

Nutrition Guidelines - 1

Much of Biology 130 is devoted to examining **nutrients** -- what they are, how to get them and how our body functions with respect to nutrient processing and regulating nutrients.

The Essential Nutrient List:

- Carbohydrate
- Fatty acids
 - Linoleic acid and Linolenic acid
 - (The omega-6 and omega-3 fatty acids)
- 8 (or more) Amino acids
- 13 Vitamins
- 15 Minerals
- Water

One of our goals is to look at our food choices with an "eye" to choosing foods that provide us with the nutrient recommendations that have been "established" over the years for health and fitness.

Learning how much and where to get nutrients would not be easy if we had to search for each of the 40 odd essential nutrients individually. We'd probably give up. Grocery stores don't organize by "nutrient" – most of us don't shop for "iron" or "calcium". We shop for foods. However, government and other agencies have produced many guidelines to help us make better choices. Your textbook also has material on how dieticians and scientists find out about nutrient requirements and the kinds of studies they do prior to making nutritional recommendations for the public. Your text also has valuable information about how to discern reliable information about nutrition from advertised assertions that bombard us daily.

<p>Epidemiological studies. Scientists observe how much and what kinds of foods a group of people eat and how healthy those people are.</p> 	<p>Case-control studies. Researchers compare people who do and do not have a given condition such as a disease, closely matching them in age, gender, and other key variables so that differences in other factors will stand out.</p> 
<p>Animal studies. Researchers feed animals special diets that provide or omit specific nutrients and then observe any changes in health.</p> 	<p>Human intervention (or clinical) trials. Scientists ask people to adopt a new behavior (for example, eat a citrus fruit, take a vitamin C supplement, or exercise daily).</p> 

As we briefly discussed in our introduction, we make food choices for any number of reasons, often having nothing to do with recommendations made by some agency, and, it seems that recommendations change daily if we are to believe what we read and hear in the popular press. What we want to do is have sufficient knowledge to make healthier food decisions and still keep some of our positive food associations.

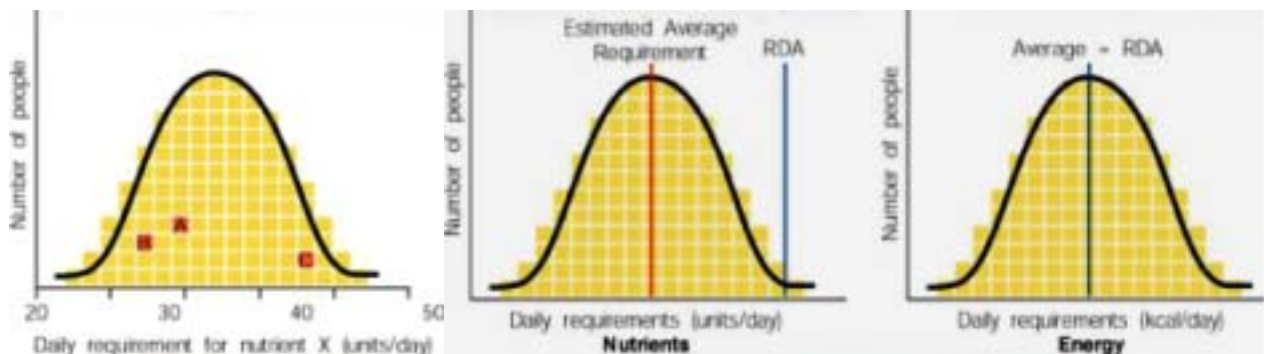
What any diet needs

- Adequate amount of nutrients
- Balance of nutrients
 - Does not overemphasize one nutrient at the expense of others
- Calories met
- Nutrient Density - Moderation
 - No nutrients in excessive amounts, but choosing foods that supply moderate amounts of several nutrients rather than few or none for calories consumed
- Variety
- Pleasing

What do we do?

Lots of research has resulted in federal guidelines (currently from the Food and Nutrition Board) for what are now called the **Dietary Reference Intakes**, or **DRI**. Many of us are more familiar with the still used Recommended Daily Allowances, the **RDAs** established in 1968. The DRI incorporate information on health and optimal activities that may minimize risks of chronic diseases that were not included in the RDAs.

Dietary study results are compiled from some 22 age and gender groups of individuals. The recommendations are a composite of these individuals, and are set to ensure that almost everyone will have well above the average nutrient level needed. Your personal dietary profile from the computer assignment lists many of those recommendations tailored to your specifics.



Recommendations just emphasize the need to obtain adequate amounts of each nutrient. It's important to know, too, that RDA are set to give a safety margin for both too little and too much of our nutrients. Taking in too much of many nutrients is just as hazardous to health as being deficient.

Moreover, since we still purchase foods – not nutrients - we need some way of associating nutrients with certain food types to make our choices both easier and more familiar. One of the goals of health agencies has been to set standards for nutrition that will result in improved health of the population. Goals and Guidelines emphasize food intakes and lifestyle behaviors that can improve health.

Some Guidelines for Healthier Eating

In 1977 by the McGovern commission published a set of guidelines for proportions of calories consumed of different nutrients, recommending restricting the proportion of fats and sugars in our diets. Those recommendations (reproduced below) are still good, although over the years, guidelines have become more general. The current World Health Organization's (WHO) guidelines are quite similar to the McGovern Commission's:

WHO Nutrition Recommendations:

- Total energy sufficient to support normal growth, physical activity and body weight (BMI = 20 – 22)
- Total Fat = 15 – 20% of total calories
 - Saturated = 0 – 10%
 - Polyunsaturated = 3 – 7%
 - Cholesterol = 0 – 300mg
- Total Carbohydrate = 55 – 75% of total calories
 - Complex carbohydrates = 50 – 75%
 - Dietary Fiber = 27 – 40 grams/day
 - Refined sugars = 0 – 10% of total calories
- Protein = 10 – 15% of total calories
- Salt = Maximum of 6 grams/day

1977 McGovern Commission's Nutrition Guidelines:

- Consume calories commensurate with activity
- Increase complex carbohydrates and unprocessed sugars (sugar in whole fruits and vegetables) to 48% of calorie intake (average = 28% in 1977)
- Decrease refined/concentrated sugars* to 10% of calorie intake (from 24%)
 - *sucrose, honey, concentrated fruit sweeteners, corn syrup, etc.
- Reduce fat to no more than 30% (from 42%)
- Reduce **saturated** fat to 10% (mono and poly 10% each – or- if not in equal proportions, monounsaturated fat can be higher)
- Reduce cholesterol to 300 mg/day or less
- Reduce sodium to 5 grams/day (2 or 3 grams better)
- Reduce protein to 12 % of total calories

Few people reached the 1977 goals so US guidelines were altered in subsequent revisions to encourage the US population to have healthier eating habits but used language such as "consume moderate", "eat a variety", "avoid too much", etc., are interpreted differently by consumers. The year 2000 goals were yet another attempt to simplify and encourage us to have healthier eating habits.

