Culinary Institute of America

CULINARY INSTITUTE OF AMERICA & THE TEACHING KITCHEN COLLABORATIVE CULINARY INTENSIVE WORKSHOP

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Day One Syllabus: Principles of a Healthy, Sustainable Lifestyle, Dietary Patterns, Food Systems, Knife Skills

Learning Objectives

By the end of this day, you should be able to …

- Discuss the tenets of the Food is Medicine philosophy.
- Identify key components of a healthy eating pattern.
- Define ultra-processed, processed, and whole foods.
- Learn basic nutrition as it relates to ingredients and cooking methods.
- Identify foods high in phytochemicals, vitamins, minerals and Omega 3 fatty acids.
- Identify resources for locally produced food products.
- Learn how social determinants affect patients' food choices and health.
- Understand how local food systems affect patients' diets.
- Discuss regenerative sources of food and nutrition as it applies to your local region. Use different knife techniques to cut a variety of ingredients.
- Use different knife techniques to cut a variety of ingredients.
- Differentiate between macronutrients and micronutrients.
- Explain how ultra-processed foods affect long-term health outcomes.
- Describe the relationship between dietary patterns and chronic disease prevention.
- Discuss the role of hospitals and health systems in modeling and promoting healthy food environments.

Learning Activities

- Lecture and discussion with Guest Speaker addressing local food systems and food insecurity
- Kitchen orientation
- Knife Use, Knife Skills, and Demonstrations
- Proper selection, cleaning, cutting and storage of selected vegetables
- Garden tour

Key Terms

Amino Acid
Broth
Complex Carbohydrate
Fiber
Food Insecurity
Gluten
Knife Cuts
Macronutrient
Mineral
Nutrient Density
Omega Fatty Acid
Phytonutrient
Protein
Plant Protein
Regenerative Agriculture
Simple Carbohydrate
Starch
Sustainable
Vitamin
Whole Foods
Glycemic Index/Load
Micronutrient
Ultra Processed Foods

Instructor Demonstrations

- Garden tour
- Station set up
- Proper selection, cleaning, cutting and storage of selected vegetables
- Knife skill techniques

Day Overview

- Nutrition Cornerstones of Healthy Eating
- Importance of Nutrition for Health
- Food is Medicine and Culinary Medicine
- Major Nutrient Groups
- Glycemic Index
- Sourcing Local Ingredients
- Proper selection of various vegetables and fruits
- Knife Skills

NUTRITION CORNERSTONES OF HEALTHY EATING

Excerpts from The Culinary Institute of America's *Philosophy of Food and Cooking:*

- An emphasis for whole, minimally processed foods that retain valuable nutrients and nonnutritive substances.
- A diet which is largely based on plant foods: fruits and vegetables, breads and grains, beans and other legumes, nuts, and plant oils.
- Smaller amounts of fish, poultry, dairy products, eggs, and meat. These animal sources can be used to flavor diets based largely on plant foods. It is recognized that restaurants are places to celebrate special occasions, and on occasion a healthful diet can accommodate larger portions of food from animal sources.
- Primarily cooking with plant oils, emphasizing those high in monounsaturated fat, and minimizing the use of saturated fat and hydrogenated fats in cooking, baking, and at the table. Animal fats can be used sparingly, whenever the flavor of butter, cream, lard, or other fat is especially appealing or critical to the success of a particular dish.
- Modern science has viewed that largely plant-based diets low in saturated fat may not necessarily need to be low in fat to prevent heart disease, various cancers, and other chronic diseases. Given the role that fat plays in enhancing palatability, moderate levels of unsaturated fat may be of critical importance in persuading many people to adopt diets abundant in vegetables, grains, and legumes. It is recognized that fat is a rich source of calories in the diet, and that an overabundance of calories in the diets of many Americans, from any source, is a leading public health concern. We believe that to achieve and maintain healthy weight, a balance of total energy intake or calories with energy expenditure (physical activity) must exist.

IMPORTANCE OF NUTRITION FOR HEALTH

This course is designed to integrate foundational nutrition science along with hands-on culinary instruction to help empower you to guide others towards eating healthier. This workshop aims to provide a transformative experience, not just for your patients, but for your own relationship with food and health. You'll learn not only what to eat, but how to make it simple, delicious, cost-effective and sustainable. From knife skills to cultural cuisines, this course will translate the science into the language of the kitchen.

A person's diet has been found to be one of the most powerful modifiable factors in preventing and treating chronic disease. According to recent data, over 600,000 deaths per year in the U.S. are linked to poor diet; more than any other risk factor including tobacco, alcohol, or sedentary behavior (Mozaffarian et al., 2024). This makes a poor diet the leading cause of death and disability. Nearly 1 in 2 U.S. adults has prediabetes or diabetes and 75% of healthcare spending (roughly $4.5 trillion/year) goes toward chronic, diet-related diseases such as cardiovascular disease, diabetes, hypertension, and certain cancers (CDC; HSPH). Making a poor diet quite expensive in the long run. The good news is that these chronic diet-related diseases are largely preventable, and in many cases, reversible, with dietary change.

This global epidemic of diet-related illness has prompted growing attention to the role of nutrition within health care. Emerging evidence shows that integrating food and nutrition interventions into clinical practice not only improves health outcomes but also reduces health care costs.

However, science has also shown us that despite knowing more than ever about which foods promote health (vegetables, whole grains, legumes, nuts, healthy fats), people still aren't eating them. There is a gap between knowing what is healthy and actually consuming it. This course aims to bridge part of that gap and enhance not only knowledge but provide the skills to create delicious and nutritious foods that can help move more people towards healthier futures.

Role of Healthcare and Healthcare Professionals

Health care providers themselves occupy a critical position in identifying, preventing, and treating obesity and related chronic conditions. Providers can screen patients for risk factors, offer dietary and physical activity counseling, and refer those in need to comprehensive behavioral interventions. Integrating nutrition into clinical practice requires institutional support from insurers and health systems, which can provide reimbursement for prevention, screening, and treatment. Moreover, health professionals can play a pivotal role in addressing inequities by connecting at-risk patients to nutrition assistance programs such as SNAP, WIC, and school meal services, ensuring that healthy food is accessible to all.

However, one of the most persistent barriers to implementing nutrition-based health care lies within the education system itself. Despite the clear connection between diet and disease, medical and health professional training devotes very little time to nutrition. In the United States, fewer than 1% of total lecture hours in medical school address nutrition, and similar gaps exist globally. Patients frequently report receiving minimal or no dietary guidance from their providers. Clinicians themselves often struggle to apply healthy eating in their own lives, let alone teach it effectively. At the same time, the public is increasingly overwhelmed by

misinformation, processed food environments, and cultural shifts away from home cooking. Even when patients want to eat better, they may not know how.

The lack of training undermines providers' confidence and ability to deliver evidence-based nutrition care. Integrating comprehensive nutrition education into medical curricula through legislative mandates, accreditation standards, and inclusion in board exams would help ensure that future clinicians are equipped to provide dietary guidance as part of routine care.

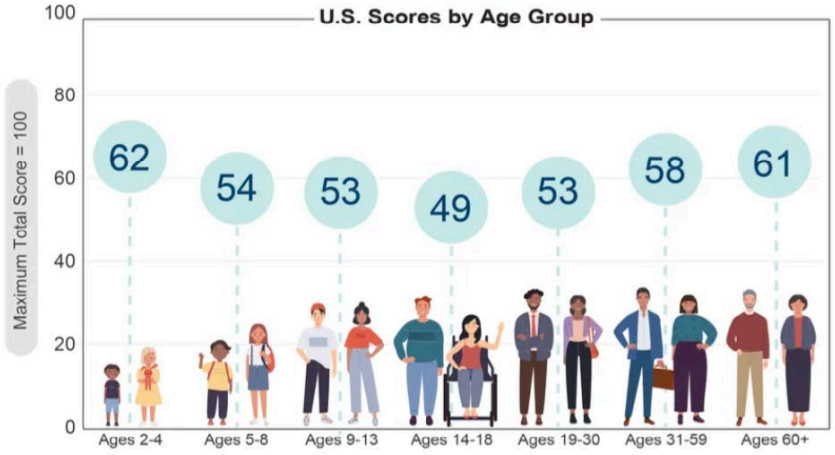
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2824217

Hospitals also play an essential role in advancing public health through the creation of healthy food and physical activity environments. As centers serving millions of employees, patients, and visitors each year, hospitals have the opportunity to model healthy behavior. By offering nutritious meals in cafeterias, improving vending machine options, and purchasing sustainable local foods, hospitals can foster both personal and environmental well-being. Programs that encourage staff wellness, such as stair-use initiatives, walking trails, or incentive-based fitness programs, complement these nutritional improvements, creating a holistic culture of health within the hospital setting.

Insurance and Medicaid coverage play a pivotal role in ensuring that nutrition-focused interventions, including culinary medicine teaching kitchen programs, are accessible and sustainable. Coverage for preventive services, pediatric weight management programs, and "Food is Medicine" initiatives can shift healthcare from a reactive model to one centered on prevention and wellness. In doing so, food, education, and clinical care become integrated components of a unified system aimed at improving quality of life, reducing chronic disease burden, and creating a healthier, more equitable future.

Nutrition Quality: A National Failing Grade

The USDA's Healthy Eating Index (HEI) evaluates diet quality out of 100 points for different age groups, the most recent scores indicate an average of 58 points with. But more alarmingly is that none of the seven different age brackets has a passing score, with children ages 2-4 having the highest score at only 62/100. During the most critical years of growth and neurodevelopment, when lifelong habits are being formed, our youngest population isn't properly being nourished. These aren't just numbers; they're red flags for future health outcomes.



Data source for Healthy Eating Index scores: What We Eat in America, National Health and Nutrition Examination Survey (undated data are from 2017-2018).

The HEI doesn't just capture what's missing, it reveals which dietary components Americans consistently under consume or overconsume. Here's how the breakdown of what components are considered in the scoring:

Adequate:

- **Protein foods**: Average American scores 100
  While Americans eat adequate amounts of protein, they are not necessarily from the recommended (plants/eggs/lean meats)

Under consumption:

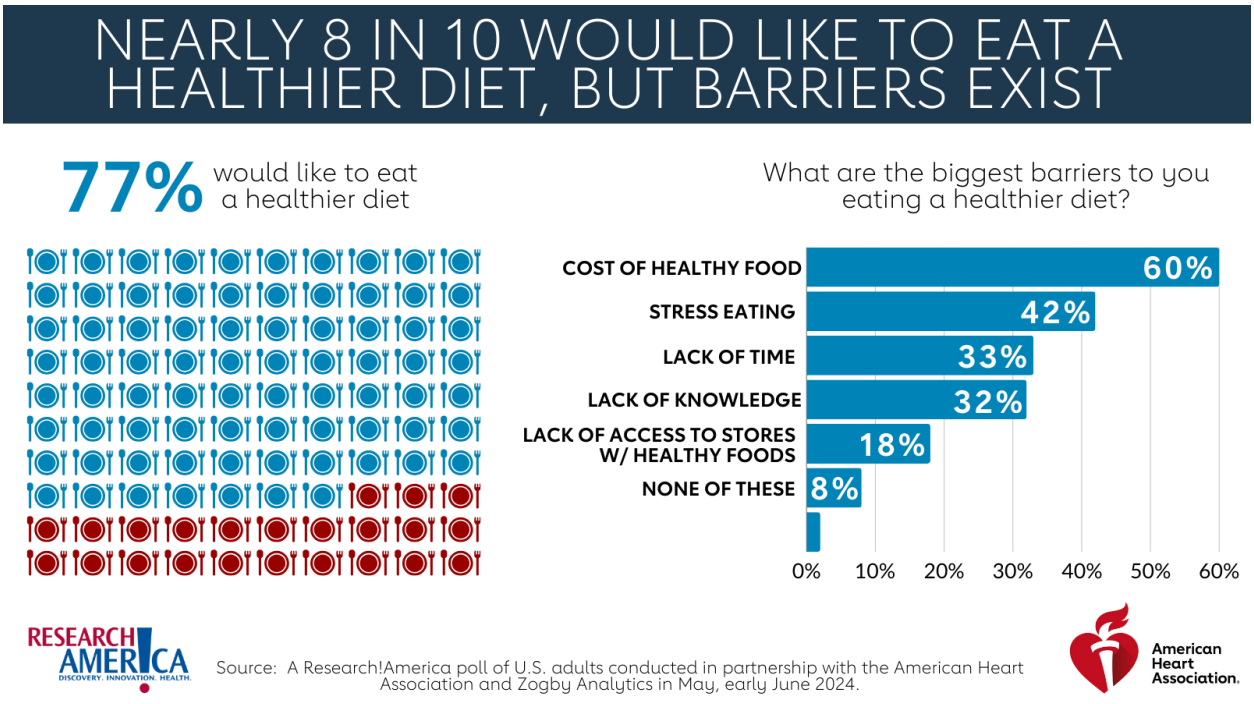
- **Total vegetables**
- **Greens and beans**
- **Whole grains**

Over consumption:

- **Refined grains**
- **Added sugars**
- **Sodium**
- **Saturated fats**

This doesn't just identify nutritional imbalance; this is a reflection of broken systems, such as food environments, economic access, culinary education, and cultural norms.

While many people may want to eat healthier, there are many barriers that prevent them, with the cost of food being the number 1 challenge people face, but time and knowledge are also part of the problems.

