

Lesson Plan

Lesson to Calculate Nutrient Analysis

Time Needed: 20–30 minutes

Materials:

- Instructor’s Resource—**Replacing *SuperTracker***
- Student Handout—**How to Calculate Nutrient Analysis Manually**
- Student Worksheet—**Calculating Nutrient Analysis** and answer key
- Computer
- Classroom projection system
- Internet access
- *Nutritive Value of Foods* PDF downloaded on computer or in print (found here www.ars.usda.gov); a condensed version can be found as an appendix in some of our nutrition textbooks
- Calculators

Procedure:

1. Review **Replacing *SuperTracker*** Instructor’s Resource before class.
2. Distribute **How to Calculate Nutrient Analysis Manually** Student Handout to students.
3. Review the Student Handout with students and work through sample calculations as needed. Explain to students that nutrient analysis is not a precise science so that values may vary based on the nutrient database used and the food description the student chooses.
4. Use the computer and classroom projection system to demonstrate how to use the spreadsheets on the Jean Mayer USDA Human Nutrition Research Center on Aging website. Inform students that the spreadsheets do not include all the nutrients included in the chart for the manual calculation. If the student is familiar with Excel spreadsheets, he or she could download the spreadsheet and add additional columns and formulas or change headings in the existing columns. For example, the column heading for *Saturated Fat (g)* could be changed to *Vitamin D (mcg)*. If there are different nutrients that you would like students to focus on, you could add them to the spreadsheet or replace one of the nutrients listed in the spreadsheet with the nutrient of your choosing. Also, the students can leave the column headed *Gram weight (g)* blank because the recipe does not provide that information.
5. Distribute the **Calculating Nutrient Analysis** Student Worksheet to students.

Instructor's Resource

Replacing *SuperTracker*

On June 30, 2018, the USDA discontinued *SuperTracker*. Although this was an unfortunate decision, there are other resources and options available to replace those previously provided on the *SuperTracker* website. Additionally, it is important to remember that ChooseMyPlate.gov is still supported and provides many useful resources such as the personalized food plan called *MyPlate Plan* (formerly *MyPlate Daily Checklist*).

The resources previously supported on the *SuperTracker* website include

- Food-A-Pedia;
- Food Tracker;
- Physical Activity Tracker;
- My Weight Manager;
- My Top 5 Goals; and
- Group Challenges.

The *SuperTracker* website was popular because it stored and tracked results in addition to providing a nutrient database and performing nutrient analysis on food and meal entries. The second section of this resource explains two alternatives for calculating nutrient analysis if individuals are willing to track progress themselves.

SuperTracker Features

Following are replacement options for each of the bulleted resources above:

Food-A-Pedia

The *Food-A-Pedia* tool was a food composition database that provided nutrition information for over 8,000 foods. The *USDA National Nutrient Database* is a good alternative. This database includes over 259,000 foods and offers comprehensive nutrient reporting. You can search individual foods or use the *Nutrient Search* function to compare the nutrient content of foods within a nutrient group.









The Dietitians of Canada created a resource that is very similar to *SuperTracker* called *eaTracker*. This resource requires users to be 14 years or older and offers a food composition database along with other features that will be described in later sections of this document. The *eaTracker* uses a standard reference food composition database that is very similar to the *USDA National Nutrient Database*. Quantities can be easily converted from metric units to US customary units.

Food Tracker

The *SuperTracker Food Tracker* tool allowed individuals to track the foods they ate and compare them to their nutrition targets electronically. Using *eaTracker*, you can enter foods you eat each day and it will track them for you. When you select *My Eating Feedback* on the left side of the *My Food* tab, you can view how the day's food intake compares with your nutrition targets.

The comparison is offered based on food groups or by nutrients. At this time, the Canada Food Guide organizes foods into four food groups: vegetables and fruit, grain products, milk and alternatives, and meat and alternatives. (The Canada Food Guide is being revised at this time.) This could cause some confusion because the US MyPlate food guidance system organizes foods into five food groups: fruits, vegetables, grains, protein foods, and dairy. To avoid confusion, use the comparison by nutrients.

The *MyPlate Plan* on ChooseMyPlate.gov offers a manual option for tracking food by food groups. A personalized *MyPlate Plan* is generated when an individual inputs his or her age, sex, height, weight, and activity level. The second page of the personalized *MyPlate Plan* is a form that lists food group targets along the left side and space for tracking daily food choices for each food group in the middle column.