The "2000 Dietary Guidelines for Americans" include:

Aim for a healthy weight.
Be physically active each day.

Let the Pyramid guide your food choices.
Choose a variety of grains daily, especially whole grains.
Choose a variety of fruits and vegetables daily.
Keep food safe to eat.

Choose a diet that is low in saturated fat and cholesterol and moderate in total fat.
Choose beverages and foods that limit your intake of sugars.
Choose and prepare foods with less salt.
If you drink alcoholic beverages, do so in moderation.

So where are we?

General goals may inspire us to want healthier eating habits but they don't tell us how and where to get nutrients any more than the RDAs do, so we look to other sources.

**Food Grouping and Food Guides
Food Exchange Lists and Nutrient Density**

Food Groups:

Decades ago, nutrition agencies collectively proposed the idea of grouping certain food categories together to simplify food choices while obtaining adequate nutrition. Some of us may remember the "Pie chart" of the four food groups.

An Early Food Guide



CHOCOLATE FUDGE
CHOCOLATE BROWNIES
CHOCOLATE MOUSSE
AND CHOCOLATE CHIP COOKIES

Agencies and health groups review and revise food group plans to reflect more knowledge about nutrition and health. The most recent revision was in 1992, when The USDA **Food Guide Pyramid**, released in 1992 was a major revision, the first that changed the four food groups as equal components of the "pie" to a pattern that reflected the proportions of different food categories that we might consume.

The food guide pyramid is always under evaluation in a number of research institutions, the USDA and the Department of Health and Human Services, which has a 32-page booklet available of their website that explains how one can best use the good guide. A federal food guide update is due in 2005 to help address total calories consumed, amount of processed carbohydrates and types of fats consumed relative to age, gender, size and physical activity. A goal is to make available personally tailored guides to more people rather than one guide that is too general to help almost anyone.

The **value** of the Food Pyramid has been the **arrangement of food groups relative to the amounts/servings we should consume**. The food pyramid separated fruits from vegetables, and added a category for sweets and fats.

One **weakness** of the pyramid was lumping all grain-based carbohydrates in one large category making no distinctions between whole grain foods and processed foods containing carbohydrate/starch. The pyramid failed to emphasize the need to make whole grain choices for health.

A second weakness of the food pyramid has been the **serving size** and **number of servings** to be consumed within categories. What we typically consume as a "serving" is not at all related to the official serving size of a food item. The variation in number of servings was intended to reflect differences in age, gender, size and physical activity levels, not individual food preferences. Unfortunately, those who liked pasta might eat 11 servings of pasta no matter what their needs, and think they were following the food guidelines appropriately.

In addition, dairy products and meats still play significant roles in the food pyramid and in our diets. Research continues to demonstrate that the amounts of dairy and meats we consume are far more than needed for health, and these foods too often contribute to more fat and more total calories in the diet than is healthy. The pyramid again made no distinctions between high fat and lower fat dairy or meat or meat equivalent sources.

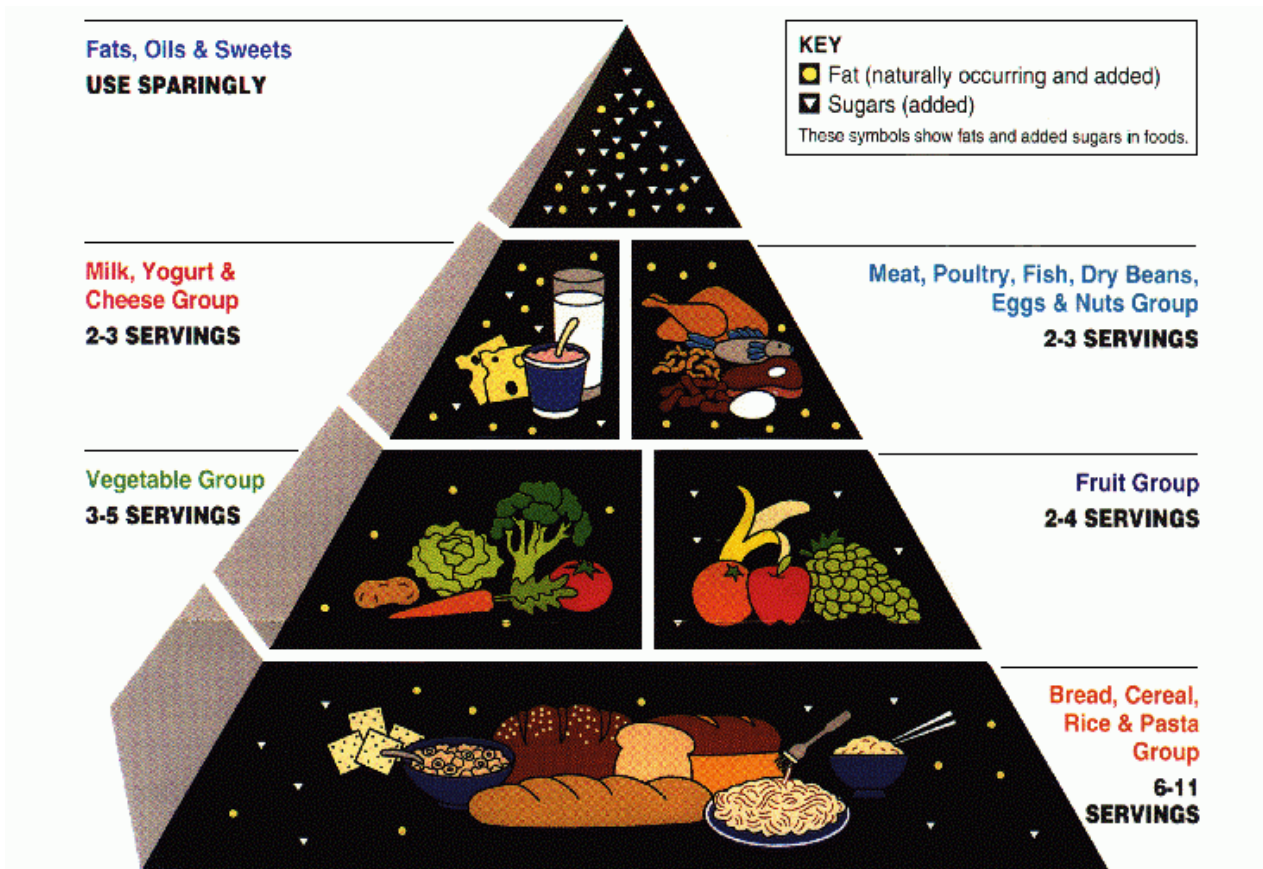
Nevertheless, the Food Pyramid is a good way to start looking at your food choices, so long as you know that you could select from the recommended groups and still be very **nutrient deficient** - especially for vitamins and minerals, because of **food preferences**.