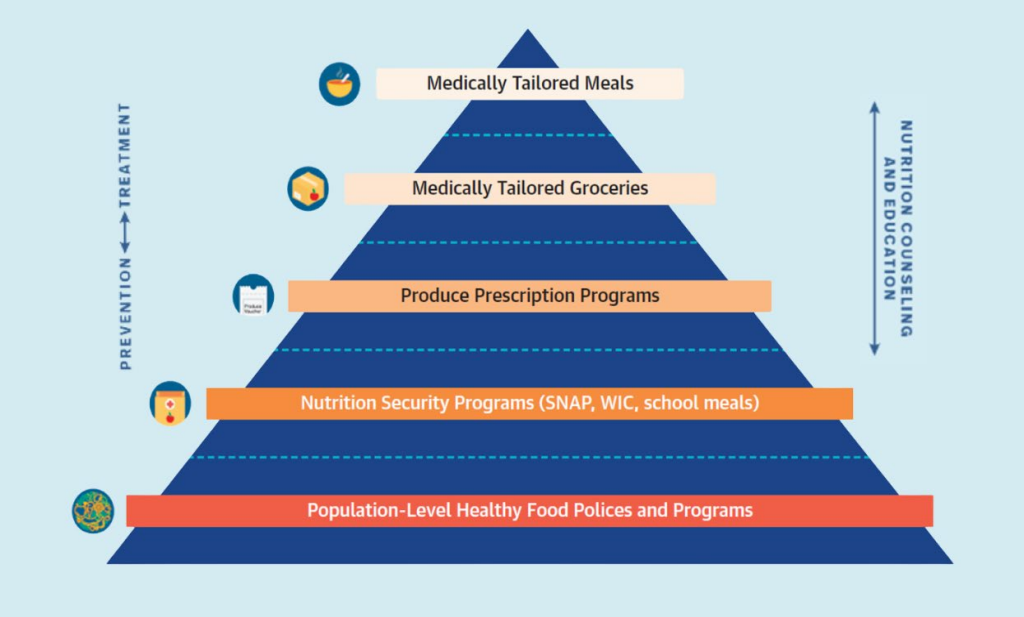


Food is Medicine: Defining the Movement

You may hear it called *Food is Medicine*, *Food as Medicine*, or even *Culinary Medicine*. But at the core, they're all about the same foundational truths. "Food is Medicine"(FIM) as defined by the American College of Lifestyle Medicine (ACLM), is a clinical approach that integrates evidence-based dietary interventions into healthcare to prevent, manage, and treat chronic diseases. Tufts University defines "food is medicine" as integrating evidence-based, food-based interventions into healthcare to prevent, manage, and treat diet-related diseases.

Food impacts every dimension of health, from prevention to treatment, from lifespan to equity. These FIM approaches include programs like medically tailored meals, produce prescriptions, and nutrition education as part of a clinical treatment plan which all aim to improve health outcomes and health equity through food.

The Food is Medicine Pyramid



Moving up the pyramid leads to more targeted, clinical, and intensive interventions like medically tailored meals. Moving down leads to broad, preventive public health measures like federal nutrition policies, school meal programs, and community-based initiatives. There is a need for synergy between these approaches; both individualized care and population-level strategies are necessary for comprehensive impact.

Medically tailored meals, medically tailored groceries, and produce prescription programs are often delivered through clinical partnerships and funded by health systems, governments, or philanthropic organizations, ensuring that patients receive healthy food at little or no cost. The underlying idea is simple yet transformative: to align the treatment of diet-related illnesses with access to nutritious food, thereby addressing both clinical needs and food insecurity simultaneously.

Medically tailored meals provide fully prepared, home-delivered options for patients with complex health conditions, improving dietary quality while reducing hospital admissions and

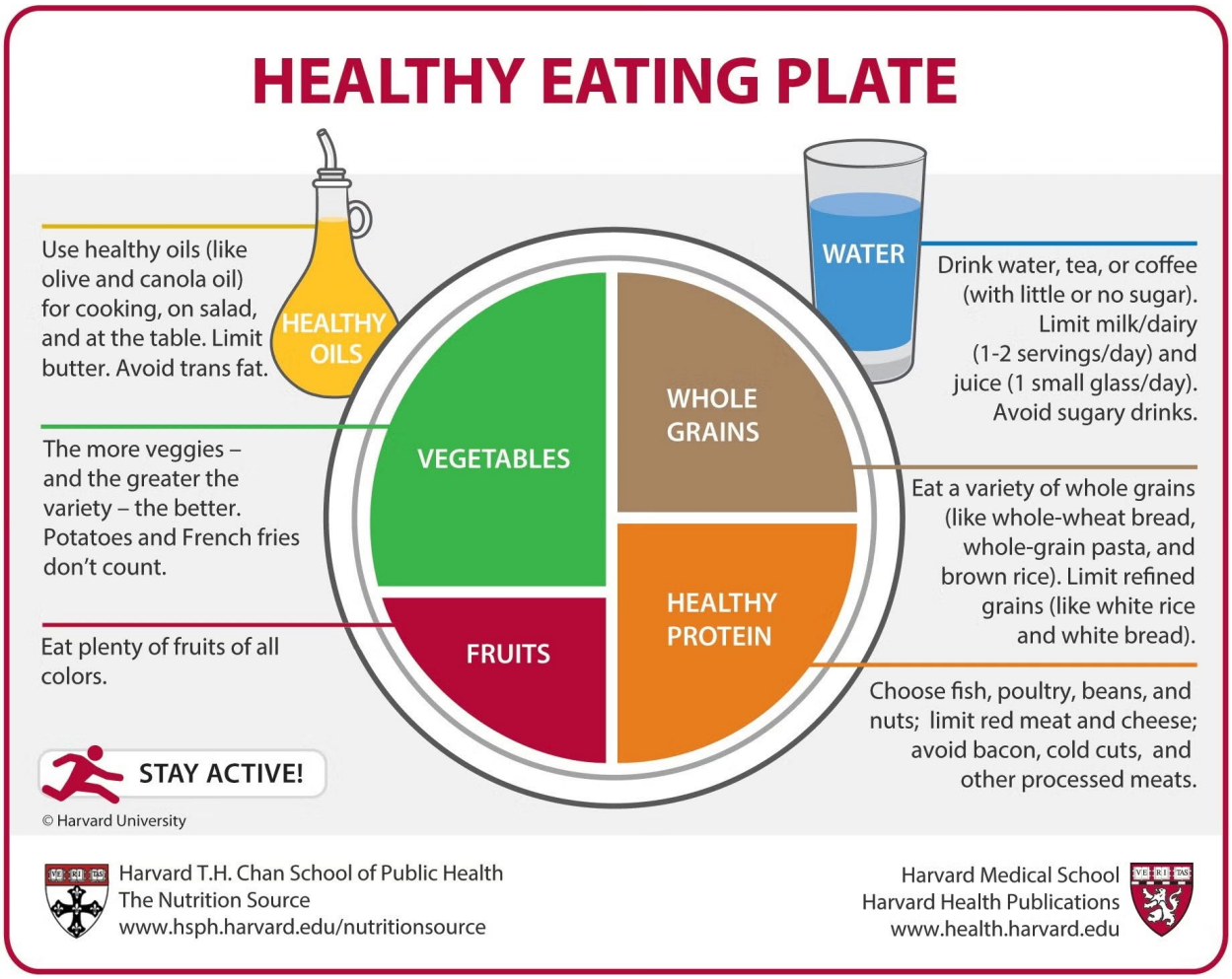
overall costs. **Medically tailored groceries** offer similar benefits for patients who can prepare food at home, combining nutrition counseling with access to appropriate ingredients. Meanwhile, **produce prescription programs** extend the impact even further by providing vouchers or debit cards for fresh fruits and vegetables to patients at risk for diet-related disease. Studies show that these programs can improve blood sugar control, reduce body mass index, and lower the consumption of fast food, all while being highly cost-effective.

Another FIM intervention that can be implemented at primary, secondary and tertiary levels is a teaching kitchen. **Teaching kitchens** are a multidisciplinary, experiential learning environment that integrates culinary instruction, nutrition education, mindfulness, physical activity, and behavior change strategies to promote sustainable lifestyle habits. It functions not only as a space for cooking but as a structured educational framework that helps participants understand how food choices and preparation methods directly influence health outcomes. Emerging from the intersection of culinary medicine, nutrition science, and behavioral psychology, teaching kitchens bring theory to life by translating dietary recommendations into everyday practice.

Teaching kitchens are designed to empower individuals through hands-on experience. Under the guidance of chefs, registered dietitians, physicians, and health coaches, participants learn to prepare balanced meals while gaining practical skills such as grocery shopping, meal planning, and food safety. Sessions often integrate mindfulness, stress management, and sleep hygiene, core aspects of holistic well-being. This experiential approach fosters self-efficacy and long-term behavior change, which are essential for preventing and managing chronic conditions like obesity, diabetes, and cardiovascular disease. Teaching kitchens can be delivered both in person and virtually, widening access for participants who face mobility or geographic barriers.

Hospitals and primary care settings are increasingly integrating teaching kitchens and culinary medicine programs into wellness initiatives and chronic disease management strategies. Technology has further expanded these opportunities, as demonstrated by the Study of Technology to Accelerate Research (STAR) program, which used electronic health record alerts and educational resources to help pediatric clinicians address childhood obesity. By combining digital tools with experiential learning through teaching kitchens, healthcare systems can create comprehensive, patient-centered models that reinforce lifestyle change at every level of care

Building Healthy Eating Patterns



The Healthy Eating Plate, created by nutrition experts at the Harvard T.H. Chan School of Public Health and editors at Harvard Health Publications, was designed to address deficiencies in the U.S. Department of Agriculture (USDA)'s MyPlate. The Healthy Eating Plate provides detailed guidance, in a simple format, to help people make the best eating choices. The Healthy Eating Plate is based exclusively on the best available science and was not subjected to political or commercial pressures from food industry lobbyists. The Healthy Eating Plate will serve as the foundational nutrition recommendations in this course.

The main message of the Healthy Eating Plate is to focus on diet quality.

THE BALANCED DIET

Balance, variety and portions are all components that help create a healthy dietary pattern. It is important to include the three essential macronutrients (carbohydrates, proteins and fats) in appropriate portions while at the same time ensuring that there is variety. This helps ensure adequate micronutrient consumption.

Whole Foods

Eating foods in their natural form will provide the most benefit. Whole foods can be minimally processed with cooking or grinding methods, but the important difference is that these foods do not have any additives or artificial substances. Consuming diets that are mostly or all whole foods can help to decrease all-cause mortality; help with weight management; help achieve favorable changes in lipid profiles; decrease risk, and even reversal, of cardiovascular disease. Many studies have shown favorable connections between those consuming diets that are whole food plant based and cancer risk as well as reduced risk for diabetes and improved glycemic control / normalized blood glucose levels for those with diabetes.

Major Nutrient Groups

Nutrients are compounds required by the body for growth, metabolism, and other body functions, necessary for maintaining life. The essential nutrients can be divided into two subsets; macronutrients and micronutrients, and then further divided into the following six categories:

Macronutrients are nutrients that provide calories or energy. Since "macro" means large, macronutrients are nutrients needed in large amounts. There are three macronutrients:

- **Carbohydrates:** Simple carbohydrates (i.e. sugars) and Complex carbohydrates (i.e. starches and dietary fibers)
- **Proteins:** Amino acids (both animal and plant based)
- **Fats:** Lipids (both saturated and unsaturated)

Micronutrients are essential substances (such as a vitamins or minerals) that are essential in minute amounts for the proper growth and metabolism of a living organism. There are several micronutrients. Some include:

- **Vitamins:** Fat soluble (A, D, E, and K) and water soluble (C and B [Thiamin, Riboflavin, Niacin, B6, B12, Folate, Biotin, Pantothenic acid]).
- **Minerals:** Major minerals (Calcium, Magnesium, Phosphorus, Sodium, Potassium, Chloride, Sulfur) and Trace Minerals (Iron, Zinc, Selenium, Iodine, Copper, Fluoride, Chromium, Molybdenum, Manganese, Cobalt)
- **Water**

Fruits and Vegetables

As shown in the Harvard Healthy Eating Plate, half of a meal should be comprised of fruits and vegetables, with different types throughout the week.
(Potatoes don't count as vegetables on the Healthy Eating Plate because of their high starch content and impact on blood sugar. Less starchy, fibrous vegetables are great alternatives. More about potatoes will be discussed in a later chapter.)

Vegetables and fruits are the foundation of a nutritious diet and play a vital role in maintaining overall health. No single fruit or vegetable provides all the essential nutrients the body needs, so it is important to consume a wide variety every day. Diets abundant in fruits and vegetables have been shown to lower blood pressure, reduce the risk of heart disease and stroke, prevent certain cancers, and promote digestive and visual health. Moreover, the natural fiber and low glycemic load of non-starchy produce such as apples, pears, and leafy greens, can help regulate blood sugar levels and appetite, making it easier to manage body weight.

The term "eat the rainbow" refers to ensuring a variety of nutrients are consumed through different naturally occurring colored fruits and vegetables. Eating a colorful assortment of produce ensures a diverse intake of vitamins, minerals, and phytonutrients while also making meals more appealing. From deep green spinach to bright orange carrots and vibrant red peppers, each hue represents a different set of protective plant chemicals that together support the body's defenses against chronic diseases.

Incorporating more fruits and vegetables into daily meals can be simple and enjoyable. Keeping ready-to-eat fruit visible encourages healthier snacking, while exploring new varieties of produce adds both flavor and nutrition. Building meals around vegetables such as in soups, salads, or stir-fries helps ensure consistent intake. It is also beneficial to choose options beyond starchy vegetables, opting instead for nutrient-dense alternatives such as broccoli, beans, and leafy greens. The key is to make fruits and vegetables the centerpiece of the plate rather than a side dish.

A vast amount of research supports the connection between fruit and vegetable consumption and reduced risk of disease. Large-scale studies have demonstrated that individuals who consume at least five servings per day experience about a 20–30% lower risk of heart disease and stroke compared with those who eat fewer than three servings. Green leafy and cruciferous vegetables, along with citrus fruits, appear to provide the strongest cardiovascular benefits. Studies like DASH and OmniHeart have shown that diets rich in fruits and vegetables can significantly lower blood pressure, sometimes as effectively as medication, especially when combined with healthy fats and lean protein.

While the evidence linking fruits and vegetables to cancer prevention is mixed, certain types of produce may help protect against specific cancers. Studies suggest that cruciferous vegetables and carotenoid-rich fruits, such as tomatoes, carrots, and kale, may reduce the risk of breast, prostate, and lung cancers. Furthermore, fiber from fruits and vegetables has been associated with lower breast cancer risk in women who consume high amounts during adolescence and

early adulthood. These findings underscore the importance of introducing plant-based foods early and consistently throughout life.

Fruits and vegetables also contribute to the prevention of type 2 diabetes. Research indicates that consuming whole fruits, particularly blueberries, grapes, and apples, is linked to a lower risk of diabetes, whereas frequent consumption of fruit juices may increase risk due to higher sugar content. Similarly, regular intake of green leafy vegetables appears to support better glucose control. Maintaining these habits not only helps regulate blood sugar but also contributes to sustained energy and metabolic health.

In addition to these benefits, fruits and vegetables play a critical role in digestive and visual health. Their high fiber content promotes regularity, prevents constipation, and reduces pressure within the intestines, which can lower the risk of conditions such as diverticulosis. Phytochemicals like lutein and zeaxanthin, found in dark leafy greens and colorful vegetables, help protect the eyes from age-related conditions such as cataracts and macular degeneration. Together, these effects illustrate that eating a wide variety of fruits and vegetables is one of the most effective strategies for long-term health and well-being.