Food group targets for a 2,000 calorie* pattern are:		Write your food choices for each food group	Did you reach your target?
 Fruits 2 cups 1 cup of fruits counts as <ul style="list-style-type: none"> • 1 cup raw or cooked fruit; or • 1/2 cup dried fruit; or • 1 cup 100% fruit juice. 	_____ _____ _____	<input type="checkbox"/> Y <input type="checkbox"/> N	
 Vegetables 2 1/2 cups 1 cup vegetables counts as <ul style="list-style-type: none"> • 1 cup raw or cooked vegetables; or • 2 cups leafy salad greens; or • 1 cup 100% vegetable juice. 	_____ _____ _____	<input type="checkbox"/> Y <input type="checkbox"/> N	
 Grains 6 ounce equivalents 1 ounce of grains counts as <ul style="list-style-type: none"> • 1 slice bread; or • 1 ounce ready-to-eat cereal; or • 1/2 cup cooked rice, pasta, or cereal. 	_____ _____ _____	<input type="checkbox"/> Y <input type="checkbox"/> N	
 Protein 5 1/2 ounce equivalents 1 ounce of protein counts as <ul style="list-style-type: none"> • 1 ounce lean meat, poultry, or seafood; or • 1 egg; or • 1 Tbsp peanut butter; or • 1/4 cup cooked beans or peas; or • 1/2 ounce nuts or seeds. 	_____ _____ _____	<input type="checkbox"/> Y <input type="checkbox"/> N	
 Dairy 3 cups 1 cup of dairy counts as <ul style="list-style-type: none"> • 1 cup milk; or • 1 cup yogurt; or • 1 cup fortified soy beverage; or • 1 1/2 ounces natural cheese or 2 ounces processed cheese. 	_____ _____ _____	<input type="checkbox"/> Y <input type="checkbox"/> N	
 MyWins Track your MyPlate, MyWins _____ _____ _____			 Limit: <ul style="list-style-type: none"> • Sodium to 2,300 milligrams a day. • Saturated fat to 22 grams a day. • Added sugars to 50 grams a day. <input type="checkbox"/> Y <input type="checkbox"/> N
			 Activity Be active your way: Adults: <ul style="list-style-type: none"> • Be physically active at least 2 1/2 hours per week. Children 6 to 17 years old: <ul style="list-style-type: none"> • Move at least 60 minutes every day. <input type="checkbox"/> Y <input type="checkbox"/> N
			<small>* This 2,000 calorie pattern is only an estimate of your needs. Monitor your body weight and adjust your calories if needed.</small>

Physical Activity Tracker

The *Physical Activity Tracker* tool allowed individuals to track their physical activity and compare it with activity targets. Using *eaTracker*, you can enter your daily physical activity and it will track it for you. When you select *My Activity Feedback* on the left side of the *My Activities* tab, you can view how your daily activity compares with your activity targets. The targets used are from the Canadian Society for Exercise Physiology activity guidelines, but they are nearly identical to the *Physical Activity Guidelines for Americans*.

My Weight Manager

The *My Weight Manager* on the *SuperTracker* website provided weight management guidance and allowed you to track progress over time. Although you can still obtain a personalized food plan (*MyPlate Plan*) based on your age, sex, height, weight, and physical activity level on ChooseMyPlate.gov, the NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) offers a similar tool. The NIDDK tool is called the *Body Weight Planner* and is more comprehensive. Please note that the *Body Weight Planner* is intended for use by individuals who are 18 years of age or older and not intended for use by women who are pregnant or breastfeeding.

Neither the NIDDK website nor ChooseMyPlate.gov will allow you to track your weight; however, you can track your weight on *eaTracker* by periodically updating your weight on the *My Profile* tab under *My Details*. You can view progress under the *My Activities* tab by selecting *Activity History* on the left side and scrolling down the page.

My Top 5 Goals

This *SuperTracker* feature allowed you to choose up to five personal goals and then sign up for tips and support from a virtual coach. A similar feature is offered on *eaTracker*, but you must be a client of a registered dietitian before you can be coached on *eaTracker*.