Nutrient Density and Balance

In addition to food groups - we must also know about **nutrient density**, **food exchanges** and **nutrient balance**, which we will discuss after looking at the food pyramid. There are also modified food groups plans for special dietary needs, such as vegetarian, reduced calorie, diabetic, etc. Pyramids have been developed for children, different cultural diets, and more recently, for diet plans that may be healthier than the typical US diet. We can look at a few of these, too. (See (<http://scidiv.bcc.ctc.edu/rkr/biology130/pyramid/> for a number of food-pyramid related websites.)

The American Diabetes Association has taken a major role in developing food exchange plans. Many diet programs have also adopted food exchange plans as a part of their programs.

The USDA Food Guide Pyramid



Recall that a problem with the food pyramid is that it makes recommended servings in a range that is supposed to be relative to all the foods one consumes, but we still need to know what a serving portion is and how many servings are appropriate for our total calories. The average adult in the US will consume between 1800 – 2800 calories depending on age, gender and physical activity. The upper number of servings is intended for those consuming more calories, the lower for those consuming less. (Makes sense, but the food pyramid doesn't actually say that.)

Nutrition Guidelines - 7

It's harder to learn what a serving is supposed to be – especially since few portions we actually eat are anything at all related to the "designated" serving size.



Typical muffin versus the USDA muffin "serving" (the "mini" muffin)

What's a serving supposed to be? (Your text has more information on this)

Grains

- 1 slice of bread or roll (Note: The typical bagel is now about 4 servings)
- 1/2 cup of cooked pasta, oatmeal or rice (Note: the typical restaurant portion is 2 cups of pasta or rice.)
- 1 ounce of cereal (We almost always consume by volume, not weight)

Vegetables

- 1/2 cup of chopped vegetables
- 1 cup of leafy vegetables

Fruit

- 6 ounces of juice
- 1/2 cup of canned fruit
- 1/4 cup of dried fruit
- 1 piece of fruit or melon slice

Dairy

- 1 cup of milk or yogurt
- 2 ounces of cheese

Meat and Meat equivalents

- 2 – 3 ounces of cooked meat, fish or poultry
- 1/2 cup cooked beans or legumes
- 2 eggs
- 1/4 cup peanut butter

Let's look at some of the details of the Six groups of the Food Pyramid

Group 1 The Pyramid Base:

Grains (bread, cereal, pasta) = 6 - 11 servings



Value: carbohydrate source

Some have: niacin

iron

thiamin

zinc

fiber if whole grain

Quantities per serving:

1 slice bread

1 oz cold cereal

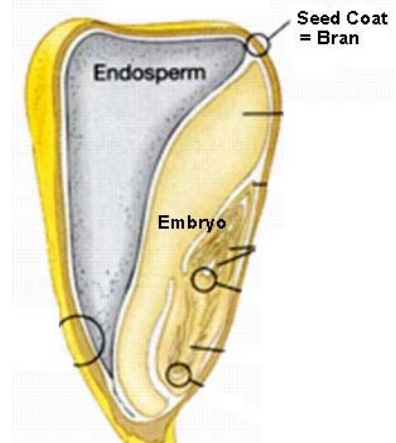
1/2-3/4 cup cooked cereal or pasta

6 crackers

Note: Whole grain needed for most value! Why?

Let's look at a typical grain or seed structure

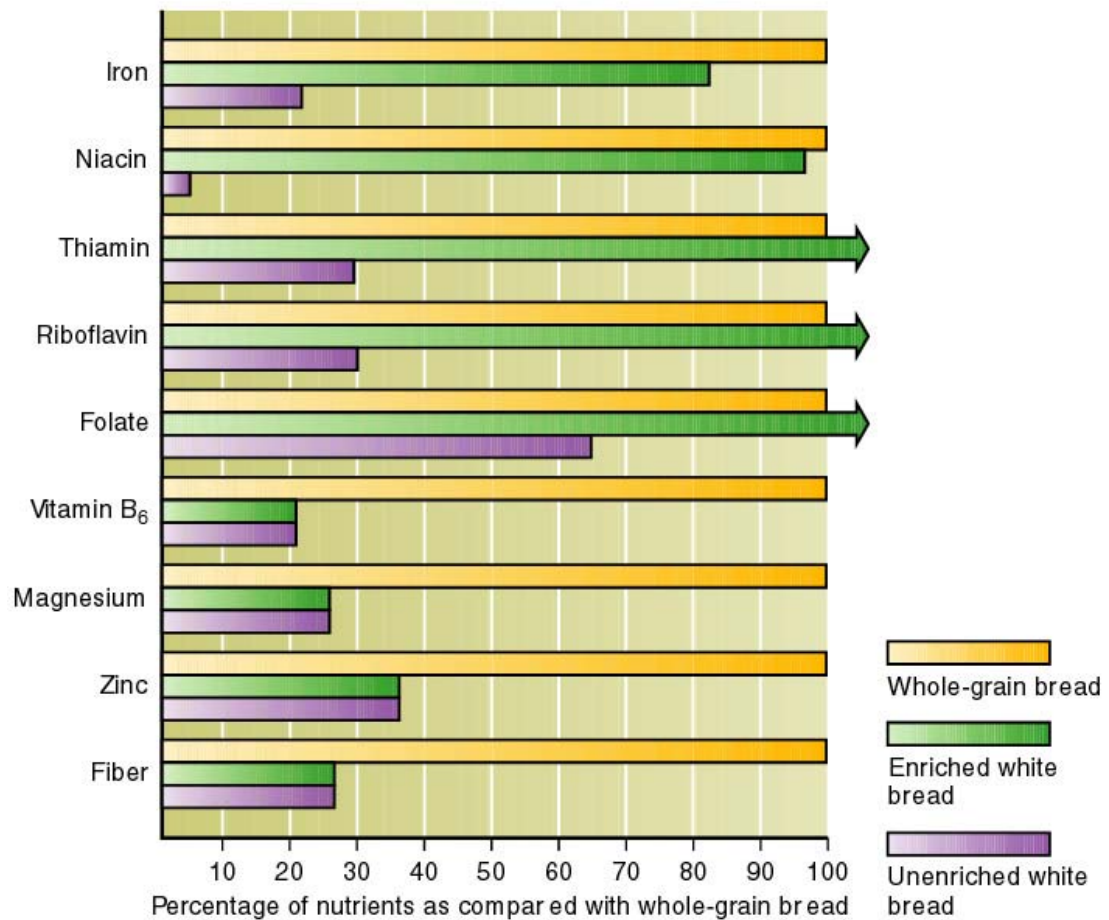
- Seed Coat (and in Grains, the fruit, too), Called Bran
 - Functions to protect embryo
 - Tough -- "mostly" fiber
 - May have some nutrients
- Endosperm
 - Nutrients for developing embryo
 - Forms the majority of the seed
 - Mostly starch and a little protein (Some seeds contain oils)
 - Virtually no fiber
- Embryo, Called Germ
 - Contains most of the vitamins and minerals needed for Development of the seed