Whole Grains

Whole grains should be included in meals but limited to only a quarter of the total portion. Whole grains have a milder effect on blood sugar and insulin than refined grains like white bread or white rice. They also include extra vitamins and nutrients such as fiber. Whole and intact grain examples include; whole wheat, barley, wheat berries, quinoa, oats, brown rice, and foods made with them, such as whole wheat pasta.

A growing body of research shows choosing whole grains over refined grains provides significant health benefits. Whole grains deliver a “complete package” of nutrients, including fiber, vitamins, minerals, and protective plant compounds, that are largely lost during the refining process. Diets rich in whole grains are associated with improved heart health, better digestion, steadier blood sugar control, and reduced risk of chronic diseases such as type 2 diabetes and certain cancers. In contrast, consuming mostly refined grains which are stripped of bran and germ can lead to nutrient deficiencies and unfavorable metabolic effects. Because of the strong evidence linking whole grains to better overall health outcomes, nutrition experts recommend making whole grains the primary source of carbohydrates and minimizing refined grain intake whenever possible. Grains will be further explored on day 2.

Protein

The remainder of a meal should include protein. As with grains, a quarter of the meal should be a source of protein. When choosing a source of protein leaner, lower saturated fat options such as fish, poultry, beans, and nuts are preferred. These are all quality, versatile protein sources that can accompany many different styles of dishes and cuisines.

Proteins like red meats (beef, pork, etc.) have higher amounts of saturated fats so it is recommended to limit the amount and frequency. If choosing to eat these kinds of proteins, it is best to choose leaner cuts and use cooking methods that will help reduce the total saturated fat. Processed meats such as bacon, sausage and deli meats should be avoided.

Oils

Plant oils like olive, canola, soy, corn, sunflower, peanut are higher in unsaturated fats and are the recommended choices when using oils. However, it is important to use these oils in moderation. Consider the total portions and cooking methods (for both a portion perspective and to avoid overheating the oils). While the majority of plant-based oils are comprised of mostly mono- and poly-unsaturated fats, palm oils are higher in saturated fats and therefore should be limited in the diet.

Avoid partially hydrogenated oils, which contain unhealthy trans fats that are linked to heart disease.

Water

When it comes to beverages, water is the best and only one our bodies need. Fruits and vegetables contain water but do not provide an adequate amount of water, so we must drink additional water to keep our bodies properly hydrated. It is best to skip sugary drinks and limit juice (even 100% fruit juice) to one small glass per day (~4 oz).

Water contains no calories, but it is vital to the proper function of the body. It is in all cells, blood, bones, teeth, hair, and skin. In fact, humans are nearly 60% water. Water is critical to the body's chemical reactions. It dissolves minerals and other compounds to transport nutrients to each cell, removes impurities from the bloodstream and the body, and forms an integral part of the cells themselves. Among other things, water is also necessary to aid in regulating the body's temperature. Water must be replenished daily by drinking fluids and eating foods that contain water.

Dairy

When it comes to dairy, if a person is going to choose to consume dairy products it is recommended to limit to one to two servings per day. More about dairy is covered in a later section.

Ultra-Processed Foods

Foods that have undergone extensive processing that has significantly altered the original state are known as ultra-processed foods. Ultra-processed foods have reduced nutrient qualities, tend to be higher in calories, lack fiber and are made mostly from substances extracted from foods, such as fats, starches, added sugars, and hydrogenated fats. They may also contain additives like artificial colors and flavors or stabilizers. Examples of these foods are frozen meals, soft drinks, hot dogs and cold cuts, fast food, packaged cookies, cakes, and salty snacks.

Processed and ultra-processed foods (UPFs) dominate modern diets, reshaping public health and nutrition. These industrially manufactured products are designed for convenience and taste. Their highly palatable, rapidly digestible nature drives overeating and metabolic imbalances, displacing nutrient-rich whole foods. High UPF intake is strongly associated with obesity, type 2 diabetes, cardiovascular disease, and mental health challenges due to mechanisms like inflammation, gut microbiota disruption, and poor appetite regulation. Although processing can

sometimes enhance safety and accessibility, the extensive refinement typical of UPFs—especially of carbohydrates—produces foods that spike blood sugar and insulin, fostering long-term metabolic harm.

Recent surveys reveal both widespread consumption of UPFs and limited public awareness of their risks. Only one in three Americans recognize the term "ultra-processed food," though many are shifting toward mindful or "clean" eating and increasing fruit and vegetable intake. Still, the economic and structural forces favoring UPFs—subsidized ingredients, industrial efficiency, and aggressive marketing—sustain their dominance. As research continues to clarify their biological and societal impacts, promoting minimally processed, whole-food diets and reexamining regulatory standards for refined ingredients are essential steps toward improving metabolic and public health.

Glycemic Index

Glycemic Index (GI) is a measurement of the body's blood glucose (blood sugar) response to a specific food as compared to a standard of either white bread or glucose. The measurement is taken after consuming a particular food that contains 50 grams of carbohydrate.

A rise in blood glucose causes the pancreas to release insulin. Insulin is necessary for the entry of glucose into the cells. (Brain and nerve cells do not require insulin.) In the cell, glucose can be used for energy, amino acid or fat formation. The higher the glucose level, the more insulin is released.

In addition to allowing glucose into the cell, increased insulin also promotes protein synthesis, fat storage (particularly in the abdominal area), triglyceride formation and hunger. The theory follows that increased insulin levels may be a factor in chronic illnesses and obesity. By choosing foods with a low Glycemic Index, the insulin response would be low. Conversely, a high GI food would result in high levels of insulin being released. Typically, less processed foods and those containing fiber or fat have a lower GI. However, the GI for a food can change when more than one food is consumed at a time.

The GI should not be the only factor considered when designing a healthful menu, but it can be helpful when deciding which carbohydrates to prepare. The following page lists the GI for various foods. It has been recommended that lower GI foods should make up the bulk of our carbohydrate intake.

In summary, the main recommendations from the Harvard Healthy Eating Plate are as follows:

- Make most of your meal vegetables and fruits: ½ of your plate. Aim for color and variety, and remember that potatoes don't count as vegetables on the Healthy Eating Plate because of their negative impact on blood sugar.
- Go for whole grains: ¼ of your plate. Whole and intact grains—whole wheat, barley, wheat berries, quinoa, oats, brown rice, and foods made with them, such as whole wheat pasta—have a milder effect on blood sugar and insulin than white bread, white rice, and other refined grains.
- Protein power: ¼ of your plate. Fish, poultry, beans, and nuts are all healthy, versatile protein sources can be mixed into salads, and pair well with vegetables on a plate. Limit red meat and avoid processed meats such as bacon and sausage.

- Healthy plant oils in moderation: Choose healthy vegetable oils like olive, canola, soy, corn, sunflower, peanut, and avoid partially hydrogenated oils, which contain unhealthy trans fats. Remember that low-fat does not mean "healthy."
- Drink water, coffee, or tea. Skip sugary drinks, limit milk and dairy products to one to two servings per day, and limit juice to a small glass per day.
- Stay active. The red figure running across the Healthy Eating Plate's placemat is a reminder that staying active is also important in weight control.

Additional Factors Related to Healthy Eating

Food choices are shaped by a complex interplay of factors beyond simply hunger and nutrition. Biological determinants, such as hunger signals, satiety, taste, texture and appearance, guide our instinctive preferences. People naturally favor sweet and familiar flavors, and foods high in fat or sugar can lead to "passive overconsumption" due to their high energy density.

Economics and physical environment also play key roles: food cost and accessibility influence what we buy and eat, with healthy items often being more expensive or less conveniently located. Furthermore, education and nutrition knowledge impact food decisions, yet knowing what is "healthy" doesn't always lead to healthier choices, because applying that knowledge in real-life contexts can be difficult.

Finally, psychological factors such as stress, mood, and comfort seeking can alter eating behavior. When someone is stressed or fatigued, they may be more likely to choose high-palatability foods or skip meals entirely.

Understanding these determinants means recognizing that changing food choices requires addressing sensory appeal, cost and convenience, and emotional context, not just providing nutrition information.

Components Impacting Ability to Eat Healthy

Source: McWhorter, 2021
https://www.eufic.org/en/healthy-living/article/the-determinants-of-food-choice

Social Determinants of Health

Source: https://www.cdc.gov/public-health-gateway/php/about/social-determinants-of-health.html

Social determinants of health (SDOH) are the conditions in which people are born, live, work, and age. These play a fundamental role in shaping dietary habits and, consequently, long-term health outcomes. A recent review of global evidence highlights that factors such as poverty, education level, occupation, race/ethnicity, migration status, disability, and neighborhood environment strongly influence food insecurity, diet quality, and nutrition-related conditions.

For instance, households experiencing food insecurity are more likely to rely on low-cost, energy-dense, ultra-processed foods, leading to higher risks of obesity, type 2 diabetes, anemia, and cardiovascular diseases. Occupation and work-schedules also matter: emergency services workers reported poor diet quality linked to fatigue, skipped meals, and lack of access to healthy options during demanding shifts. Moreover, geographic and educational disparities were evident, rural districts or areas with lower education levels had significantly lower fruit and vegetable consumption in some settings.

SDOH exert their influence not only through access and affordability, but also via stress and psychosocial pathways. Chronic stress can lead to emotional-eating behaviors, increased intake of high-fat/high-sugar foods, and poorer metabolic profiles. Importantly, this research argues that diet is a critical mediating pathway between social conditions and health outcomes, suggesting that improving SDOH can enhance dietary quality and reduce health disparities.

For health professionals, this means nutrition counselling should go beyond individual behavior change to address structural and social factors. Strategies might include screening for food insecurity, supporting clients in navigating affordable healthy foods and work-schedule constraints, and advocating for policies that improve food access, workplace nutrition environments, and educational resources. Integrating SDOH awareness into dietary interventions enhances equity, strengthens impact, and aligns with efforts to improve population nutrition and reduce chronic disease burden.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC11547420/

Food Environment

A healthy food environment sits at the intersection of people and the broader food system. It is shaped by the physical spaces we move through, the policies that govern those spaces, the economics of price and access, and the sociocultural norms that guide what families and communities choose to eat. In many places, highly processed foods and sugary drinks are easier to find, cheaper, and more aggressively marketed than wholesome options. Their ubiquity at checkout counters, in vending machines, and across media channels tilts everyday decisions toward less healthful choices. By contrast, a truly supportive food environment makes nutritious options visible, convenient, affordable, and appealing. Achieving that standard requires coordinated effort from governments and schools, health systems and employers, businesses and nonprofits, and the neighborhoods and families where daily habits are formed so that, by default, the healthy choice becomes the easy choice.

Although food decisions feel personal, they are powerfully shaped by forces beyond the individual. Taste, beliefs, nutrition knowledge, and income matter, but so do cultural traditions, peer expectations, and the social settings in which eating occurs. Families are among the most influential settings. Children form lasting food preferences at home, and the foods kept in the pantry or refrigerator strongly predict what is eaten. Households that keep fruits and vegetables on hand see higher intake across children, adolescents, and adults; shared family meals are consistently linked with greater consumption of produce and other nutrient-dense foods. Parents' beverage choices are also mirrored by their children, with frequent household consumption of sugar-sweetened drinks associated with higher intake among youth. These dynamics are compounded by structural constraints. Lower-income families face higher relative prices for healthier foods and tighter time budgets, which can push meals toward convenience options and away from home cooking.

Social networks and prevailing norms further shape what people eat. When healthier eating is perceived as the norm, preferences for less healthful foods tend to diminish; when media feeds are saturated with images of low-nutrient products, intake often rises. Practical, sociocultural strategies can help tip the balance at home and in peer groups. Keeping ready-to-eat fruit visible, limiting the routine presence of sugary drinks, sharing at least one family meal per day when feasible, and building simple weekly meal-prep routines that involve children and teens all make nutritious choices more likely. Over time, these small practices create a home culture that normalizes healthy eating and equips young people with skills that persist into adulthood.

The community settings where people spend their days like childcare centers, schools, after-school programs, workplaces, and neighborhoods are equally consequential. Access to full-service supermarkets is uneven, and "food deserts" remain a reality for millions of U.S. households that live far from large grocery stores and lack reliable transportation. Limited supermarket access is linked with lower diet quality and higher obesity risk, while a local landscape dominated by small convenience stores often means higher prices, less variety, and poorer-quality produce. When corner stores stock more fresh items, nearby residents do eat better, suggesting that targeted improvements can pay dividends. The evidence on fast-food proximity is mixed, but the concentration of fast-food outlets near schools correlates with higher soda intake, lower fruit and vegetable consumption, and weight gain in children, underscoring the need to consider how retail geography shapes daily choices.

Communities can improve healthy food access through multiple, reinforcing approaches. Expanding the availability of fresh produce in neighborhood stores, aligning public transit routes with supermarkets, and supporting farmers markets through vouchers and local incentives all bring nutritious foods closer to where people live and work. Zoning tools can encourage supermarkets to open in underserved areas, create "healthy food zones" near schools and parks, and prevent excessive clustering of fast-food outlets. Restaurants can be partners in health by reformulating menu items, highlighting healthier options, and providing calorie information in clear, prominent formats. Municipal permitting and incentives for mobile produce vendors, food trucks featuring wholesome offerings, and community gardens can further diversify access, while local zoning and grants can sustain these efforts long term.

Sociocultural Influences

Families: Parents and other family members influence children's dietary choices, and children develop food preferences at home that can last well into adulthood. The food that families keep at home and how family members share meals can influence what and how much they eat. For example, there is a strong association between children, adolescents, and adults eating more fruits vegetables if they are available at home. Eating family meals together has also been linked with increased intake of fruits and vegetables and other healthy foods. Eating meals together may or may not affect weight as some studies show a positive link while others do not. Families also influence what children drink, with children drinking more sugar-sweetened beverages when their parents frequently consumed these beverages, compared with children whose parents did not drink sugar-sweetened beverages.
Families with lower incomes face additional barriers to healthy eating. One roadblock is that healthy foods, such as vegetables, fruits, and whole grains, tend to be more expensive than less healthful foods such as refined grains and sweets. Another is time: It takes longer to prepare meals at home than to buy convenience foods or fast food. People in lower-income households, often single parents working full time and taking care of children, may have less time for meal preparation.

Social Networks and norms: Social norms are rules that define beliefs and behaviors of a group. People may change their food preferences and eating behaviors based on health-based social norms. Some research has found that when participants are exposed to healthy social norms, they report lower preferences for unhealthy foods compared with participants who are exposed to unhealthy norms. Increased exposure to social media that endorses images of low-nutrient processed foods may also lead to greater consumption of these foods.