Group Challenges

The *SuperTracker Challenges and Groups* as well as the *Presidential Champions* and the electronic versions of *PALA+* programs are no longer available. However, the *Presidential Active Lifestyle Award (PALA+)* is still viable, but progress must be logged manually. This challenge can be found on the US Department of Health and Human Services website.

Options for Calculating Nutrient Analysis

This section explains how to manually calculate nutrient analysis. It also describes a spreadsheet resource offered by the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, which can be used to perform nutrient analysis. Students could then track their results on paper, in a Word® document, or even create a spreadsheet to track and graph their results over time.

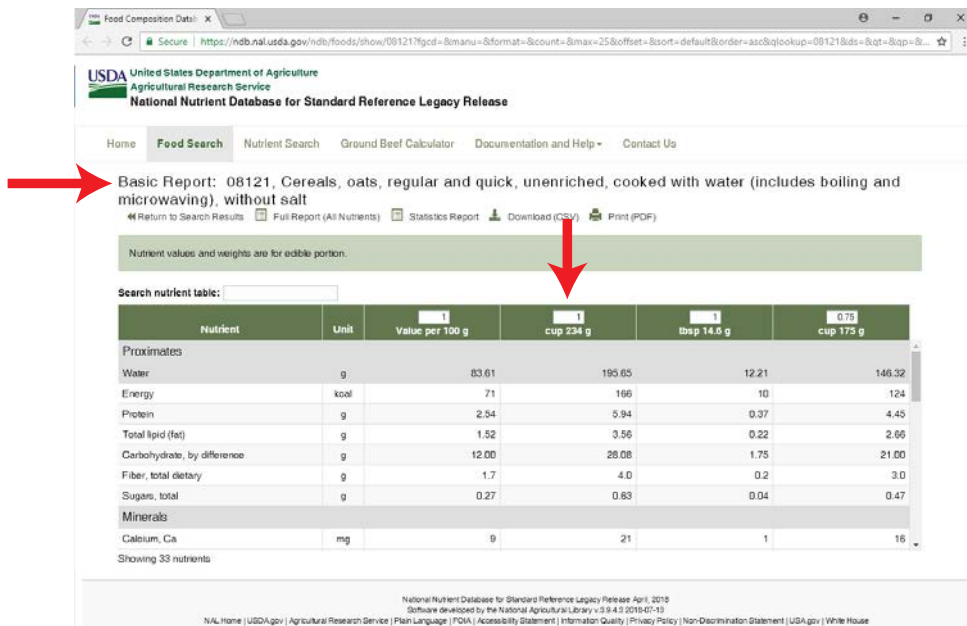
Calculating Nutrient Analysis Manually

A recipe or meal can be analyzed with manual calculation. The following steps describe how to perform a nutrient analysis.

1. Make a chart. List the foods consumed in the first column and their amounts in the second column. Determine which nutrients you want to include in your analysis and add a column for each nutrient. Label each column with the nutrient and its unit of measure.

Nutrient Analysis								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
<i>Oatmeal</i>	<i>1 cup</i>							
<i>Milk, nonfat, fortified</i>	<i>½ cup</i>							
<i>Walnuts</i>	<i>2 Tbsp.</i>							

2. Using a nutrient database such as the *USDA National Nutrient Database for Standard Reference* (ndb.nal.usda.gov), find the food you want to analyze. Select the amount on the database that reflects the amount you ate.



If Internet access is not available, the *Nutritive Value of Foods* is available in portable document format (PDF) on the USDA website (www.ars.usda.gov). This can be downloaded to your computer and/or printed when you are in a location that does have Internet access so it is available for use in the classroom.

3. Enter the nutrient amounts in your chart.

Nutrient Analysis								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
<i>Oatmeal</i>	<i>1 cup</i>	<i>166</i>	<i>5.9</i>	<i>3.6</i>	<i>28</i>	<i>4</i>	<i>9</i>	<i>0</i>
<i>Milk, nonfat, fortified</i>	<i>½ cup</i>	<i>45</i>	<i>4.4</i>	<i>0.3</i>	<i>6.2</i>	<i>0</i>	<i>65</i>	<i>60</i>
<i>Walnuts</i>	<i>2 Tbsp.</i>	<i>65</i>	<i>1.5</i>	<i>6.5</i>	<i>1.4</i>	<i>0.7</i>	<i>0</i>	<i>0</i>

4. After all the foods and their nutrients are entered in your chart, total the columns to determine the nutrient analysis for that meal.

