **Nutrition Facts** Serving Size 1 oz. (28g/About 15 chips) Servings Per Container About 3 **Amount Per Serving** **Calories** 1 oz. 140 / Entire Pkg. 400 Calories from Fat 50 / 160 % Daily Value* **Total Fat** 6g, 18g — 9% 27% Saturated Fat 1g, 3g — 5% 15% Polyunsaturated Fat 2g, 6g Monounsaturated Fat 3.5g, 10g Trans Fat 0g, 0g **Cholesterol** 0mg, 0mg — 0% 0% **Sodium** 160mg, 470mg — 7% 19% **Potassium** 70mg, 200mg — 2% 6% D.  **Nutrition Facts** Serving Size 1/2 piece (73g) Servings Per Container 2 **Calories** 230 Calories from Fat 80 *Percent Daily Values are based on a 2,000 calorie diet. Amount / Serving — % Daily Value* **Total Fat** 9g — 14% Saturated Fat 5g — 25% Trans Fat 0g **Cholesterol** 0mg — 0% **Sodium** 380mg — 16% Vitamin A 0% • Vitamin C 0% Amount / Serving — % Daily Value* **Total Carbohydrate** 34g — 11% Dietary Fiber 5g — 20% Sugars 6g **Protein** 4g Calcium 2% • Iron 15%
Feedback	A. Incorrect. *Servings Per Container* does not identify the serving size. B. Incorrect. *Calories* do not identify the serving size. C. Correct! *Serving Size* on this package estimates one serving to be about 15 chips. D. Incorrect. *Calories from Fat* does not identify the serving size.
Post Test	Select the best description of a serving size on a Nutrition Facts label. A. 0.08 mg/5% B. 1 oz. (42g/15 sticks)* C. 1 and 1/2 Packages D. 250 Calories

SKILL: Divide the amount of food to be consumed by the Serving Size	#15
OBJECTIVE: The learner will correctly divide the amount of food to be consumed by the serving size, in order to calculate the number of servings to be eaten	

CONTENT PRESENTATION	
Information Presentation: In order to determine the nutritional information for multiple servings of a food product, the amount of food to be consumed must be identified in terms of number of servings. To identify the number of servings to be consumed, divide the amount of food to be consumed, as measured in serving size units, by the serving size.	
Examples: For serving size of 2 cups and amount to be consumed of 3 cups, the amount of food is equal to 1.5 (= 3 cups / 2 cups per serving) servings.	
Non-Examples: For serving size of 2 Cups and amount to be consumed of 4 Cups, the amount of food is equal to 4 servings.	
Pretest & Embedded:	Which of the following is the correct calculation for the number of servings if serving size is 1/2 Cup when the amount of food is 3 Cups? A. 1/2 Cup per serving + 3 Cups = 3-1/2 Cups B. 1/2 Cup per serving x 3 Cups = 1.5 Cup C. 3 Cups - 1/2 Cup per serving = 2-1/2 Cup D. 3 Cups / 1/2 Cup per serving = 6 servings*
Feedback	A. Incorrect. This calculation involves addition of figures with improper units of measurement. B. Incorrect. This calculation involves multiplication of figures with improper units of measurement. C. Incorrect. This calculation involves subtraction of figures with improper units of measurement. D. Correct! This calculation involves division of figures with proper units of measurement.
Post Test	Which of the following mathematical formulas correctly determines the number of servings for a serving size of 4 cookies when the amount of food is 3 cookies? A. Food quantity per serving / Food quantity B. Food quantity / Food quantity per serving* C. Food quantity per serving + Food quantity D. Food quantity - Food quantity per serving

SKILL: Multiply the number of servings to be consumed by the amount of sodium per serving	#16
OBJECTIVE: The learner will correctly multiply the number of servings to be consumed by the amount of sodium per serving, to calculate the total amount of sodium to be consumed	
CONTENT PRESENTATION	
Information Presentation: The nutrition facts label lists the amounts of sodium and other nutrients on a per serving basis. When there serving quantity is not equal to one serving, a person must calculate the multiple or proportion of the per serving amount. This is done by multiplying the number of servings by the amount per serving.	
Examples: For 5 servings and a per serving sodium amount of 10 mg, the total amount of sodium to be consumed is 50 mg (= 5 servings x 10 mg/serving).	
Non-Examples: For 3 servings and a per serving sodium amount of 7 mg, the total amount of sodium to be consumed is 7 mg.	
Pretest & Embedded:	Which of the following calculations correctly determines the total amount of sodium to be consumed for 4 servings when the per serving sodium amount is 5 mg? A. 4 servings x 5 mg = 20 mg* B. 5 mg C. 5 mg / 4 servings = 1.25 mg D. 4 servings + 5 mg = 9 mg
Feedback	A. Correct! This calculation involves multiplication of the number of servings by the amount per serving. B. Incorrect. 5 mg is the per serving amount that needs to be multiplied by the number of servings. C. Incorrect. The correct calculation involves multiplication of the number of servings and per serving amount. D. Incorrect. The correct calculation involves multiplication of the number of servings and per serving amount.
Post Test	Which of the following mathematical formulas correctly determines the total amount of sodium to be consumed A. Number of servings / Sodium amount per serving B. Sodium amount per serving / Number of servings C. Number of servings + Sodium amount per serving D. Number of servings x Sodium amount per serving*

SKILL: Determine the total amount of sodium to be consumed	#17
OBJECTIVE: The learner will correctly determine the total amount of sodium to be consumed, given an unmeasured quantity of food and the food's Nutrition Facts label.	
CONTENT PRESENTATION	
Information Presentation: To calculate the total amount of sodium in an amount of food to be consumed, a person must determine the food quantity as a serving quantity, then apply the per serving sodium amount to that serving quantity.	
Examples: The Nutrition Facts label contains the food's serving size, units of measurement per serving, and the amount of sodium per serving to be applied to the amount of food to be consumed for the total amount of sodium.	
Non-Examples: The Nutrition Facts label also contains the food's servings per container, and the amount of total potassium per serving; however, these applied to the amount of food to be consumed does not calculate the total amount of sodium.	
Pretest & Embedded:	Which of the following components determine the total amount of sodium to be consumed? A. Serving Size, Servings per container, Amount of sodium per serving, and the amount of food to be consumed B. Serving Size, Units of measurement per serving, Amount of sodium per serving, and the amount of food to be consumed* C. Servings per container, Amount of sodium per serving, Percentage of sodium per serving, and the amount of calories per serving D. Servings per container, Units of measurement per serving, Amount of potassium per serving, and the amount of food to be consumed
Feedback	A. Incorrect. Servings per container will not determine the amount of sodium to be consumed. B. Correct! Basic mathematical formulas using these components in a Nutrition Facts label with the amount of food to be consumed will determine the total amount of sodium to be consumed. C. Incorrect. Servings per container, percentage of sodium per serving, and the amount of calories per serving will not determine the amount of sodium to be consumed. D. Incorrect. Servings per container and the amount of potassium per serving will not determine the amount of sodium to be consumed.
Post Test	In the following list, select the item that is not required to determine the total amount of sodium to be consumed. A. Amount of sodium per serving B. Amount of calories per serving* C. Servings per container D. Serving Size