Marketing: Industry marketing exerts a powerful, pervasive influence, particularly on children and adolescents. Advertising for restaurant fare, sugary beverages, candy, and snacks overwhelmingly promotes energy-dense, nutrient-poor products. Digital channels like websites, games, social platforms, and immersive virtual environments can extend that reach and blur the line between entertainment and advertising, which young audiences are less able to recognize. Packaging tactics, such as the use of cartoon characters, measurably sway children's choices. Although global and national bodies have recommended restricting marketing of unhealthy foods to children, policy adoption has been uneven, and many voluntary industry pledges rely on weak nutrition standards. Stronger regulation, consistent monitoring, and meaningful reformulation goals are needed to align children's marketing with public health.

Public communication can also be harnessed to improve diets. Education campaigns across television, radio, print, and social media that celebrate specific foods or healthy eating patterns can shift awareness and norms, especially when paired with fiscal policies that discourage unhealthy products and subsidize healthier alternatives. Counter-marketing that highlights the health harms of sugar-sweetened beverages and ultra processed foods can balance the promotional landscape. In restaurants, clear calorie labeling, incentives that reward healthier menus, and nutrition standards for meals linked to toys or giveaways help recalibrate default choices for families.

Building Healthy Food Environments

- Keep fresh fruit washed and ready-to-eat at home as snacks for the whole family.
- Limit or avoid keeping sugary beverages at home. If you enjoy these drinks, consider them as an occasional treat, such as when eating out in a restaurant.
- Try to eat at least one meal together daily as a family. Consider getting children involved to help with preparation (chopping vegetables, setting the table) or cleanup.
- Implement a meal prep day once weekly, batch-cooking proteins, grains, and vegetables so they can be reheated quickly during the week. Encourage children and teens to participate in meal prep by washing fruits and vegetables, chopping for older kids, and more advanced cooking or baking food ingredients for teenagers.

Visit the below pages for specific recommendations to improve environments like schools and workplaces:

- **Early childcare and education** (ages 2-5 years old)
- **Schools** and other **spaces for youth**, such as afterschool programs (ages 5-17 years old)
- **Workplaces** (adults)

Farmers markets, and other fresh markets around the world, offer what many modern supermarkets find hard to emulate:

- Transparency – You see your food being cleaned, packaged, and can speak to those that grow and produce it.
- Sensory trust – all your senses are experienced in real time
- Human connection – Vendors can help you find what you are looking for, explain their philosophy and production practices and give you tips on how to prepare the food you buy from them directly.
- Local identity – Fresh Markets reflect local season, flavors, people and values.

You can find local food in our area through the USDA Local Food Directory such as farmers' markets, Community Supported Agriculture (CSA), and Food Hubs at https://www.usdalocalfoodportal.com/ and local Food Banks through Feeding America at https://www.feedingamerica.org/find-your-local-foodbank

Farm Bill

Larger federal based policies influence our food systems. Agricultural-based policies, from procurement that favors local produce to adjustments in the Farm Bill that support fruit and

vegetable production, can shift what is grown, processed, and distributed. Training, financing, research support, and land preservation for specialty crops help align the supply side with dietary guidance. Local and regional investments in production and distribution infrastructure for fresh foods close the gap between farm and table. The farm bill provides funding for crops as well as food assistance funds for households that have low incomes.

Food Assistance

Nutrition assistance programs are critical levers for healthier food environments, particularly for families with children. Increasing enrollment in WIC and SNAP, modernizing program guidelines to incentivize produce purchases, testing limits on sugary drink purchases, and strengthening healthy stocking standards for SNAP retailers can all improve the nutritional quality of foods bought with public benefits. Removing barriers to health-promoting education campaigns within SNAP, expanding WIC fruit and vegetable vouchers, enabling farmers markets and small stores to accept electronic benefits, and prioritizing child-focused pilots can further enhance program impact. Robust data collection and evaluation are necessary to ensure these changes translate into better diets and health outcomes.

Globalization

Finally, globalization has reshaped diets worldwide. Increased wealth, technology, and market integration can raise living standards and expand access to diverse foods, yet they also accelerate the spread of ultra processed products and sedentary lifestyles. As countries move through the "nutrition transition," patterns shift from scarcity and high physical activity to abundant, low-nutrient foods and reduced movement, driving rapid increases in obesity and chronic disease. The relationship between income, education, and obesity also evolves in lower-income countries, higher socioeconomic status often correlates with higher obesity risk, while in higher-income countries the reverse is more common. Global institutions can help countries navigate trade, agriculture, and health policies to promote nutritious diets, expand physical activity, and reduce disparities. Coordinated, evidence-based strategies that engage all sectors are essential to build food environments, local to global, that make healthy eating both feasible and routine.

Food Systems

Government policy and pricing shape the food environment at scale. Over recent decades, fruits and vegetables have become relatively more expensive than many processed foods, while sweeteners and sugary drinks became cheaper, contributing to higher consumption and weight gain. Natural experiments and longitudinal studies show that price shifts influence what people buy and how much they weigh. Taxes on sugar-sweetened beverages, implemented in several U.S. cities and internationally, have reduced local purchases of sugary drinks, though cross-border shopping can dilute the effect.

Chile has a comprehensive policy suite which combines warning labels, marketing restrictions to children, school sales bans, and beverage taxes has reduced sugary drink purchases substantially, suggesting that layered, system-wide strategies are more effective than single

policies in isolation. Attention to equity remains essential, as policy benefits can vary by education and income, and poorly designed interventions may widen health gaps.

Lack of access to supermarkets

Roughly 2 million U.S. households live more than a mile from a supermarket and don't have cars or access to cars. Researchers use the term "food desert" to describe neighborhoods with limited access to full-service grocery stores or supermarkets. Living in food deserts is associated with lower quality diets and increased risk of obesity. There's evidence that low-income neighborhoods, as well as Black or Hispanic neighborhoods, are less likely to have access to large supermarkets offering high-quality and low-cost food, compared with middle-income neighborhoods and white neighborhoods.]

Greater access to convenience stores

Having greater access to small food stores may increase the risk of obesity. Convenience stores often offer less variety, higher prices, and lower quality produce than supermarkets. When small stores do stock healthier foods, however, people living nearby eat better. If small stores changed the foods they stock, they could have a positive influence on community members' diets and obesity risks. Convenience stores selling unhealthy snack foods are more likely to locate in low-income neighborhoods and particularly near schools. They're also found near schools with more Hispanic and Black students, even after accounting for students' poverty level.

Fast food

Although eating fast food has been shown to increase caloric intake and the risk of weight gain, it is not as clear that living or working closer to fast-food restaurants has the same effect. While some studies have found that living near fast-food restaurants is linked to weight gain, lower intake of vegetables, and less physical activity, other studies have not. Fast-food restaurants are more likely to locate near schools, and proximity of fast-food restaurants to schools has been linked to weight gain, lower fruit and vegetable intake, and higher soda intake in school children.

Source: https://nutritionsource.hsph.harvard.edu/healthy-food-environment/

Home Cooking

Home cooking has gained increasing attention as a valuable strategy for improving diet quality and overall health. People who prepare meals at home more frequently tend to consume fewer calories, less fat, and less sugar compared to those who rely heavily on restaurant meals or packaged convenience foods. These individuals are also less likely to consume fast food and more likely to meet dietary recommendations for fruits, vegetables, and whole grains. Notably, this relationship between home cooking and healthier eating appears to persist even when individuals are not actively trying to lose weight, suggesting that the act of cooking itself may naturally lead to better dietary habits. Cooking at home typically involves greater control over ingredients and portion sizes, which can limit excess intake of calories, sodium, and unhealthy fats.

Programs that incorporate hands-on cooking instruction, combined with nutrition and lifestyle education, have shown promise in encouraging long-term changes in food behaviors. Participants in such programs often report increased confidence in their cooking abilities, greater willingness to experiment with healthy ingredients, and a reduction in the consumption of processed and convenience foods. These behavioral shifts are associated with measurable improvements in health outcomes, including reductions in blood pressure, waist circumference, and cholesterol levels. Cooking is not just a skill for meal preparation—it is a foundation for sustained health-supporting choices that extend beyond the kitchen.

Several mechanisms help explain why home cooking is linked to better health. People who cook regularly tend to rely less on ultra-processed foods, which are typically high in added sugars, refined carbohydrates, and artificial additives while being low in fiber and essential nutrients. Cooking at home allows for the use of minimally processed, whole-food ingredients and supports more intentional portion sizes and healthier cooking methods. This can foster more balanced and nutrient-dense meals, reduce the risk of overeating, and encourage mindful eating practices. Additionally, the social and emotional aspects of preparing and sharing meals—such as connecting with family, expressing creativity, and enjoying food in a calmer setting—may contribute to healthier eating patterns and improved well-being.

At the same time, it's important to recognize that not all home-cooked meals are automatically healthy, and the benefits of cooking at home are not experienced equally across all households. The quality of home-cooked meals depends on factors such as access to nutritious ingredients, time availability, and culinary skills. While some households may cook frequently, they may still rely on energy-dense, nutrient-poor ingredients due to financial or logistical constraints. Moreover, social determinants such as income, education, and work schedules can influence whether home cooking becomes a health-promoting habit or a source of additional stress. Therefore, efforts to promote home cooking as a public health strategy must be paired with broader support, such as cooking education, food access initiatives, and policies that address time poverty and economic inequality.

MISE EN PLACE

Everything in its place and a place for everything

Organization, of yourself and your workspace, is an essential skill and will make kitchen work easier and more efficient. Mise en place, a French term commonly used to express kitchen or workspace organization, takes planning and anticipation of the entire task.

Benefits of Mise en Place

- Increased speed and efficiency (e.g., not running around gathering ingredients and equipment throughout the cooking process).
- Clean workstation--makes the process of cooking more enjoyable and easier to accomplish.
- Sanitary conditions more easily maintained (e.g., products held at correct temperatures and helps to avoid cross-contamination).

Kitchen organization should include:

- The recipe(s) and ingredients needed to complete the task.
- Food safety and sanitation needs.
- Small and large equipment needed. Consider equipment needs throughout the entire process, including the final container which will hold the product.
- Planning the time allotted to the process.
- When working in teams, identify how the tasks be divided among the team members.

Workspace Organization

- Recipe
- Recipe ingredients
- Cutting board (set board on a wet paper towel or antiskid mat to prevent it from sliding)
- Chef knife and paring knife, and peeler if needed
- Waste and compost containers
- Small equipment: utensils, pans, service pans
- Large equipment: ovens, steamers, steam jacketed kettles, tilt skillet
- Table height and cutting board at correct height for individual
- Organization appropriate for individual preferences (e.g., right or left-handed individuals)
- Products maintained at appropriate temperatures

Priorities in Food Preparation

Before we eat, we should be able to answer "YES" to each of the following questions:

- Does it taste good?
- Does it look good?
- Is it cooked properly?
- Is it the correct temperature?

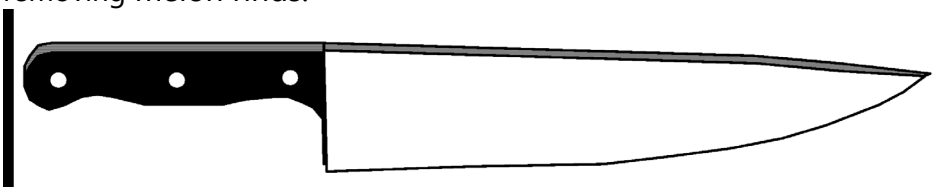
KNIFE SKILLS

Knife selection

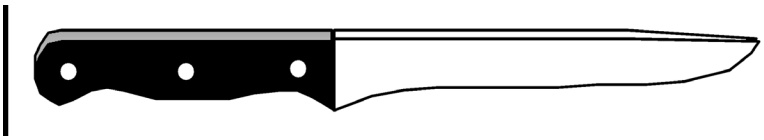
Knives come in all shapes and sizes. Understanding the function of various knives will help you pick the right tool for the job.

Chef Knife: An all-purpose knife used for most cutting and dicing. Chef knives are versatile tools that can be used for most tasks. They are available in sizes ranging from 6″ to 12″ (8″ is standard). You should choose a knife that you can grip securely—larger knives tend to fit best in larger hands. Chef knives with forged blades can be used for heavy-duty tasks such as cracking and chopping, while thinner, more flexible stamped blades work best for delicate tasks such as

removing melon rinds.

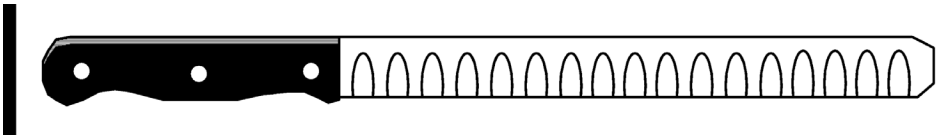


Boning Knife: A knife with a narrow blade that is used to cut around the bones in meat during butchering. Boning knives are specialized knives used to de-bone poultry and smaller red meat cuts, as well as filleting fish.



Paring Knife: Mostly used for peeling fruits and vegetables but work well to slice small soft foods such as olives and mushrooms.

Slicer: Long knife used for carving meat

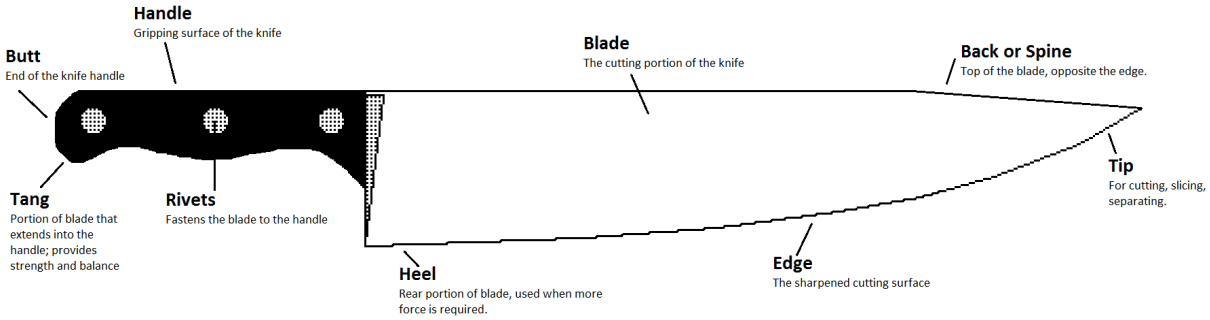


Serrated knives: Not designed for cutting or chopping tasks. These are highly specialized knives that are designed for slicing breads and cakes. Slicers have less defined teeth and are "smoother" than standard serrated knives. Slicers are typically used only for carving meat.