Nutrient Analysis								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
<i>Oatmeal</i>	<i>1 cup</i>	<i>166</i>	<i>5.9</i>	<i>3.6</i>	<i>28</i>	<i>4</i>	<i>9</i>	<i>0</i>
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<i>Walnuts</i>	<i>2 Tbsp.</i>	<i>65</i>	<i>1.5</i>	<i>6.5</i>	<i>1.4</i>	<i>0.7</i>	<i>0</i>	<i>0</i>
<i>Banana, sliced</i>	<i>½ cup</i>	<i>67</i>	<i>0.8</i>	<i>0.3</i>	<i>17.1</i>	<i>1.9</i>	<i>1</i>	<i>0</i>
TOTAL		<i>343</i>	<i>12.6</i>	<i>10.7</i>	<i>52.7</i>	<i>6.6</i>	<i>75</i>	<i>60</i>

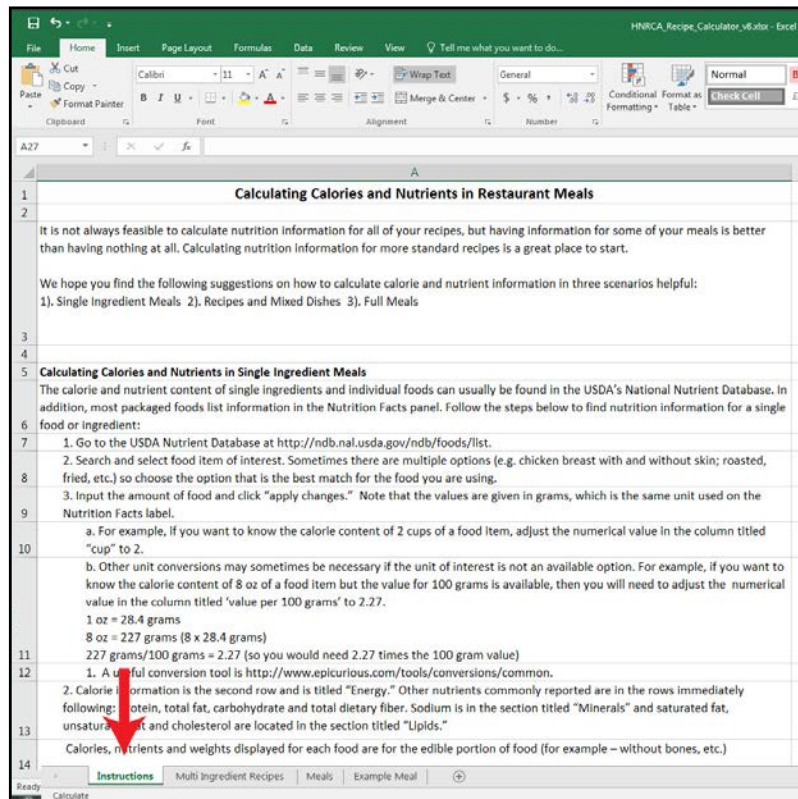
5. To determine the nutrient analysis for one serving of a recipe manually, the procedure is essentially the same with one additional step. The additional step is to divide the totals by the number of servings to ascertain the nutrient amount for one serving. Therefore, a nutrient analysis for a *Spinach Omelet* recipe that yields three servings would be calculated as follows:

Recipe Nutrient Analysis Spinach Omelet (3 servings)								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
<i>Eggs</i>	<i>6</i>	<i>429</i>	<i>37.7</i>	<i>28.5</i>	<i>2.2</i>	<i>0</i>	<i>426</i>	<i>246</i>
<i>Milk, nonfat</i>	<i>3 Tbsp.</i>	<i>17</i>	<i>1.6</i>	<i>0.1</i>	<i>2.3</i>	<i>0</i>	<i>24</i>	<i>22</i>
<i>Butter</i>	<i>1 Tbsp.</i>	<i>100</i>	<i>0</i>	<i>11</i>	<i>0</i>	<i>0</i>	<i>110</i>	<i>2.3</i>
<i>Spinach, fresh, chopped</i>	<i>1½ cup</i>	<i>15</i>	<i>1.5</i>	<i>0</i>	<i>2.3</i>	<i>1.5</i>	<i>48</i>	<i>0</i>
<i>Monterey Jack cheese, low fat</i>	<i>¾ cup</i>	<i>480</i>	<i>42</i>	<i>30</i>	<i>6</i>	<i>0</i>	<i>1,320</i>	<i>0</i>
<i>Nutmeg</i>	<i>pinch</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
TOTAL		<i>1,041</i>	<i>82.8</i>	<i>69.6</i>	<i>12.8</i>	<i>1.5</i>	<i>1,928</i>	<i>270.3</i>
Divide by # of servings		<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>
Nutrients per serving		<i>347</i>	<i>27.6</i>	<i>23.2</i>	<i>4.3</i>	<i>0.5</i>	<i>642.7</i>	<i>90.1</i>

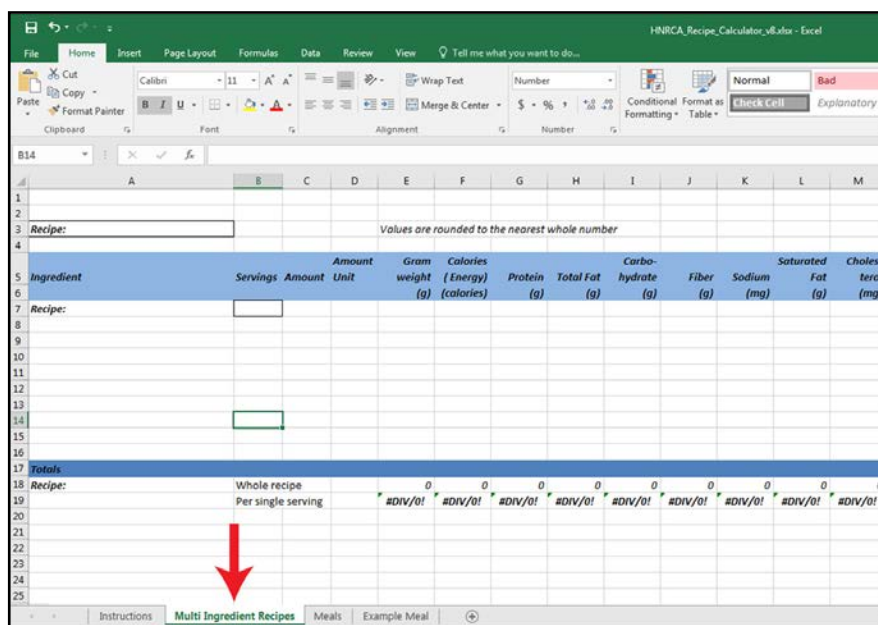
Calculating Nutrient Analysis with Spreadsheets

The Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University offers many useful resources including spreadsheet tools for calculating calories and nutrients in meals (hnrca.tufts.edu/flipbook/resources/restaurant-meal-calculator/#). This website offers three ready-to-use MS Excel® spreadsheets with formulas for calculating either single ingredient meals, recipes and mixed dishes, or full meals. This resource also suggests using the *USDA National Nutrient Database* to determine nutrient content of various foods.