Nutrition Guidelines - 9

When we process grains, we remove the bran and germ, leaving only the endosperm material. Even though we add back some B vitamins, and iron enrich our processed wheat products (flour), we have significant fiber loss along with other vitamins and minerals. The vast majority of grains consumed in the United States are processed grains.

Comparison of nutrients with processed and whole grain wheat flour



**Groups 2 and 3 Level 2 of the Pyramid
Vegetables and Fruits**



Vegetables = 3 - 5 servings (but careful choices!)

Fruits = 2 - 4 servings

Value: from none (carbohydrate) ---> best mineral sources
Vitamin C
Vitamin A (carotene sources)
Folacin

Quantities:

1/2 cup vegetable or fresh fruit
1 small-medium fruit

Special notes on vegetables and fruits:

- Majority of fruit is sugar
- Majority of favored vegetables are starch
e.g.: corn
peas
apples
potatoes

Let's compare our preferences with nutritional value of some vegetables and fruits based on the contribution of 10 vitamins and minerals. CSPI published an update in *Nutrition Action* the other year, rating fewer nutrients, but it's not much different.

Nutrient Density Value

1. broccoli
2. spinach (beware phytic acid)
3. Brussels sprouts
4. lima beans
5. peas
6. asparagus
7. artichokes
8. cauliflower
9. sweet potatoes
10. carrots

Consumption

1. tomatoes (16)
2. oranges (33)
3. potatoes (14)
4. lettuce (26)
5. corn (15)
6. bananas (18)
7. carrots (10)
8. cabbage (15)
9. onions (31)
10. sweet potatoes (9)

What does this say?

We need to make careful food choices to meet our vitamin and mineral requirements, especially for vitamin A and vitamin C. We can do this with a little knowledge of botany. (This is a science class.)

Plant Families for good nutrient choices

Focus on a few plant families and a little plant knowledge

- Greens are the active metabolic parts of plants -- so they naturally have more vitamins and minerals (and very few calories).
- Seeds are the embryonic plant. They have many nutrients needed to get the seed established. (This is also where you will find fats in plants).
- Most fruits are, in nature, a plan by the plant to encourage somebody to disperse its babies (seeds) to new locations. Fruits cater to the sweet tooth of animals. They often have fewer nutrients than vegetables, but naturally contain dilute, rather than concentrated, sugars. Whole fruits also have some fiber. Most of the fiber is lost when fruits are processed into juice.
- **Dark** green and orange plant foods are good carotene sources.
- Virtually all vegetables are good fiber sources.
- Those **phytochemicals**, too

The Botany Lesson:

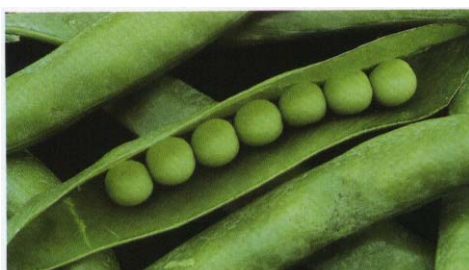
A. Cruciferous Vegetables (Cabbage family – broccoli, Brussels sprouts bok choy, kale, cabbage, cauliflower, turnips, radishes, etc.) (Cruciferae)

- **Calcium** source
- Excellent for many vitamins and minerals
- Carotene when dark green
- Indoles (potential for inhibiting cancers)



B. Legumes (beans, lentils, etc.) (Leguminosae)

- High Protein
- Iron
- Starch, too



C. Solanaceous Vegetables (tomato, peppers, potato, eggplant)
(Solanaceae)

- Vitamin C (Good for Iron absorption)
- Lycopene in tomatoes (potential anti-cancer)

D. Chenopodiaceous Vegetables (beets, spinach, Swiss chard)
(Chenopodiaceae)

- Iron
- Carotene
- Many minerals

E. Grains (Gramineae, for the most part. This is the grass family)

- Excellent source of starch and, when whole grains, fiber
- May contain B vitamins and iron, when the grain product is enriched, and most processed grains are.

F. Citrus Fruits (Rutaceae)

- Vitamin C (Good for Iron absorption)



G. Rosaceous Fruits (apples, pears, peaches, plums, apricots, cherries, raspberries, strawberries, etc.) (Rosaceae) (Note: blueberries and cranberries are not Rosaceae; they are Ericaceae family, but both have good phytochemicals.)

- Some Vitamin C
- Some a little Iron
- *Tasty*



Some special notes for specific vitamins and minerals:

Vitamin A deep green vegies

orange vegies and fruits except citrus

Vitamin C Citrus fruits

Cruciferous (cabbage family) vegies

broccoli and Brussels sprouts

Solanaceous (potato, tomato, peppers family) vegies

green pepper and red pepper

Calcium greens and broccoli

Group 4 Level 3 of the Pyramid

Dairy Foods (Milk, Yogurt, Cheese, etc.) = 2 - 3 servings



Value: calcium source

also: protein
zinc
riboflavin
B₆

and most milk is fortified with vitamin A and vitamin D

Quantity for 1 serving (based on calcium supplied)

1 cup liquid milk, yogurt or pudding

1 1/2 cups ice cream

2 cups cottage cheese

1 1/2 oz cheese (e.g. cheddar)

Notes: high in calories unless reduced in fat content
high in fat (unless reduced in fat content)
many people are sensitive to lactose

Group 5 Level 3 of the Pyramid
Meat, Poultry, Fish, Legumes, Nuts, Cheese = 2 - 3 servings



Value: protein sour
also: iron (some)
riboflavin
niacin
thiamin
B₁₂ (Animal sources only)
zinc

Quantities per serving:

2-3 oz lean, boneless, skinless meat, fish or poultry
(if fat and bone more)
2 oz cheese
4 Tablespoons peanut butter
3/4 cup beans canned
1 cup dry legumes cooked
2 eggs
1/2 cup cottage cheese

Notes: cross-reference to **dairy products**
often high in calories if associated with **fat** (and most are!)