Utility knives: Used primarily for slicing. They work well with delicate foods such as fruit and small roasts or poultry.

Sharpening Steel: Used for honing the edge of a knife

Knife Parts and Functions



Blade: The most common blade material is stainless steel, which is either forged or stamped. Forged blades are molded into shape and are generally heavier and more durable, with a prominent heel at the base of the blade. Stamped blades are cut from a solid sheet of metal and are more lightweight but dull more quickly. Stamped blades are common on inexpensive, low-quality knives, but high-quality stamped blades can also be found. Stainless blades of both types are easily sharpened.

Handle: Wood has traditionally been used for knife handles but is being replaced by plastics and laminated wood. Wood warps when it is wet and can harbor bacteria, making it difficult to clean. Plastic handles are found often in commercial kitchens because they are easy to clean and require no special care. Plastic is used most often on stamped knives that do not have a full tang, an extension of the blade that the handles are attached to. On forged knives, the tang continues through the length and width of the handle. The handle is attached to the tang using three rivets.

Tip or point: Used for small incisions, around bones, punctures, and detailed work

Back or spine: Gives blade appropriate stability and flexibility, varies in thickness depending on style of knife and intended uses.

Heel: The end of the guard, used to break through small bones or shells.

Edge: Primary cutting surface of the knife.

Bolster: Attachment point between the handle and the blade, provides stability, and is found on higher quality knives.

Tang: Runs through the handle (full tang) and provides balance and stability to the knife.

Rivets: Connects the handle to the tang.

Sharpening Knives

A sharp knife is safer than a dull one. Sharp knives glide evenly through food. Dull knives tug so it is necessary to apply more force.

Sharpening stones may be used to sharpen knives but require a certain skill.

Electric and hand-held knife sharpeners are designed to imitate the motion of a sharpening stone. When using knife sharpeners, the key is to use a single smooth motion as you pass the blade through. Jerks or pauses result in an uneven, gouged blade that may require professional attention to fix.

Despite their name, **sharpening steels** do not sharpen knives. Sharpening steels keep your knife blade sharp in between sharpening by re-aligning the microscopic burrs that make up the fine edge of your blade. Once the burrs are broken or bent, a sharpening steel will no longer help. To use a sharpening steel, hold your knife at a 20° angle against the steel and run it from tip to heel in one smooth motion. The safest way to use a sharpening steel is to hold it point-down against a countertop or worktable, sweeping your knife against it blade-down.

Knife Safety Rules

- Always use a sharp knife. A sharp knife is safer than a dull knife because it requires less pressure while cutting. If sharp, the knife will not slip as easily, and your hand will not tire as quickly.
- Use the correct size and type of knife for the job.
- French knife - basic chopping and dicing
- Boning knife - removing bones from meats and poultry
- Slicer - slicing meats, poultry, and breads
- Paring knife - peeling fruits and vegetables
- Hold the knife firmly in your hand and cut away from your body. Always use a cutting board.
- Always place knives on flat surfaces away from the edge of the table with the blade facing away from you. Never cover a knife with towels or other materials, keep it in sight of everyone.
- Do not grab blindly for a knife: reach deliberately for the handle. If a knife falls off the table, do not grab it.
- When handing a knife to another person, point the handle toward them.

Cutting Boards

Cutting boards come in many shapes and sizes. Choosing the correct cutting board is just as important as choosing the correct knife!

There are three important characteristics you should look for when selecting a cutting board:

1. It should be easy to clean and sanitize.
2. It should protect the edge of your knife from becoming dull too quickly.

3. It should be rough enough to keep your food from moving around as you chop.

It is also important to prevent the cutting board from moving around during use.

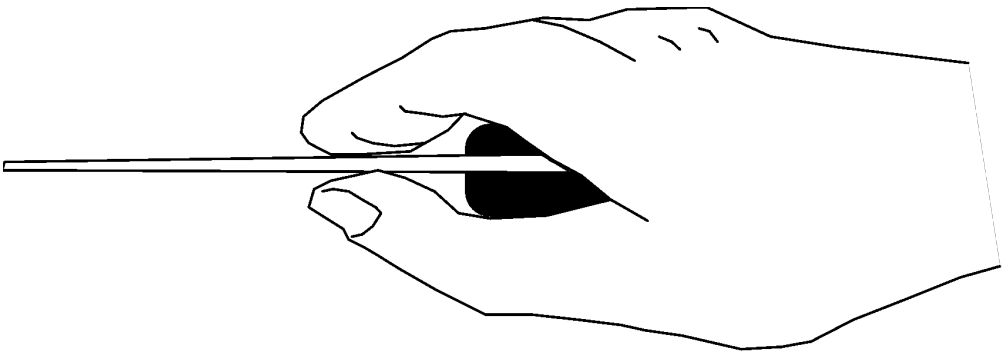
- Cutting boards with rubber feet: Limits you to using only one side of the cutting board
- Cutting boards with grippers in the corners: both sides can be used.
- Non-slip mats: used to secure any cutting board. If you do not have any of these available, a good substitute is a damp (not wet!) dish cloth. Place it under the cutting board, then try to slide the board around before you start cutting. If the cutting board slides, re-dampen the cloth.

Cutting Board Type	Pros	Cons
Plastics High-density polyethylene or PE	Does not dull knives Can be washed in the dishwasher Can be bleached Can be resurfaced	Thinner boards (home-style) cannot be resurfaced
Plastic chopping mats	Cheaper than cutting boards Easy to transfer cut foods Can be bleached	Warp when washed in the dishwasher Do not protect knife blade as well as thicker cutting board
Wood Hard rock maple or cherry hardwoods are less porous	Does not dull knives	Cannot go in dishwasher Will not stand up to repeated bleaching Some cannot be resurfaced Cheaper wooden boards easily warp and crack Heavier
Bamboo Harder and even less porous than the hardwoods	Absorbs little moisture Resists scarring from knives	Gets worn or "furry" after a lot of use. Splinters eventually

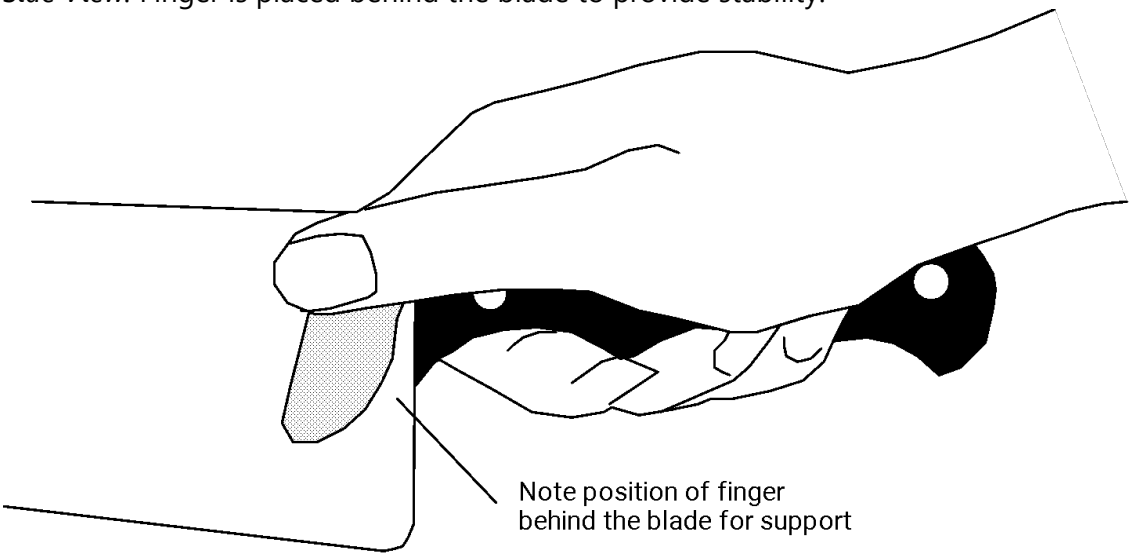
Holding a Knife

The most secure way to grip a knife is by gripping the top of the blade firmly between your thumb and forefinger. Place your middle finger just behind the heel. This grip may take some getting used to, but it gives you maximum control over your knife and allows you to pivot from the wrist when chopping.

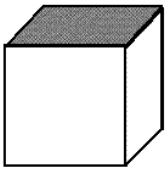
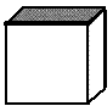
Top View: Grasp knife by the handle, allowing the thumb and index finger to rest on the blade for support. This is a preference by some cooks. An individual preference to hold the knife in other ways is acceptable.



Side View: Finger is placed behind the blade to provide stability.



Commonly Used Knife Cuts

Brunoise	1/8 x 1/8 x 1/8	
Medium Dice	1/2 x 1/2 x 1/2	
Large Dice	3/4 x 3/4 x 3/4	
Fine Julienne	1/16 x 1/16 x 1 1/16 x 1/16 x 2	
Julienne	1/8 x 1/8 x 1 1/8 x 1/8 x 2	
Bâtonnet	1/4 x 1/4 x 2	
Paysanne	1/2 x 1/2 x 1/8	

All cuts are in inches

Day Two Syllabus: Flavor Dynamics, Principles of Meal Planning, Healthy Carbohydrates, Cooking Techniques of Pulses, Grains, Legumes, and Potatoes, Salad Dressings

Learning Objectives

By the end of this day, you should be able to …

- Understand the 5 basic tastes.
- Discuss ways to maximize flavor when cooking food.
- Learning ways to create dishes with complete proteins using pulses, grains and legumes
- Understand how to properly cook and store grains and legumes for weekly meal preparations.
- Discuss the benefit of weekly meal preparation for maximum ease, convenience and creativity.
- Recognize the ways that nutrients are preserved or lost during the cooking process.
- Identify the ingredients used in basic types of salad dressings.
- Make a variety of salads using greens, vegetables, pulses and legumes.
- Cook a variety of carbohydrates including pulses, grains, pasta and potatoes.
- Select the proper potatoes suitable for various cooking techniques.
- Explain how carbohydrate quality and processing influence blood glucose response and metabolic health.
- Describe the role of resistant starch and dietary fiber in supporting gut and metabolic health.
- Identify the nutritional benefits of sweet potatoes and other root vegetables.

Learning Activities

- Lecture and Demonstration
- Tasting Exercise
- Product Identification and Selection
- Hands on Production
- Meal Prepping Techniques

Key Terms

Aquafaba	Protein	Plant Protein
Complete Protein	Bean	Taste
Grain	Pulse	Aroma
Incomplete Protein	Vacuum Seal	Flavor
Legume	Vinaigrette	Whole Foods
Meal Planning	Emulsion	Whole Grain

Resistant Starch	Glycemic Index	Fortification

INSTRUCTOR DEMONSTRATIONS

- Flavor dynamic tasting
- Proper selection, cleaning, cutting selected vegetables
- Selecting, cleaning, cooking, cooling and storage of legumes, grains, pulses
- Freezing portioned grain “cups”
- Making dressings and vinaigrettes

FLAVOR DYNAMICS

Appreciating food is akin to appreciating art and can be done on different levels. The basic level of appreciation is an impression of like or dislike, however, this does not provide any insight as to what or why you like or dislike a piece of art, a food, or a cuisine. If you are to fully appreciate a piece of art, you must learn some of the components which lead to a pleasing or displeasing experience and the same is true of food.

To appreciate art there are certain characteristics such as line, composition, color, etc. that create an overall impression; likewise, in food there are similar considerations. We consume and therefore appreciate food not only with our tongues, but with our noses, eyes, and ears.

Understanding Flavor

Flavor: The quality of something that affects the sense of taste, 2. the blend of taste and smell sensations evoked by a substance in the mouth, 3. characteristic or predominant quality.

Source: *Webster's New Collegiate Dictionary*

We describe our flavor world as being composed of four basic tastes: sweet, sour, salty and bitter. To these, Aristotle added astringent, pungent and harsh. Scientists continue to debate whether the modern four cover all experiences; a growing body of data suggests that the sweet/sour/salty/bitter paradigm may be an oversimplified model for a process so complex that we are only on the brink of understanding it.

Taste: the one of the special senses which perceives and distinguishes the sweet, sour, bitter or salty quality of a dissolved substance and is mediated by taste buds on the tongue, 2. the objective sweet, sour, bitter or salty quality of a dissolved substance as perceived by the sense of taste, 3. a sensation produced by the stimulation of the sense of taste, in conjunction with that of touch and smell.

Source: *Webster's New Collegiate Dictionary*

The Five Senses

When we consume food, we do not just eat, we experience food with all five of our senses. The more we incorporate the five senses into the dining experience, the more fulfilling it will be.

When cooking, we can hear the hissing and spitting of fat hitting the open flames of a grill or the sizzle of ingredients being added to a hot pan. While we are dining a sizzling hot plate might catch our attention, or perhaps the "oohs and aahs" of another table receiving their meal.

Our eyes give us an indication of how the food is going to taste. When we see a beautifully browned, seared steak, our expectation is that it will taste as good as it looks. When we cut into that same beautifully seared steak and feel the crust on the outside, our expectations are, likewise, elevated. On the other hand, if that same steak is kind of grey and flabby looking, with no crust it loses its appeal.

Next, we smell the aroma of the dish and finally have our first indication of the flavors we will be experiencing. And finally, we taste the dish, and all the expectations culminate with what is hopefully a glorious and satisfying experience.

Once we put the food in our mouths, we have three main experiences. These experiences occur in the following order.

1. **Temperature:** If the food is too hot or too cold the human tongue cannot taste the food properly. It can also be uncomfortable.
2. **Texture:** Crispy, crunchy, soft, velvety, airy, fluffy, slimy, gooey, etc.
3. **Taste:** Sweet, sour (acid), salty, bitter (alkaline), umami (earthy, savory)

Developing Flavor

So, now we know that flavor is the way we can both taste and experience food. The question then becomes; how can we develop flavor? How can we get more out of each ingredient? The answers are not long held secrets only bequeathed to those who aspire to the culinary profession. In fact, the answers are simple and almost obvious.