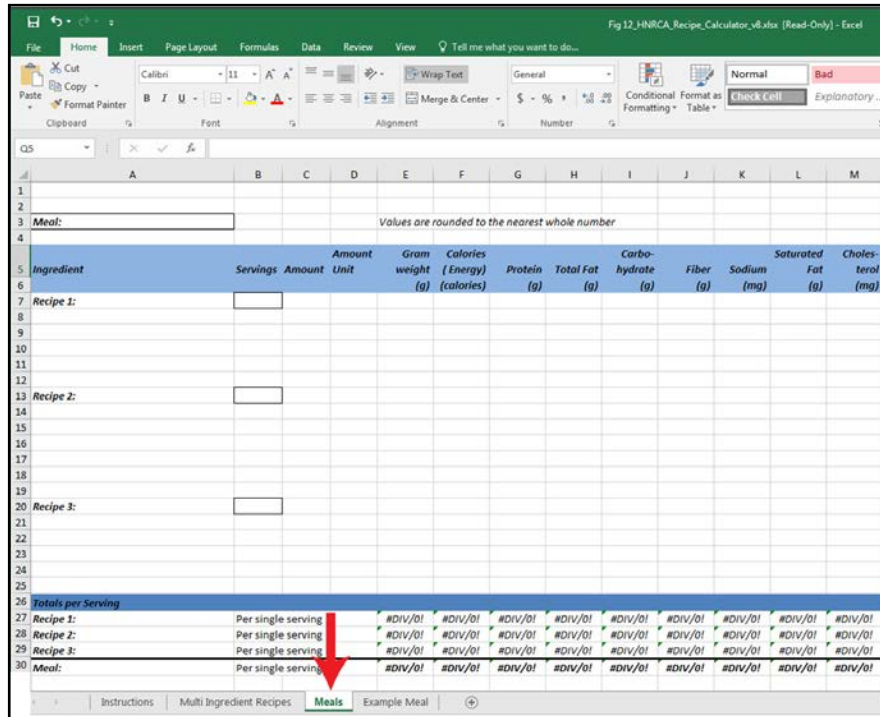
1. Instructions are included with the spreadsheets.



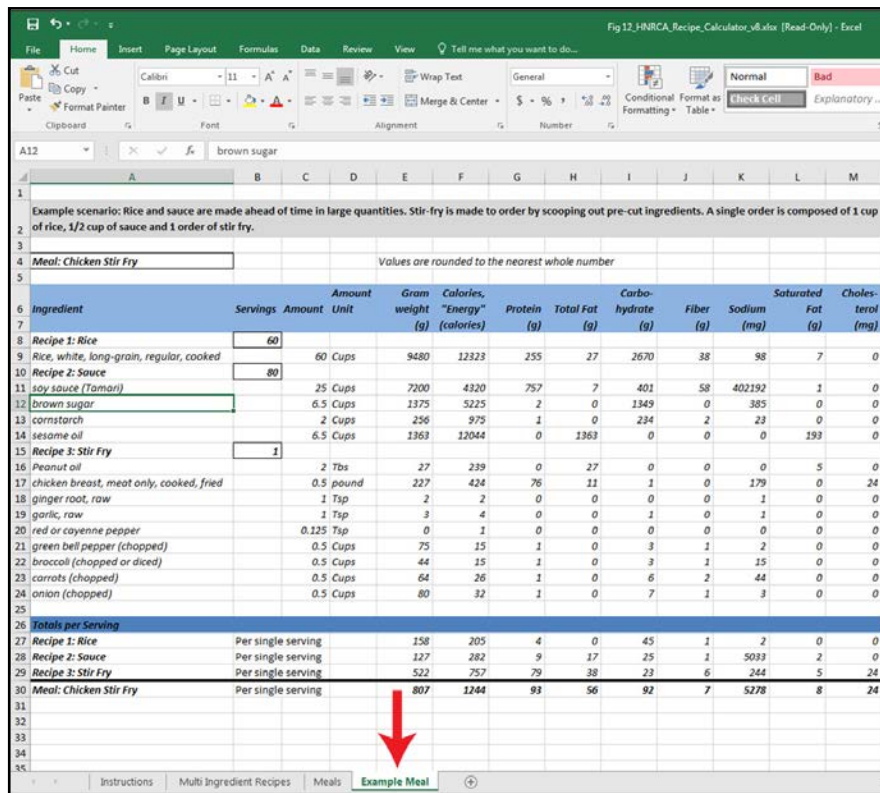
2. The spreadsheet calculates the nutrient analysis for a recipe once the number of servings, ingredients, and their nutrients are entered.



3. This spreadsheet will provide a nutrient analysis for an entire meal once the recipes' ingredients, number of servings, and nutrients are entered.



4. A completed spreadsheet shows the nutrient analysis for a chicken stir-fry meal as an example.



Student Handout

How to Calculate Nutrient Analysis Manually

When nutrient analysis software is unavailable, a recipe or meal can be analyzed by calculating manually.

1. Make a chart. List the foods you want to analyze in the first column and their amounts in the second column. Determine which nutrients you want to include in your analysis and add a column for each nutrient. Label each column with the nutrient and its unit of measure.