Group 6 The Pyramid Top
Sweets and Fats (Where I get my chocolate)



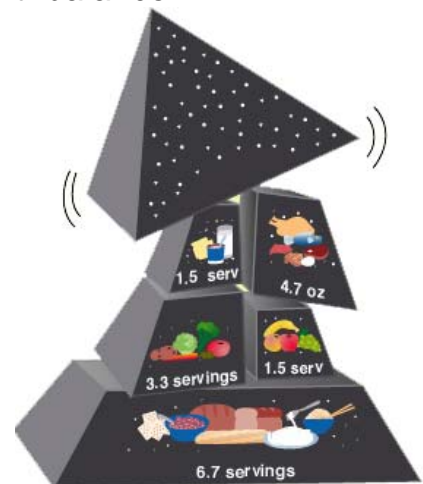
Consume Sparingly

What's Included:

1. fats:
 - butter
 - oils (including olives and avocados)
 - mayonnaise
 - cream
 - most nuts
2. sweets:
 - jams and jelly
 - candy
 - pastries and cakes
 - syrup
 - chocolates
3. snacks:
 - cookies
 - chips
 - granola bars
4. beverages:
 - coffee and tea
 - sodas
 - alcohol
 - chocolate
5. seasonings:
 - spices
 - sauces
 - flavorings

- Items from each of the first 5 food groups can contribute 25% or more of at least 3 nutrients
- Fats and sweets may provide:
 - 20% of the diet's calories
 - 30% of the diet's fat
 - little else

The more one's calories come from foods at the top of the pyramid the less likely the diet will have proper nutrient balance.



The more one's calories come from the upper levels of the pyramid (in proportions indicated) the more likely the diet will lack nutrient balance. So what do we do?

Value of these foods: tasty

Problem: high in calories while mostly low in micronutrients

In comparison:

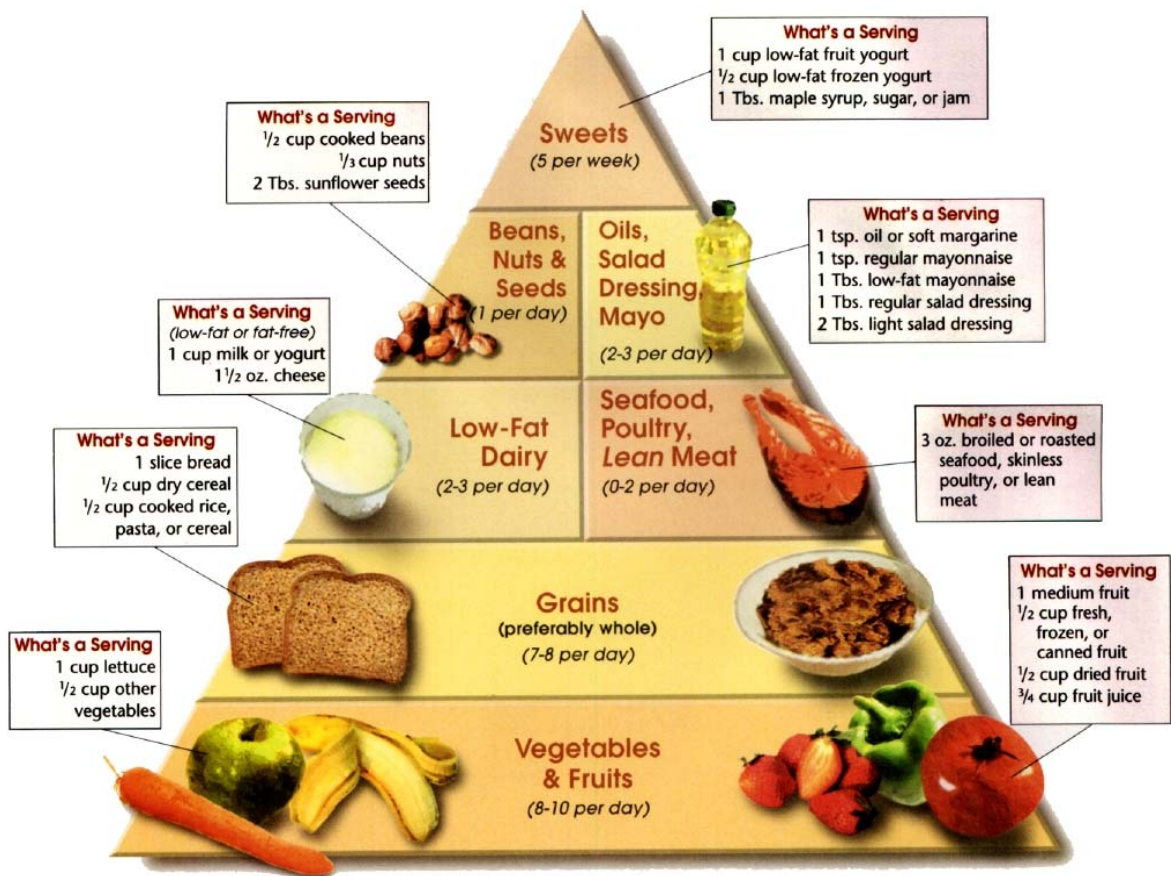
Solving some of the weaknesses of the food pyramid – Alternatives

The **American Cancer Society** started in the early 1990's campaigning about the pyramid – first to present a pyramid that what upside down with a phrase "Look at it this way" to focus our attention on eating whole grains, vegetables and fruits. More recently, the emphasis has switched to "5 a day" to emphasize consuming vegetables and fruits.