- **Ingredients:** Probably the most important part of cooking is buying the freshest, vibrant and seasonal ingredients possible. It is much easier to make a dish taste, smell and look good if the raw ingredients already taste, smell and look good.
- **Technique:** The proper cooking technique executed precisely will not change the nature of the ingredient, but will enhance it, add to its essence, and transform it from a raw ingredient to a finished product. This is the part that can be taught and learned the easiest. Again, there is no secret in how to properly sear a fillet of salmon, there is however proper technique. Once you learn this technique for searing it can be applied to any recipe. The same can be said about all the cooking techniques.
- **Seasoning:** This is perhaps the most difficult lesson to learn in the kitchen. The most important thing to know about cooking in general and seasoning in particular is that you must taste your food. Knowing which flavors combine well, which herbs or spices to use in which dish and in what quantity can be dizzying. For the novice and even for more advanced cooks, using a recipe as a guideline is an essential starting place for learning and applying flavor combinations. It then becomes up to the individual cook to taste and adjust the seasonings repeatedly to get it just right.

Flavor Principles

As just mentioned, seasoning and flavor combinations can be a daunting aspect of the kitchen to master. However, there are resources and guidelines to help you in your journey. Every culture has its own set of flavors and flavor combinations which reflect and represent its cuisine. Learning these combinations is an invaluable tool in cuisine exploration.

"The taste that results from a mixture of several flavoring ingredients that are used frequently and consistently within a cuisine."

"a taste that can be abstracted and described apart from the basic foodstuffs the ingredients interact with."

"Certain conjunctions of flavoring ingredients are used over and over again within a cuisine."

"...may be varied in characteristic ways and applied to different kinds of food, but no matter how or where they are employed, they will almost invariably result in a dish which *tastes*... and which, in some meaningful way, *is*..."

Enhancing Flavor

The following is a list of ideas which can be incorporated to enhance flavor and not add large amounts of dietary fat, sodium, or calories:

- Spice rubs and marinades
- Powders made from fruits, mushrooms, vegetables, garlic, olives, and citrus
- Pan reductions and glazes
- Roasted garlic and caramelized onions
- Preserved lemons
- Roasted bell peppers
- Chili peppers: dried or fresh
- Grilled vegetables
- Salsas and chutneys made from vegetables, fruits, and bean based
- Infused oils and vinegars
- Strong flavored oils used as finishing agents: sesame, extra virgin olive oil, walnut
- Sun-dried foods: tomatoes, cherries, cranberries
- Small amounts of full-flavored cheeses
- Wine
- Capers
- Ginger
- Seeds and nuts (can also be toasted to enhance flavor)
- Fruit and vegetable purées
- Heighten the flavor of grilled foods by smoking it with wood, leaves, spices, etc.
- When steaming, toss herbs into the water
- Create aromatic broths by infusing stocks with a variety of herbs and spices.

Source: *Healthy Menus*

Meal Prep Guidelines

- Choose a specific day of the week to 1) plan the menu, whether week by week or for the whole month, and write out your grocery list 2) food shop, 3) do meal prep, or most of your cooking. Some of these days may overlap if you choose, but breaking up these tasks may help keep meal planning manageable.
- As you find favorite 'prep-able' meals, or your menus become more familiar and consistent, watch for sales and coupons to stock up on frequently used shelf-stable ingredients like pasta, rice, and other whole grains, lentils, beans (canned or dried), jarred sauces, healthy oils, and spices.
- On your meal prep day, focus first on foods that take the longest to cook. This includes proteins like chicken and fish; whole grains like brown rice, quinoa, and farro; dried beans and legumes; and roasted vegetables.

- Also consider preparing staple foods that everyone in the family enjoys and which you can easily add to a weekday meal or grab for a snack: washed greens for a salad, hardboiled eggs, a bowl of chopped fruit, cooked beans.
- If you prefer not to pre-cook proteins, consider marinating poultry, fish, or even tofu on your prep day so that you can quickly pop them into the oven or stir-fry later in the week.
- Multi-task! While foods are baking or bubbling on the stovetop, chop vegetables and fresh fruit, or wash and dry salad greens for later in the week.
- When you cook a recipe, make extra portions for another day or two of meals, or to freeze for a different week. Be sure to date and label what goes in the freezer so you know what you have on hand.
- For lunches, get a head start and use individual meal containers. Divide cooked food into the containers on prep day.

Storage

Meal prep can save time and money if you are preparing just enough for what is needed the following week. Refrigeration and freezing are an important step to successful meal planning. However, forgotten food such as produce hiding in a drawer or a stew stored on a back shelf in an opaque container for too long can spoil and lead to food waste. Label all prepped items with a date so that you can track when to use them by. Rotate stored items so that the oldest foods/meals are kept up front. Store highly perishable items like greens, herbs, and chopped fruits front-and-center at eye-level so you remember to use them.

Some foods freeze better than others. Cooked meals tend to freeze well in airtight containers. Foods with high moisture content, such as salad greens, tomatoes, or watermelon, are not recommended as they tend to become mushy when frozen and thawed. Blanching vegetables for a few minutes before freezing can help. If the texture of a frozen food becomes undesirable after thawing, they might still be used in cooked recipes such as soups and stews. The following are recommended times for various cooked foods:

Under refrigeration at 40°F or lower:

- 1-2 days: Cooked ground poultry or ground beef
- 3-4 days: Cooked whole meats, fish and poultry; soups and stews
- 5 days: Cooked beans; hummus
- 1 week: Hard boiled eggs; chopped vegetables if stored in air-tight container
- 2 weeks: Soft cheese, opened
- 5-6 weeks: Hard cheese, opened

Freezing at 0°F or lower:

- 2-3 months: Soups and stews; cooked beans
- 3-6 months: Cooked or ground meat and poultry
- 6-8 months: Berries and chopped fruit (banana, apples, pears, etc.) stored in a freezer bag
- 8-12 months: Vegetables, if blanched first for 3-5 minutes (depending on the vegetable)

Source: https://nutritionsource.hsph.harvard.edu/meal-prep/

Keeping Foods Out of the Danger Zone

An important weapon against pathogens is the observance of strict time and temperature controls. Generally, the disease-causing microorganisms found in foods, except for E. coliO157:H7, need to be present in significant quantities to make someone ill. Once pathogens have established themselves in a food source, they will either thrive or be destroyed, depending upon how long foods are in the danger zone.

There are pathogens that can live at all temperature ranges. For most of those capable of causing food-borne illness, the friendliest environment provides temperatures within a range of 41° to 135°F/ 5° to 57°C—the danger zone. Most pathogens either are destroyed or will not reproduce at temperatures above 135°F/ 57°C. Storing food at temperatures below 41°F/ 5°C will slow or interrupt the cycle of reproduction. (It should also be noted that intoxicating pathogens may be destroyed during cooking, but any toxins they have produced are still there.)

When conditions are favorable, bacteria can reproduce at an astonishing rate. Therefore, controlling the time during which foods remain in the danger zone is critical to the prevention of food-borne illness. Foods left in the danger zone for a period longer than 4 hours are considered adulterated. Additionally, the four-hour period is cumulative, meaning that the meter continues running every time the food enters the danger zone. Once the four-hour period has been exceeded, heating or cooling cannot recover foods.

Reheat Foods Safely

When foods are prepared ahead and then reheated, they should move through the danger zone as rapidly as possible and be reheated to at least 165°F/ 74°C for a minimum of 15 seconds. If all proper cooling and reheating procedures are followed each time, foods may be cooled and reheated more than once. Food should be brought to the proper temperature over direct heat (burner, flattop, grill, or conventional oven) or in a microwave oven. Instant-read thermometers should always be used to check temperatures.

Thaw Frozen Foods Safely

Frozen foods may be thawed safely in several ways. Never thaw food at room temperature. The best (though slowest) method is to allow the food to thaw under refrigeration. The food should still be wrapped and should be placed in a shallow container on a bottom shelf to prevent possible cross-contamination.

If there is no time to thaw foods in the refrigerator, covered or wrapped food may be placed in a container under running water of approximately 70°F/ 21°C or below. Use a stream of water strong enough to circulate the water around the food. Individual portions that are to be cooked immediately may be thawed in a microwave oven. Liquids, small items, and individual portions may even be cooked without thawing, but larger pieces that are cooked while still frozen become overcooked on the outside before they are thoroughly done throughout.

Nutrients in Cooking

Vitamin and mineral preservation during food handling is critical to assure that the food will contain the highest nutrient levels. The nutrient content of foods is affected by many factors:

degree of maturity at harvest, transportation time, storage, food processing, and cooking methods. Water-soluble vitamins are easily destroyed, while minerals are less delicate.

Vitamins and minerals will leach into the water in which cut vegetables are washed, boiled or canned. To minimize nutrient loss, wash food before cutting and steam vegetables instead of boiling them. Reserve nutrient-rich cooking liquids to preparing soups and marinades, to braise or poach meats, poultry and fish, and to cook starches. Minerals are unaffected by high temperatures, but to preserve vitamins, avoid high heat and use the shortest appropriate cooking times.

For optimum nutrient value, produce should ripen on the vine, which increases nutrient content. However, most produce is harvested unripe so that it can withstand shipping. To delay further nutrient loss, fruits and vegetables should be chilled immediately and kept cold until they are used. Fruits and vegetables with cut skins should be covered so that vitamins are not exposed to air. Also, remove fruits and vegetables from opened cans and cover. Remember, a canned food product typically contains a lower nutrient content than the fresh product due to processing.

The amount of nutrient loss is closely related to the extent to which food tissues have been broken, cut or chopped, and also to the length of time the food is exposed to air and water. Careful handling and storage of food items and close attention to proper cooking techniques will help to minimize nutrient loss. Fresh whole foods or minimally processed foods will deliver the maximum nutritive value while assuring the highest quality in appearance, taste and texture.

Nutrients are destroyed by exposure to the elements: heat, oxygen, light, and extremes in PH and moisture. Actual effects are dependent on and can be accelerated by the amount of time the food is exposed to each element.

Remember, the rules established to maintain food quality also preserve nutrients. For example, keeping vegetables fresh by washing them whole, wrapping them in a moist towel, and covering and refrigerating them will help to maintain freshness and nutrient content. When preparing most vegetables, consider whether the vegetable will be peeled before cooking. Removing the peel will expose more of the vegetable flesh to the elements with consequent nutrient destruction. In cases such as peeled tomatoes, asparagus, and potatoes, the maintenance of high culinary standards overrides maximizing nutrient retention.

To cook most vegetables, steam them over rapidly boiling water for a short period until just done. Remove and serve, or if not served immediately, stop the cooking process by plunging the vegetables into ice water, then drain thoroughly, wrap, and refrigerate until ready to serve. Retain steaming liquid to be used elsewhere. If steaming is not practical, blanch vegetables for a short period in rapidly boiling water. Then, follow the necessary steps for maximum nutrient retention. Avoid the use of added acid during cooking or holding, as the acid will destroy the color of the vegetable. A popular “trick” to maintain the color of vegetables is to add alkaline (baking soda); however, this will change the texture of the vegetable and rob it of nutrients. When possible, cook vegetables from the raw state and serve immediately.

Using the microwave to cook vegetables and reheat starches and soups is an ideal way to decrease cooking time and retain quality and nutrients. To maximize the nutrient value of soups, avoid holding them in a steam table. Instead, prepare the soup, cool immediately, portion into cups or bowls, and reheat - in a microwave or a la minute - holding the garnish separately.

VINAIGRETTES

A vinaigrette is a temporary emulsion made by blending oil, acid, and other ingredients until they form a homogenous sauce. The sauce remains and emulsion for only a short time, quickly separating back into oil and vinegar. Both oils and vinegars can be flavored. To add flavor and help stabilize the sauce an emulsifier is sometimes included. Vinaigrettes are thought of mainly as dressing for green salads, but they are used in many other ways as well: as marinades for grilled or broiled foods, to dress salads made from pastas, grains, vegetables, and beans, as dips, as sauces served with hot or cold entrees and appetizers, and brushed on sandwiches.

A standard vinaigrette ratio of three parts oil to one part acid works well as a starting point, but the vinaigrette needs to be tasted and evaluated whenever a change is made in the type of oil, acid, or specific flavoring ingredients.

The choice of acid ranges widely as well, from vinegar, to fruit juice, to malted barley, to similar acidic liquids. Every vinegar has a different level of tartness or acidity. Additional vinaigrette ingredients include emulsifiers (egg yolks, mustard, roasted garlic, fruit or vegetable purées, or reduced meat stocks) and such seasonings as salt, pepper, herbs, and spices.

Vinegar

The term "vinegar" comes from the French *vin aigre*, or sour wine. Vinegar is an acidic liquid produced through fermentation. Souring is a natural process that occurs when an alcoholic liquid is exposed to the air. Bacteria present in the air converts the alcohol into a natural acetic acid, and it is this acid that gives vinegar its characteristic sharpness.

Vinegar is an essential ingredient in the kitchen and a highly versatile flavoring. Keep vinegars in a cool place away from light; they do not need to be refrigerated. Most vinegars can be kept almost indefinitely if stored correctly.

Types Of Vinegar

Vinegar	Acetic Acid	Flavor	Uses
Wine vinegar *France, Italy, Spain*	At least 6% acetic acid	Produced from both red and white wines, the quality of the vinegar depends on the quality of the wine. There are almost as many types of wine vinegar as there are wines.	Wine vinegars are ideal for mayonnaise and all kinds of salad dressings. They are also used in many classic butter sauces, such as béarnaise.

Malt vinegar *England*	4-8 %	Malt vinegar is made from grain (malted barley) and is strongly flavored.	Often used as a pickling vinegar for onions and other vegetables. It is also used in the manufacture of sauces and chutneys. Best with straight forward food such as fish and chips, cold meats, or when preparing relishes and chutneys.
Cider vinegar *North America*	5-6 %	It has a strong, sharp flavor and so should only be used where it complements the other ingredients.	Apple cider vinegar is best for salads, dressings, marinades, condiments, and most general vinegar needs Cider vinegar is the best choice for deglazing pork chops accompanied by sautéed apples. Used in fruit pickling.
Rice wine vinegar *Far East*	2-4 %	Japanese rice vinegars are mellow and mild, while vinegar from China is sharp and sometimes slightly sour.	Rice vinegar is popular in Asian cooking and is great sprinkled on salads and stir-fry dishes. Its gentle flavor is perfect for fruits and tender vegetables.

Types of Salad Dressings

- Oil and vinegar dressings
- Mayonnaise-based
- Dairy-based
- Vegetable coulis or puree

Emulsions

An emulsion is a mixture of two substances that do not normally mix, such as oil and water. A vinaigrette is an example of an oil-and-water emulsion, meaning that the oil has been broken up into very small droplets suspended throughout the vinegar.