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Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
<i>Oatmeal</i>	<i>1 cup</i>							
<i>Milk, nonfat, fortified</i>	<i>1/2 cup</i>							
<i>Walnuts</i>	<i>2 Tbsp.</i>							

2. Using a nutrient database such as the *USDA National Nutrient Database for Standard Reference* (ndb.nal.usda.gov), find the food you want to analyze. Select the amount on the database that reflects the amount you ate.

The screenshot shows the USDA website interface. At the top, it says 'USDA United States Department of Agriculture Agricultural Research Service National Nutrient Database for Standard Reference Legacy Release'. Below this is a navigation bar with 'Home', 'Food Search', 'Nutrient Search', 'Ground Beef Calculator', 'Documentation and Help', and 'Contact Us'. The main content area shows a search result for 'Basic Report: 08121, Cereals, oats, regular and quick, unenriched, cooked with water (includes boiling and microwaving), without salt'. Below the search result is a table with columns for 'Nutrient', 'Unit', 'Value per 100 g', 'cup 234 g', 'Tbsp 14.6 g', and 'cup 173 g'. The table lists various nutrients including Water, Energy, Protein, Total lipid (fat), Carbohydrate, Fiber, Sugars, and Minerals. A red arrow points to the search result text, and another red arrow points to the 'cup 234 g' column header.

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3. Enter the nutrient amounts in your chart.

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4. After all the foods and their nutrients are entered in your chart, total the columns to determine the nutrient analysis for that meal.

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TOTAL		<i>343</i>	<i>12.6</i>	<i>10.7</i>	<i>52.7</i>	<i>6.6</i>	<i>75</i>	<i>60</i>

5. To determine the nutrient analysis for one serving of a recipe manually, the procedure is essentially the same with one additional step. The additional step is to divide the totals by the number of servings to ascertain the nutrient amount for one serving. Therefore, a nutrient analysis for the following *Spinach Omelet* recipe that yields three servings would be calculated as follows:

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<i>Milk, nonfat</i>	<i>3 Tbsp.</i>	<i>17</i>	<i>1.6</i>	<i>0.1</i>	<i>2.3</i>	<i>0</i>	<i>24</i>	<i>22</i>
<i>Butter</i>	<i>1 Tbsp.</i>	<i>100</i>	<i>0</i>	<i>11</i>	<i>0</i>	<i>0</i>	<i>110</i>	<i>2.3</i>
<i>Spinach, fresh, chopped</i>	<i>1½ cup</i>	<i>15</i>	<i>1.5</i>	<i>0</i>	<i>2.3</i>	<i>1.5</i>	<i>48</i>	<i>0</i>
<i>Monterey Jack cheese, low fat</i>	<i>¾ cup</i>	<i>480</i>	<i>42</i>	<i>30</i>	<i>6</i>	<i>0</i>	<i>1,320</i>	<i>0</i>
<i>Nutmeg</i>	<i>pinch</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
TOTAL		<i>1,041</i>	<i>82.8</i>	<i>69.6</i>	<i>12.8</i>	<i>1.5</i>	<i>1,928</i>	<i>270.3</i>
Divide by # of servings		<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>	<i>÷3</i>
Nutrients per serving		<i>347</i>	<i>27.6</i>	<i>23.2</i>	<i>4.3</i>	<i>0.5</i>	<i>642.7</i>	<i>90.1</i>

Student Worksheet

Calculating Nutrient Analysis

Name _____ Date _____ Period _____

Manual Nutrient Analysis Calculation

- Calculate the nutrient analysis for the following recipe. Be sure to show your work. Round numbers up to one decimal place.

Recipe: Chicken Teriyaki

Yield: 4 servings

Ingredients:

- 8 oz. chicken thighs, boneless, skinless
- 1 t. fresh ginger, grated
- ¼ t. salt
- 2 t. vegetable oil
- 1 T. honey
- 1 T. rice wine vinegar
- ½ t. granulated sugar
- 2 T. low-sodium chicken broth
- 1 T. soy sauce

Recipe Nutrient Analysis Chicken Teriyaki (4 servings)								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
TOTAL								
Divide by # of servings								
Nutrients per serving								

Nutrient Analysis Calculation Using Spreadsheets

2. Use the spreadsheet for Multi Ingredient Recipes found on <https://hnrca.tufts.edu/flipbook/resources/restaurant-meal-calculator/> to calculate the nutrient analysis for the *Chicken Teriyaki* recipe. Either copy and paste your completed spreadsheet below, download and print a copy to attach to this worksheet, or submit electronically as directed by your instructor.