The DASH (Dietary Approaches to Stop Hypertension):

The Dash diet was developed to help lower cholesterol and blood pressure – and for those who follow it, it works. CSPI's *Nutrition Action* (May 2003) modified the DASH diet to represent it in the familiar pyramid form, and added whole grain emphasis. The DASH diet is also low in sodium, a nutrient not represented in the food pyramid. The DASH diet is one of many healthy ways of looking at the food pyramid – many others can be found on the internet, generally at university nutrition research websites.

The DASH diet has vegetables and fruits as its foundation (base) and whole grains at level two. Low-fat dairy and meats share level three, with fish and poultry taking priority. The added fourth level includes legumes, nuts and seeds and oils for healthy fats. Sweets remain at the top, but servings are limited to three times/week.



Note: Choose lower-salt foods from all categories.

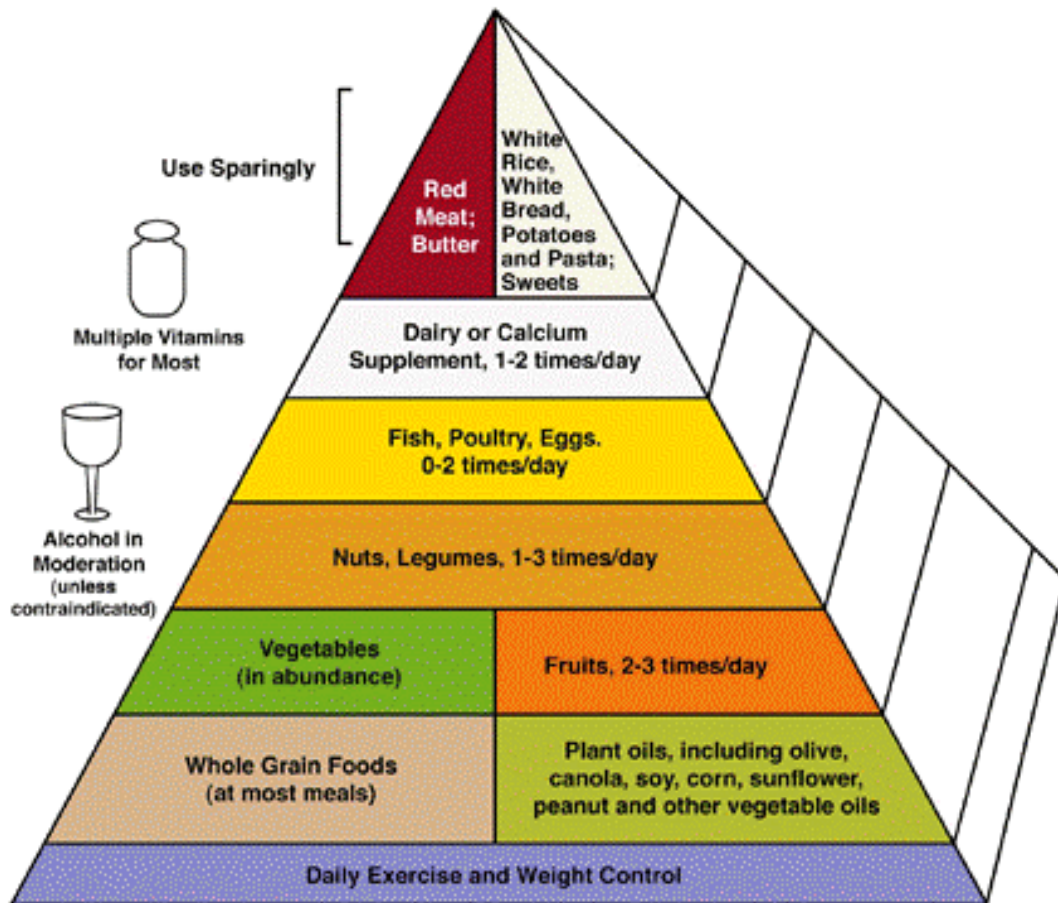
Too many refined carbohydrates and too few healthy fats

Another failing of the food pyramid is the emphasis on grains without noting that processed grains, which we overwhelmingly choose, aren't much different than sugars (starch is long chains of glucose) in how we digest and absorb them. We now eat large portions of pasta, breads, crackers and rice without paying attention to the "real" serving size, and haven't improved our diets. These large portions are contributing to the increasing rate of obesity in the United States.

Harvard's School of Public Health Pyramid

(<http://www.hsph.harvard.edu/nutritionsource/pyramids.html>) Researchers at Harvard University, led by Walter C. Willet, have developed a pyramid that reflects the need for the US population to have a healthier diet that reduces the risk of chronic diseases related to type of fats and carbohydrates consumed along with total calorie intake.

Their pyramid has 7 levels and 10 groups, including a pyramid base of daily exercise and weight control. Note the emphasis on whole grains, plant oils (for healthy fats), nuts and legumes for protein sources, along with the continued emphasis on a variety of vegetables and fruits. Dairy products (or a calcium supplement), red meats and refined carbohydrate sources are at the tip of their pyramid, in the same category as sweets.



Nutrient Density Concerns

Looking at ways to improve food groups is but one aspect of healthy eating. Is it enough to know the food pyramid and recommended servings to have a healthy diet and to enjoy our eating experiences while maintaining appropriate weight levels balanced to body activity? Well, not exactly. We also need to get our nutrients' worth out of the calories we eat. For that we turn to **Nutrient Density and Exchange Plans**

A serious weakness of the food pyramid plan is that food groups fail to address:

- calories
- sometimes nutrient balance (in spite of the plan)

Some valuable food choices, especially dairy products and meats, may have other substances as well:

- Milk products are often high in fat
- Meat products are often high in fat
- Fruits, vegies and grain-based foods (carbohydrate choices) are often high in sugar/starch and sometimes fat, too

Recall that we want to have a diet that:

- is nutritionally adequate
- is nutritionally balanced
- controls calories
- has variety
- and **can** include "chocolate"

Today many diet plans look at the **nutrient density** of foods to factor in the need to look at the relationship between the calories in a food item to its nutrient content.

Why is using nutrient density so valuable in diet planning? You can eat chocolate! (OK – seriously – If your food choices from the food pyramid are more nutrient dense, you have freedom to also select from **fat or sweet foods** - or if the majority of your choices are nutrient dense, you can choose some of the less nutrient dense of the other pyramid groups)

Also - nutrient density is **essential** to maintain nutrient balance if on a weight loss program, because your calories are so restricted, or if you are a sedentary female in her 50's or 60's and the recommended daily calories to sustain your lifestyle is about 1600.

How do we learn to make nutrient dense decisions?