Temporary emulsions are made by blending, shaking, or whisking ingredients together. The ingredients begin to separate from each other as soon as you stop mixing them. The oil and vinegar separate quickly, but the emulsion can be re-formed by whipping again.

Permanent or stable emulsion, like mayonnaise, contain emulsifiers that attract and hold both oil and water in suspension. Some common emulsifiers used in the kitchen include egg yolks, mustard, and starches.

How to Make a Vinaigrette

1. Combine the vinegar with the emulsifier and seasoning ingredients first. Adding mustard, salt, pepper, herbs, or other ingredients to the vinegar is the easiest way to be sure they are evenly dispersed throughout the sauce for an even flavor before adding the oil.
2. Add the oil gradually while whisking constantly to create a thick, emulsified vinaigrette. Whisk in the oil, or to create a more stable vinaigrette, use a blender, immersion blender, electric mixer with a wire whip, or food processor. Vinaigrettes made by machine hold their emulsion longer than those that are simply whisked together.

Composed Salads

A composed salad is where ingredients are arranged on a plate rather than tossed in a bowl. These types of salads are often served as a main meal and can include protein to bolster satiety and nutrition.

Examples of Composed Salads

Components		Chef	Chicken Caesar	Taco	Cobb
Main item or protein	2 ounces	Turkey, ham cheese, hard-cooked egg	Chicken, Parmesan cheese	Taco filling meat, Cheddar cheese	Chicken breast, hard cooked egg, blue cheese
Lettuces	1 cup	Romaine, varies	Romaine	Mixed greens	Mixed greens
Vegetables or fruit	½ cup	Carrot, tomatoes, cucumbers		Tomatoes	Tomato avocado
Crunch			Croutons	Taco chips or tortilla strips	Bacon
Dressing	½ to 1 ounce	Thousand island or ranch	Caesar	Salsa	Red wine vinaigrette

The Healthy Eating Plate

The Healthy Eating Plate was created by Harvard Health Publishing and nutrition experts at the Harvard School of Public Health. It offers more specific and more accurate recommendations for following a healthy diet than MyPlate, developed by the U.S. Department of Agriculture and the Department of Health and Human Service. In addition, the Healthy Eating Plate is based on the most up-to-date nutrition research, and it is not influenced by the food industry or agriculture policy.

The Healthy Eating Plate recommends filling most of your plate with healthy carbohydrates – with vegetables (except potatoes) and fruits taking up about half of your plate, and whole grains filling up about one fourth of your plate.

Try these tips for adding healthy carbohydrates to your diet:

1. **Start the day with whole grains.**
   Try a hot cereal, like steel cut or old-fashioned oats (not instant oatmeal), or a cold cereal that lists a whole grain first on the ingredient list and is low in sugar. A good rule of thumb: Choose a cereal that has at least 4 grams of fiber and less than 8 grams of sugar per serving.
2. **Use whole grain breads for lunch or snacks.**
   Confused about how to find a whole-grain bread? Look for bread that lists as the first ingredient whole wheat, whole rye, or some other whole grain —and even better, one that is made with *only* whole grains, such as 100 percent whole wheat bread.
3. **Also look beyond the bread aisle.**
   Whole wheat bread is often made with finely ground flour, and bread products are often high in sodium. Instead of bread, try a whole grain in salad form such as brown rice or quinoa.
4. **Choose whole fruit instead of juice.**
   An orange has two times as much fiber and half as much sugar as a 12-ounce glass of orange juice.
5. **Pass on potatoes, and instead bring on the beans.**
   Rather than fill up on potatoes – which have been found to promote weight gain – choose beans for an excellent source of slowly digested carbohydrates. Beans and other legumes such as chickpeas also provide a healthy dose of protein.

References

1. Mozaffarian D, Hao T, Rimm EB, Willett WC, Hu FB. Changes in diet and lifestyle and long-term weight gain in women and men. N Engl J Med. 2011;364:2392-404.

Source: https://nutritionsource.hsph.harvard.edu/carbohydrates/

CARBOHYDRATES

Carbohydrates are one of the three essential macronutrients, alongside protein and fat. They are the body's primary source of energy, especially for the brain and red blood cells, which rely almost exclusively on glucose. Carbohydrates are made up of carbon, hydrogen, and oxygen and are found in a wide variety of foods, including fruits, vegetables, grains, legumes, dairy products, and sugars.

Carbohydrates can be classified as either simple or complex. Simple carbohydrates include sugars naturally present in fruits and dairy, as well as added sugars found in processed foods and beverages. These carbohydrates are quickly digested, providing rapid energy but often contributing to blood sugar spikes. Complex carbohydrates, found in foods such as whole grains, legumes, and starchy vegetables, are digested more slowly. They provide sustained energy and are typically rich in fiber, vitamins, and minerals.

Carbohydrates and Blood Glucose

The type and quality of carbohydrates directly affect blood glucose levels. Simple carbohydrates digest rapidly, leading to sharp spikes in blood sugar and insulin. Over time, frequent spikes can contribute to insulin resistance and increased risk of metabolic disease.

Complex carbohydrates—particularly those that retain their natural fiber and structure—digest more slowly and result in a gradual rise in blood glucose. These include foods such as lentils, barley, quinoa, and minimally processed whole grains. Consuming carbohydrates with sources of protein, healthy fats, or fiber can further slow digestion and blunt the glucose response.

Other strategies to improve post-meal glycemic control include adding acidic components like vinegar, which has been shown to slow gastric emptying and reduce the glycemic impact of a meal.

Processed Carbohydrates and Their Effects

Highly processed carbohydrates—such as white flour, maltodextrin, and high-fructose corn syrup—have been stripped of their natural structure, including fiber and phytonutrients. These ingredients digest rapidly, spike blood sugar, and promote fat storage. They are often combined with salt and fat to create hyper-palatable foods that disrupt appetite regulation and encourage overeating.

Modern processed foods frequently contain carbohydrate loads far greater than what the body can comfortably manage. For example, a typical fast-food meal can deliver over 200 grams of refined carbohydrates—comparable to the amount used in clinical glucose tolerance tests. This repeated overload contributes to insulin resistance, inflammation, and the development of chronic diseases.

Even foods labeled as "100% whole grain" can be misleading, as they may be heavily milled and reconstituted, stripping away the protective food matrix. Choosing truly intact grains like steel-cut oats, wheat berries, or barley provides metabolic advantages and better nutritional value.

Resistant Starch

Resistant starch is a form of carbohydrate that resists digestion in the small intestine and instead ferments in the large intestine. It behaves more like fiber, feeding beneficial gut bacteria and producing short-chain fatty acids like butyrate, which support gut health, lower inflammation, and may improve insulin sensitivity.

Sources of resistant starch include underripe bananas, lentils, legumes, whole rolled or steel-cut oats, barley, and sorghum. Additionally, cooking and cooling starchy foods such as potatoes, rice, and pasta increases their resistant starch content through a process called retrogradation.

Incorporating resistant starch into the diet can help reduce post-meal blood sugar spikes, enhance satiety, and support metabolic health. Clinicians can use this as a practical tool to guide patients toward more nutrient-dense and gut-friendly carbohydrate choices.

Glycemic Index and Glycemic Load

The Glycemic Index (GI) ranks carbohydrate-containing foods on a scale from 0 to 100 based on how rapidly they raise blood glucose levels compared to pure glucose (GI = 100). Foods with a high GI (≥70) cause a quick and substantial rise in blood sugar, while those with a low GI (≤55) produce a slower and more sustained response.

However, GI alone does not account for the amount of carbohydrate in a typical serving. This is where Glycemic Load (GL) becomes useful. GL considers both the quality (GI) and quantity of carbohydrates in a serving, providing a more practical picture of a food's impact on blood sugar. A food with a high GI may still have a low GL if eaten in small amounts.

Choosing foods low in both GI and GL—such as legumes, whole grains, non-starchy vegetables, and most fruits—can improve glycemic control, promote satiety, and reduce the risk of chronic conditions such as type 2 diabetes and cardiovascular disease.

Low-Carbohydrate and Ketogenic Diets

Low-carbohydrate and ketogenic diets significantly reduce carbohydrate intake, typically to 20–45% (or lower) of daily calories. This shifts the body's metabolism toward using fat and protein as primary energy sources, producing ketone bodies as a byproduct. This metabolic state, known as ketosis, can support initial weight loss and stabilize blood sugar levels.

While short-term studies show benefits in weight loss and metabolic markers, these diets also come with risks. Ketosis can lower blood pH, leading to calcium loss from bones and increased risk of kidney stones. High-fat intake may elevate blood lipids, potentially increasing cardiovascular risk if the fats are primarily saturated.

Additionally, long-term adherence to ketogenic diets may result in nutrient deficiencies—particularly B-vitamins, fiber, and phytonutrients—due to reduced intake of fruits, vegetables, legumes, and whole grains. While some individuals find these diets satiating and effective, clinicians should guide patients toward heart-healthy fat and protein choices and consider the long-term sustainability and nutritional adequacy of these dietary patterns.

Dietary Fiber

Dietary fiber refers to plant-based carbohydrates that resist digestion in the small intestine and ferment in the large intestine. It plays a critical role in digestive health, metabolic regulation, and chronic disease prevention.

There are two main types:

- **Soluble fiber** dissolves in water to form a gel-like substance. It slows glucose absorption and binds bile acids, helping to lower blood sugar and cholesterol levels.
- **Insoluble fiber** does not dissolve in water. It increases stool bulk, supports regularity, and helps prevent constipation.

Fermentable fibers also act as prebiotics, feeding beneficial gut bacteria and generating short-chain fatty acids like butyrate. These compounds help maintain colon health, reduce inflammation, and support immune function.

Adequate fiber intake—25 to 38 grams per day for adults—is associated with reduced risk of cardiovascular disease, type 2 diabetes, colorectal cancer, and obesity. A diet rich in fruits, vegetables, whole grains, legumes, nuts, and seeds provides a diverse mix of soluble and insoluble fibers essential for optimal health.

Maximizing Grains

Grains encompass a vast array of cereals, breads, whole grains, and pastas. Grains are key components of dishes to satisfy consumers seeking healthy, plant-forward foods that align with special diets and preferences. With huge varieties in flavor, size, and texture, these ingredients are welcome additions to any dish.

What is a grain?

Grains can be whole, cracked, or made into coarse or fine meals of flours. Grains, also known as cereals, are grasses that bear edible seeds. Both the plant and the seed (kernel) are referred to as Grains. Each kernel of grain is composed of four parts: the hull (outer husk), bran, germ, and the endosperm. When neither the bran nor the germ is removed, it can be referred to as a whole grain. Items baked with whole grain flours generally have a nuttier and more pronounced flavor than those made from white wheat flour.

The USDA recommends 3 to 7 ounce-equivalents of grains daily, depending on your calorie needs, and advise that at least half of your total grains should be whole grains. An ounce-equivalent is a standard serving size for grains, such as 1 slice of bread, 1 cup of ready-to-eat cereal, or ½ cup of cooked rice or pasta This recommendation coincides with the current scientific literature which states that a healthy diet is one based primarily on plants. This means that grains will be playing a starring role at the center of the plate, while meat portions will be decreasing. This current nutrition focus has motivated chefs and food professionals to explore the world of grains and pastas for interesting new additions to the plate. The challenge is that consumers are looking for healthy alternatives with no compromises in flavor. Also, they want to perceive equal value among vegetables, grains, and meats. Ultimately, these plant-based dishes should be perceived with equal value when compared to dishes where the focus is meat or animal protein.

Grains such as quinoa, spelt, barley, and triticale are just some of the more globally prepared grains which are now being seen more commonly across the United States. Many of these grains accompany a variety of heirloom beans and legumes. It appears that glamorization of these ethnic ingredients, grains, beans, and legumes, is quite appealing to consumers.

Grains are an excellent source of vitamins, minerals, protein, and fiber. However, keep in mind that the nutritional content will vary depending upon the amount of refining and the method of preparation. Grains are quite versatile; for example, bulgur can be incorporated into many diverse meals: soups, salads, stuffings, and vegetable/grain medleys. The food cost of grains is very low and therefore plays an important role from a budget control issue.

The current scientific literature states that a healthy diet is one based primarily on plants. This means that whole grains will be playing a co-starring role on the plate with legumes and vegetables, while meat portions will be making minimal appearances as a backup performer. The challenge is that consumers are looking for healthy alternatives with no compromises in flavor. They perceive equal value among vegetables, grains, and meats.

The current trend for chefs is to incorporate global flavors to meet these demands. Today, traditional cuisines of Asia, the Mediterranean, and Latin America inspire the creation of so many flavorful plant-based dishes. Grains such as quinoa, spelt, and triticale are only some of the few which are now being prepared in restaurants across the United States. Many of these grains accompany a variety of heirloom beans and legumes. It appears that glamorization of these ingredients, grains, beans, and legumes, is quite appealing to consumers. A glossary of grains and heirloom beans and legumes is provided at the end of this section.

Grains

The fruit of a grass, grains have a pleasant taste, are inexpensive and readily available, and provide a valuable and concentrated source of nutrients and fiber.

There are over 5,000 species of grain, barley, corn, maize, millet, oats, rice, sorghum, and wheat. Among these will be found the world's principal cereal crops. They can be divided into different families: seeds, grass, wheat, rice.

Through discovery by early man that these plants' seeds could be grown and harvested with simple ease, the earliest form of "village" communities evolved. Most of the grasses were found in abundance in very fertile land with adequate irrigation–areas such as the Nile valley of Egypt and Western parts of Asia. Cereal grains were of prime importance to these ancient cultures in many of their traditions and myths; the name "cereal" itself is derived from the word "ceres". Ceres was the Greek and Roman god (or giver) of grain and life.

Particular staple grains have been associated with certain areas of the world: East Asia with rice, wheat in the Western Hemisphere with wheat, America with maize or corn, Africa with sorghum and millet. Today, with improvements in travel and communication, cross influences are more noticeable. There are a few exceptions to the rule such as sorghum and millet; these remain the staples of Africa.

Whether eaten whole or milled as unrefined flour, cereal grains have an excellent nutritional balance of protein, carbohydrate, fat, vitamins, minerals, and fiber. If you have switched to a more healthful way of eating, you are part of a growing trend. Current interest in health, nutrition and overall fitness is changing the way America eats. Today's menus are leaner and lighter, emphasizing grains, fresh fruits and vegetables, poultry, fish and low-fat dairy products.

Nutritionists recommend limiting foods which are high in fat, cholesterol, sodium, and sugar, and eating more complex carbohydrates. In fact, the American Heart Association and several other authorities recommend that as much as 55% of the calories in our diet each day come from complex carbohydrates. Rice and other grains are becoming increasingly popular and are an excellent source of complex carbohydrates.