3. How do the results from your manual calculation compare with those from the spreadsheet?

4. Which method do you prefer and why? _____

Answer Key

Calculating Nutrient Analysis

Name _____ Date _____ Period _____

Manual Nutrient Analysis Calculation

- Calculate the nutrient analysis for the following recipe. Be sure to show your work. Round numbers up to one decimal place.

Recipe: Chicken Teriyaki

Yield: 4 servings

Ingredients:

- 8 oz. chicken thighs, boneless, skinless
- 1 t. fresh ginger, grated
- ¼ t. salt
- 2 t. vegetable oil
- 1 T. honey
- 1 T. rice wine vinegar
- ½ t. granulated sugar
- 2 T. low-sodium chicken broth
- 1 T. soy sauce

Values may vary based on the nutrient database used and the food description the student chooses, but answers should be close to those provided in the following table:

Recipe Nutrient Analysis Chicken Teriyaki (4 servings)								
Food	Amount	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
Chicken thighs	8 oz.	320	56	18	2	0	381	0
Fresh ginger, grated	1 tsp.	0	0	0	0	0	0	0
Salt	¼ tsp.	0	0	0	0	0	147	0
Vegetable oil	2 tsp.	80	0	9	0	0	0	0
Honey	1 Tbsp.	60	0	0	17	0	0	0
Rice wine vinegar	1 Tbsp.	0	0	0	0	0	9	0
Sugar	½ tsp.	8	0	0	2	0	0	0
Chicken broth, low sodium	2 Tbsp.	1	0.3	0	0.1	0	71	0
Soy sauce	1 Tbsp.	11	1.9	0	1	0.1	1,005	0
TOTAL		480	58.2	27	22.1	0.1	1,613	0
Divide by # of servings		÷4	÷4	÷4	÷4	÷4	÷4	÷4
Nutrients per serving		120	14.6	6.8	5.5	0.03	403.3	0

Nutrient Analysis Calculation Using Spreadsheets

- Use the spreadsheet for Multi Ingredient Recipes found on <https://hnrca.tufts.edu/flipbook/resources/restaurant-meal-calculator/> to calculate the nutrient analysis for the *Chicken Teriyaki* recipe. Either copy and paste your completed spreadsheet below, download and print a copy to attach to this worksheet, or submit electronically as directed by your instructor.

Inform students that the spreadsheets do not include all the nutrients included in the manual calculation example on previous page. If the student is familiar with Excel® spreadsheets, he or she could download the spreadsheet and add additional columns and formulas or change headings in the existing columns. For example, the column heading for *Saturated Fat (g)* could be changed to *Vitamin D (mcg)*. Also, the students can leave the column headed *Gram weight (g)* blank because the recipe does not provide that information.

Ingredient	Servings	Amount	Unit	Gram weight (g)	Calories (Energy) (calories)	Protein (g)	Total Fat (g)	Carbohydrate (g)	Fiber (g)	Sodium (mg)	Vitamin D (mcg)
Recipe: Chicken Teriyaki											
Values are rounded to the nearest whole number											
Recipe: Chicken Teriyaki	4										
Chicken thighs, boneless, skinless		8.00	ounces		320	56	18	2	0	381	0
Fresh ginger		1.00	teaspoon		0	0	0	0	0	0	0
salt		0.25	teaspoon		0	0	0	0	0	147	0
vegetable oil		2.00	teaspoon		80	0	9	0	0	0	0
honey		1.00	tablespoon		60	0	0	17	0	0	0
Rice wine vinegar		1.00	tablespoon		0	0	0	0	0	9	0
Sugar		0.50	teaspoon		8	0	0	2	0	0	0
Chicken broth, low sodium		2.00	tablespoon		1	0	0	0	0	71	0
Soy Sauce		1.00	tablespoon		11	2	0	1	0	1005	0
Totals											
Recipe: Chicken Teriyaki	Whole recipe				0	480	58	27	0	1613	0
	Per single serving				0	120	15	7	0	403	0

- How do the results from your manual calculation compare with those from the spreadsheet?

Answers will vary.

- Which method do you prefer and why?

Answers will vary.