Food exchange plans, which use nutrient density in planning, also pay very close attention to serving portions and fat content per serving. Most food exchange plans make portion sizes relative to a fixed number of calories. Although this initially complicates learning, once in practice, nutrient density diet planning has excellent results. The **American Diabetes Association** may be the oldest group that uses food exchanges for meal planning and dietary adequacy. Theirs is among the best, and they are generous in providing the public with their nutrition information at low cost. A thorough exchange list is in your textbook Appendix G, too.

How do Food Exchange Plans Work?

Nutritionists have devised food listings based on **equivalent portions** for foods that list **fat** in addition to food groups and provide for differences in caloric value per portion. This means that several groups have lists for low-fat, medium-fat and high-fat, each with different "fat exchanges". Vegetables and fruits are also separated in such programs, so that most exchange lists have 6 categories. Within a category portions are set to have "standard" calories.

Exchange Group Reference	Portion	Calories
1. skim milk	1 cup	90
2. low calorie vegetable	1/2 cup	25
3. fruit	1 small	40
4. bread (starch)	1 slice	70
5. lean meat	1 oz	55
6. fat	1 tsp.	45

Most exchange groups list the fat-content subgroups separately.

- Exchanges are foods or food combinations that match these portions **and** calories [e.g.. whole milk = 1 milk + 2 fat for 1 cup]
- Exchanges are then correlated to desired total caloric intake
- In exchange lists, the number of "bread" portions goes way up because of the carbohydrate component in our diet.

Food and Cultural Heritage

Food pyramids and exchange programs can work well for those of us who consume an "American" traditional diet. Does the food pyramid fit into ethnic diets that are not the "American meat and potato" traditional diet? Does a person who chooses not to eat meats have a nutritional disadvantage? How do we interpret the food pyramid guidelines for other types of diets?

Vegetarian Options

Those who choose to have a plant-based diet can modify the pyramid to ensure they get the nutrients needed. Often, vegetarians have an overall healthy lifestyle, and in contrast to what most think, do not lack adequate protein or other nutrients. Protein is found in most whole plant foods in proportions adequate for human needs. Plus most plant foods are lower in fat than the typical animal foods we like.



Food pyramids are often available for other cultures. Most lack dairy components and have far less emphasis on meats. Healthy oils are found in many cultures' diets. The Mediterranean diet is one that is popular, although high in fat from olive oil. Italian, Mexican and Chinese ethnic restaurant meals have drawn media publicity for their high fat content. To a large extent, the restaurant menus in the U.S. do not represent a typical family meal plan for people in those nations. Our restaurant meals include fatty foods that are far less abundant in home meals.

Speaking of home meals -- On to the Grocery Store

Once primed with information about making healthy food choices we need to implement our plans. How do we grocery shop with nutrition in mind?

Purchasing only whole fresh foods with an exchange plan book and calculator in hand is one way... Focus your food choices on:

- Whole grains (fortified cereals are OK, although often high in sugar and expensive for what you get. Look for fiber content).
- Fresh vegetables that are good sources of minerals and vitamins A and C should top your list.
- Fruits can add carbohydrate and, if chosen well, vitamin C and fiber to augment the fiber in your vegetables and whole grains.
- A variety of legumes add protein and fiber, too, and many legumes are available dried at low prices.
- Non-fat dairy products are good calcium sources

Realistically, most of us don't use whole fresh foods exclusively, and rely on processed and prepared foods for many of our meals. Do our food manufacturers help us?

Food Labels

Manufacturers are required to provide us with certain nutrient information on **food labels**. This should help each of us make better food choices when we need to rely on packaged foods. In addition, food manufacturers are also allowed to make a number of "approved" nutritional and health statements on food labels and in their promotional advertising, only some of which are reliable.

What food labels list:

- The common, recognized name of the product
- Name and address of the manufacturer
- Net contents by weight or count
- Approved health claims, if any
- Approved nutrient claims, if any



- List of ingredients in descending order of weight
- Serving size (as determined by the manufacturer) and number of servings in package
- Quantities of nutrients determined by the FDA to be important
 - Fat
 - Saturated Fat
 - Cholesterol
 - Sodium
 - Total Carbohydrate
 - Sugar
 - Fiber
 - Protein

Vitamin A, Vitamin C, Calcium, and Iron must be listed by the percent of daily recommendation (based on population data).

Nutrition Facts
 Serving size ³/₄ cup (28 g)
 Servings per container 14

Amount per serving
 Calories 110 Calories from fat 9

	% Daily Value*	
Total Fat 1 g		2%
Saturated fat 0 g		0%
Cholesterol 0 mg		0%
Sodium 250 mg		10%
Total Carbohydrate 23 g		8%
Dietary fiber 1.5 g		6%
Sugars 10 g		
Protein 3 g		

Vitamin A 25% Vitamin C 25% Calcium 2% Iron 25%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories:	2000	2500
Total fat	Less than	65 g	80 g
Sat fat	Less than	20 g	25 g
Cholesterol	Less than	300 mg	300 mg
Sodium	Less than	2400 mg	2400 mg
Total Carbohydrate		300 g	375 g
Fiber		25 g	30 g

Calories per gram
 Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS, listed in descending order of predominance:
 Corn, Sugar, Salt, Malt flavoring, freshness preserved by BHT.
VITAMINS and MINERALS: Vitamin C (Sodium ascorbate), Niacinamide, Iron, Vitamin B₆ (Pyridoxine hydrochloride), Vitamin B₉ (Riboflavin), Vitamin A (Palmitate), Vitamin B₁ (Thiamin hydrochloride), Folic acid, and Vitamin D.

The serving size and number of servings per container

kCalorie information and quantities of nutrients per serving, in actual amounts

Quantities of nutrients as “% Daily Values” based on a 2000-kcalorie energy intake

Daily Values reminder for selected nutrients for a 2000- and a 2500-kcalorie diet

kCalorie per gram reminder

The ingredients in descending order of predominance by weight

What do we get from the label information?

1. **Serving size.**

Serving size is more or less standardized by the FDA, so that one manufacturer cannot claim 5 servings per package and another 3, when the package is the same. There is still a problem with serving size since the FDA still sets unrealistic portion sizes for many food items, such as 3 ounces for meats, fish and poultry, and too often a package is what we eat, no matter how many servings are listed.

2. **Amount of fat**

The fat content of foods must be given by calories, rather than by weight, as in the past. Much of the weight of many products is non-caloric (either water or fiber). Grams of total fat will also be listed, along with grams of saturated fat. However, the amount of trans-fat is not listed, and it is processed in much the same way as saturated fat. The FDA has just recently mandated trans-fat labeling, which will go into effect within a few years.

You still need to calculate the percent of total calories contributed by fat, but the calculation is now easier. To do this calculation:

Divide the calories contributed by fat by the total number of calories in the food and then multiply by 100. For example:

$90 \text{ fat calories} / 140 \text{ total calories} = 0.64 * 100 = 64\%$ of the total calories from fat.

Although it's seldom as important to do the calculation for carbohydrate or protein, you must first multiply the grams of carbohydrate or protein by 4 to get the calories of carbohydrate or protein. Then you can divide by total calories to arrive at the percent of calories contributed by these nutrients.

3. **Percent of daily value for nutrients**

Labels also list **percent of daily value** information for an "idealized" person who consumes a 2000-calorie diet and the standard recommendation for amounts of fat, protein and carbohydrate.

Most of us want to strive for less than 30% fat in our diets and to read that a food with 13 grams of fat contributes 20% of our daily fat quota if we eat 2000 calories doesn't tell us much if we need just 1800 calories and want only 20% of those calories to be fat. For example, 20% of 1800 calories = 360 / 9 calories per gram = 40 grams of fat per day. For this person, the 13 grams of fat per serving listed on the label would actually be 32% of the daily fat intake.

Vitamin and mineral content on labels

Food Labels also list daily values for a number of vitamins and minerals. These daily values were taken from the 1968 recommended dietary allowances (the RDAs) using the population segment for each that had the greatest need. Many individuals need less than those amounts, with respect to vitamins and minerals. A joint Canada-United States commission has been working on revisions for the daily values listed on food labels (and for fortification of foods) and has made recommendations to the US Institute for Medicine. Their recommendation, also a compromise, is more of an average value of most population life stage groups (of which there are 22). Pregnant and nursing women, infants and toddlers are not factored into the calculations.

Recommended* food label DV changes include:

	Current Daily Value	Possible Future Daily Value
Iron	18 mg	6 mg
Riboflavin	1.7 mg	1 mg
Niacin	20 mg	11 mg
Vitamin B ₆	2 mg	1 mg
Vitamin B ₁₂	6 µg	2 µg
Phosphorus	1000 mg	588 mg
Iodine	150 µg	93 µg
Magnesium	400 µg	286 µg
Zinc	15 mg	7.5 mg
Copper	2 mg	0.7 mg

*Reprinted from *Tufts University Health and Nutrition Newsletter*, September 2004 from the *Guiding Principles for Nutrition Labeling and Fortification*, Institute of Medicine of the National Academies.

One way to simplify the interpretation of labels is to learn your recommended amounts of bulk nutrients in grams in the first place. (Your nutrient profile lists them, so it becomes easier to interpret the labels.)

Once you learn about good food choices, you don't need to rely on labels so much anyway. A quick check for total calories, percentage and grams of fat, grams of sugar and fiber content are useful. Fiber content often tells you about whether the product was made with whole grains. High fat and/or high sugar content usually mean "empty" – not nutrient dense – foods.

Labeling areas to watch:

Labels will list total carbohydrate, fiber content and "sugars". But many sugars are not in the narrow "sugar" category so you might think that a food with 31 grams of carbohydrate that has 2 grams of fiber and just 2 grams of sugar would be a super choice for complex carbohydrates. It may or may not be. The label will also be unable to distinguish between dilute sugars and concentrated, since it's listing grams. (But that's pretty easy to do on your own. Liquids usually contain dilute sugars.)

Claims about fat also need evaluating. The claim may be making reference to the weight of fat and not proportion of calories of fat such as 2% milk. It's actually 38% fat by calories. Manufacturers are now changing this.

Labels must distinguish between foods that are naturally free of or low in a nutrient (such as cholesterol), and those from which the nutrient has been removed, reducing what you would otherwise consume in that food product. This is aimed at reducing misleading claims for similar foods.

Health and nutrition claims on labels and in advertising

A manufacturer is limited somewhat in the nutrition and health claims and terms that can be put on food labels by the FDA. Regulations do not apply to advertising that is not regulated by the FDA, nor to meats, which are regulated by the USDA. These terms also apply just to "single" foods. Food combinations sold as "entrees" do not have the same regulations, so you have to be more conscientious in evaluating their nutritional value. **See your text more details on label definitions.**

The FDA has defined (and regulated the use of) terms such as:

- free
- low fat
- lean
- reduced
- more
- less
- high
- good source

Certain health claims are allowed, such as

- fat content and cancer risk
- cholesterol and heart disease
- calcium and osteoporosis risk
- sodium and hypertension risk
- fruits, vegetables and fiber and cancer risks

However, the language used and permitted requires us to be careful analysts. Here are some samples collected and published by *Nutrition Action*, June 2003.

A Fine Line

Which claims need FDA approval and which don't? When does a claim cross the line between offering to "affect the structure or function of the body" and promising to "prevent, treat, cure, mitigate, or diagnose" a disease? It's not easy to tell.

In January 2000, the FDA tried to answer that question, at least for claims on supplements. Here are some examples of claims that fall into each category.

No Prior Approval Needed (Structure/Function Claim)	Approval Needed (Disease Claim)
Helps maintain normal cholesterol levels	Lowers cholesterol
Maintains healthy lung function	Maintains healthy lung function in smokers
Provides relief of occasional constipation	Provides relief of chronic constipation
Suppresses appetite to aid weight loss	Suppresses appetite to treat obesity
Supports the immune system	Supports the body's antiviral capabilities
Relief of occasional heartburn or acid indigestion	Relief of persistent heartburn or acid indigestion
For relief of occasional sleeplessness	Helps reduce difficulty in falling asleep
Arouses sexual desire	Helps restore sexual vigor, potency, and performance

Other structure/function claims that need no prior approval

- Improves memory
- Helps you relax
- For hair loss associated with aging
- Improves strength
- Helps enhance muscle tone or size
- Prevents wrinkles
- Promotes digestion
- Relieves stress
- For relief of muscle pain after exercise
- Boosts stamina
- Helps promote urinary tract health
- To treat or prevent nocturnal leg muscle cramps
- For common symptoms of PMS
- Maintains intestinal flora
- For hot flashes

Conclusion

With the effort it seems to take to make food choices, learn diet planning, nutrient density, food groups, exchanges, get beyond misleading labels and advertising, do we really want to do all this? Well yes, because it means better health and fitness. And a little knowledge applied to our eating decisions can go a long way!