Dried pasta is another excellent source of complex carbohydrates. Dried noodles are made from a flour-based paste and some special noodles, especially those from Eastern cuisine's, may be based on a flour made from legumes. For example, mung beans are the foundation for cellophane noodles. In today's market, consumers are enjoying a variety of dried Asian and European wheat pastas, rice noodles, couscous, mung bean noodles, whole wheat soba noodles, and freshly made pastas to duplicate classic pasta dishes from the Mediterranean, Southeast Asia, China, and Japan.

The nutritional value of these pasta dishes is greatly influenced by the sauce that accompanies the dish. Offering dishes with heavy amounts of butter, cheese, or high fat meats such as bacon lessens the overall nutritional value of the dish greatly.

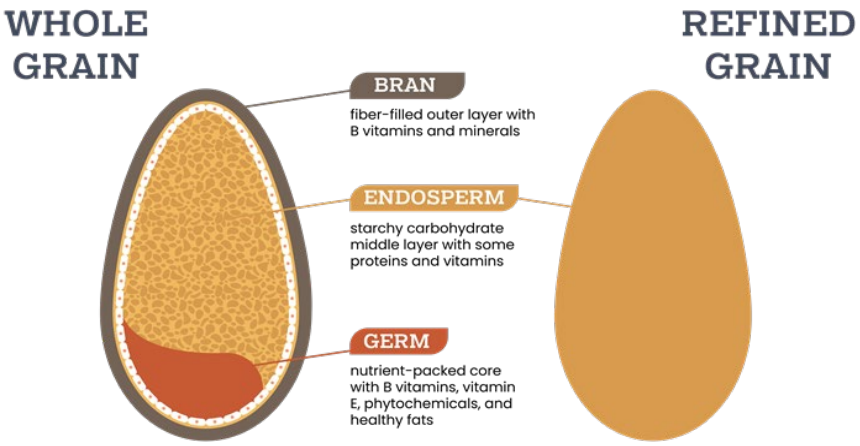
Currently, most grains we produce in this country wind up as animal fodder. Most of the remaining grain is used to prepare flour. and it is in the form of breads, cakes and pastries that most Americans consume cereal grains, followed by breakfast cereals.

Grains and cereals offer a subtle taste. This characteristic makes them ideal for carrying the flavors of other foods and acts as the base for smaller portions of more pungent and highly flavored foods. For example, in North Africa, steaming couscous served with a spicy stew and piquant harissa sauce. In India, a bed of fragrant basmati rice with a serving of seafood curry, each grain can carry the complex flavors of the sauce without losing its own special flavor.

Looking at Grains

Grains are seeds comprised of four layers: the hull, the bran, the germ and the endosperm.

The hull is the dry, inedible outer covering of the seed that is removed and is mostly used for animal feed. A grain that has had the outer hull removed is considered a whole grain if the bran and germ are still intact.



Whole grains that have loosely attached hulls and require very little mechanical processing (wheat for example) are called berries. Grains that have tightly attached hulls and need milling to remove them are called groats.

The bran is the protective covering of the grain and is several layers thick. Bran is rich in nutrients and is an excellent source of dietary fiber. The embryo of the seed is known as the germ. It is rich in enzymes, oil, protein, vitamins, and minerals. The endosperm is the starchy center of the grain. It is high in carbohydrate and helps nourish the seed as it sprouts. White rice, pearled barley, and that part of the wheat that is made into white flour are all endosperms.

Fortification and Enrichment

Fortification was initiated in the early part of this century to correct nutrient deficiencies. For example, iodine was added to salt to diminish goiter, and Vitamin D was added to milk to help conquer rickets.

Fortification has expanded in recent years to include many vitamins and minerals. Often, these nutrients are not originally present and are added in amounts greater than what might be found naturally. The purpose of fortification is to minimize widespread marginal deficiencies in the United States. For example, Calcium is added to flour, Vitamin C is added to flavored beverages, and minerals are added to cereals.

Enrichment refers to a process by which the nutrients thiamin, riboflavin, niacin, and iron are added to refined grains and grain products at levels specified by law. The Enrichment Act of 1942 was enacted to replace some nutrients lost during processing of flour. Unfortunately, when a food or flour is enriched, other nutrients that are lost during processing such as fiber and potassium are not replaced.

In short, enrichment returns nutrients lost during processing, while fortification adds nutrients to supply additional vitamins or minerals. Foods may be both enriched and fortified. For example, flour is enriched with iron, riboflavin, thiamin and niacin, and may also be fortified with calcium.

Gluten-Free Diets

Wheat and other cereals made into flours contain proteins. Gluten, made up of glutenin and gliadin, is the protein element giving doughs their structure and elasticity. Customers on a gluten-free diet may have an inherited disease called “celiac sprue.” For these people, the gluten proteins commonly found in barley, rye, oats, and wheat, (remember the acronym ”BROW”) are not absorbed by the body. In turn, the inability to absorb these proteins causes severe pain during the digestive process. Those with celiac sprue disease are not able to produce “protease,” which is an enzyme devoted to digesting gluten proteins. Since these proteins cannot be digested, they damage the small intestine. Also, since the proteins are not absorbed, neither are their nutrients many nutrients are not taken into the body. A person with celiac sprue has to avoid digesting any and all gluten proteins for life.

When dining out, a celiac customer with celiac should first identify themselves, ideally well in advance. To meet their needs, a kitchen must address the Three Cs: content, contact, and contamination. - “the three C’s.” First, a product cannot contain any gluten protein in the “content” of the recipe or formula. Secondly, there should not be any “contact” with gluten proteins. This includes touch, surfaces, and equipment, which constitutes “contamination.” Cutting boards, utensils, tools, or any substance which comes into contact with the product cannot be used in conjunction with a gluten-based item.

When cooking for somebody with a gluten-free diet, utilize ingredients without any gluten proteins. Examples are rice flours, cassia, buckwheat, tapioca starch, and potato starch. "Wheat free" does not mean "gluten free." Also avoid ingredients that which are made through fermentation, such as extracts, especially vanilla as. T traces of gluten protein may be present in its processing. Distilled products are acceptable, but many alcohols must also be avoided.

A Comparison of Gluten-Free Flours to Wheat Flour

Flours	Carbohydrates	Protein	Fat	Fiber	Additional Trace
	%	%	%	%	
Bean (Canadian)	64	18.2	1.27	23.5	Iron rich
Corn	76	7	1	14	Vitamin A
Cornmeal	77	8	3	10	Vitamin A
Cornstarch	88	Trace	0	Trace	Few trace elements
Garbanzo	60	20	4	12	Potassium
Garfava	59	23	6.5	7.5	Iron rich
Millet	73	10	3	3	Magnesium
Potato	80	8	0.05	3.5	Phosphorus, Potassium
Potato Starch	77	0.05	0	0	Iron rich
Quinoa	66	12	5	7	Potassium, calcium
Rich (brown)	79	6	1	2	Vitamins, minerals
Rice (sweet)	80	6	0	0	Few trace elements
Rice (white)	76	6	0	0	Few trace elements
Sorghum	75	10	4	2	Iron, B vitamins
Soy	30	36	20	2.5	Amino acids
Tapioca	99	1	0	0	Few trace elements
Wheat flour	76	10	1	3	

Source: *The Gluten-Free Gourmet Bakes Bread* by Bette Hagman

Major Culinary Grains

Wheat

One of the earliest cultivated grains, wheat is grown throughout the temperate zones of the world. It was considered one of the five important grains in China and is the "staff of life" in the United States. Wheat has been given the title of the Queen of Grains. It is one of the world's most vital foods with its broad expanse of cultivation.

Wheat can be grown as far north as Alaska and as far south as the equator. Today hybrids of wheat are available for almost every climatic region. The second quality, one it shares with rye, is its protein structure; when milled into flour, is excellent for baking purposes. Wheat protein can form an elastic gluten matrix when mixed with water.

The name "wheat" derives from the old German word -WEIZZI - which is very similar to the Old English word - HWOETE. Both terms mean white, which is an early description of wheat flour, as opposed to the darker cereal flours.

There are thousands of species of wheat, both wild and cultivated, however, only fourteen are commonly used and recognized as cereal grasses.

Wheat is primarily used for flour and animal feed. It is available in the following forms:

Form Available	Uses
Cracked wheat	Side dishes, pilafs
Bulghur	Stuffings, salads
Couscous	(Semolina coated with flour)
Farina	Cereal

Corn (Maize)

Corn was first cultivated as early as 3000 BC in Southern Mexico. In the early 150's corn reached the Old World through Syria, Lebanon, and Egypt and eventually reached the Mediterranean countries.

Corn is a good source of complex carbohydrates but does not contain as much protein as quinoa, amaranth, whole wheat, or rye. Traditional diets of Latin America also combined corn (yellow or blue) with beans. This combination provides the eight essential amino acids necessary for balanced nutrition. Blue corn contains more protein than yellow corn, 6 grams of protein in a two-ounce serving as compared to 4 grams in a two-ounce serving.

Most of the corn consumed by the Americas was treated with lime. The lime added calcium to the calcium-poor maize along with other B vitamins such as niacin (Niacin is the vitamin deficient in the disease pellagra) It also allowed for the two amino acids lysine and methionine to be more available for digestion. In North America, the Anasazi used primarily blue corn. Lime was not used with blue corn. This may have been fortunate since the lime would have washed out the blue plant pigment known as a phenolic - anthocyanin. This pigment is currently being researched for protective health properties in cancer and heart disease.

Form Available	Uses
Whole Hominy: dry or canned	Cereal or starch
Hominy grits: dry	Cereal
Cornmeal: yellow, white, blue	Baking, polenta
Masa harina: hominy soaked in lye, ground	Tortillas, tamales

Rice

Rice is the staple grain for half of the earth's population. It originated in China and Asia and later its use spread to Europe and North and South America. There are approximately seven thousand species of rice worldwide.

Until recently, United States was mostly eating one type of rice: long grain white. As American palates expand to accept traditional global cuisine's, other more exotic rices are also making small gains in popularity. A few of these include sweet rice that Japanese use for sushi; basmati, an aromatic rice that is widely used in Indian cooking; and arborio, a short grain white rice used to make Italian risotto. Varieties of rice differ in size and shape of the grain. The longer grain rice cooks up fluffy and dry, and the grains separate easily. The short grain rice cooks up sticky and plump. The preferred rice in Asian cooking is sweet or glutinous rice, which is stickier than long grain rice. This is an important feature when preparing rice which is to be eaten with chopsticks or other many Asian dishes.

Brown	Hulled grains, bran intact; short, medium, or long grain; may be enriched
White	Polished grains, long or short grains
Converted	Par-cooked, polished grains, may be enriched
Basmati	Delicate, extra long grain, polished
Italian short-grain	Short grains, polished; types include Piedmontese and Arborio
Wild	Long, dark brown grain not related to other rices

Barley

One of the earliest cultivated grains; barley has a short growing season and is very hardy. Today it is of primary culinary importance in the Middle East and the UK.

Form Available	Uses
Scotch, whole grain, hull removed	Pilaf
Scotch, pearled , polished	Soup, pilaf

Flour	Breads

Buckwheat

Has the strongest flavor of all the grains. It is a staple ingredient of Russia and northeastern European Countries such as Poland.

Kasha is the buckwheat groat that is broken into triangular pieces and roasted. It is often made into pilaf, used as stuffings or combined with pasta.

Form Available	**Uses**
Kasha, roasted grain	Pilaf
Flour, dry	Crepes, pancakes, blinis

Millet

Originated in Egypt and Arabia; today it is popular in many parts of the world today. Most of the millet grown in the United States is used for bird seed.

Form Available	**Uses**
Whole, Hulled	Pilaf, cereal

Oats

Oats are a valuable source of nutrients and fiber. They are grown in cooler climates and are widely used in North America, the UK, Ireland and Baltic countries. They are readily available and inexpensive. Mainly consumed as a hot or cold cereal, oats are also commonly used as an ingredient in baked goods and side dishes.

Form Available	**Uses**
Goats, whole or crushed	Pilaf, cereal
Rolled/Old-fashioned Groats, steamed and flattened	Cereal, porridge. granola
Steel-cut/Irish/Scotch Groats, cut into pieces	Cereal, porridge, baked goods
Bran	Hot and cold cereal, baked goods
Flour	Baked goods

Amaranth

Amaranth is a beautiful plant which comes in various ranges of sizes, colors, and shapes was and played a major role in both the diet and religious ceremonies of the Aztec, whose diet consisted mainly of corn, beans, and amaranth. Amaranth has a high-quality protein profile with almost twice as much protein as corn and wheat. It also has high levels of both methionine and lysine. It is also rich in calcium, iron, fiber, and phosphorous. The seeds are golden in color with an occasional dark grain and are as tiny as poppy seeds. As it cooks, the grain becomes transparent.

The amaranth leaves are also edible and are a good source of calcium. They contain much more than any other common green vegetable. Perhaps amaranth is truly the "grain of the Gods" as it was referred to by the Aztecs.

Quinoa

Quinoa was also known as the sacred "mother grain" to the Incas of Peru. It had many advantages over corn (maize) for the Incas and their predecessors because it grows well over high altitudes and is an excellent source of protein. The Incas typically ate both the seeds and the tender leaves of the quinoa plant. The quinoa seed is a grain containing protein and energy. The quinoa leaves are a vegetable containing the protective plant chemicals and vitamins. Today, quinoa is successfully used to improve the nutritional status of Peruvian children.

Quinoa has most of the bran and germ intact, and consequently most of the nutritional value contained. It has an unusually high amount of the amino acids lysine and methionine, which are generally low in more common grains. It is also a good source of B vitamins, iron, and calcium. Quinoa has an outer coating of saponin which must be rinsed off prior to cooking. This saponin is bitter and soapy tasting.

Teff

Teff is an ancient grain that has been used for ages to make *injara*, a large spongy crepe that is the national bread of Ethiopia and is served alongside every meal as the utensil to pick up food. It is available as a whole grain or as flour.

Triticale

This grain is a cross between rye and wheat. The kernels are also larger than wheat berries. It is also higher in protein and contains a better balance of amino acids than both rye and wheat because it contains more lysine.

Forms Available: Whole berries, flaked, flour

Kamut

This is an ancient relative of wheat that was grown by Egyptians as long ago as 4000 BC. Recently rediscovered, it is again being cultivated because of its exceptional nutrition and flavor. The grains are two to three times the size of wheat and also contain a higher nutritional profile than today’s wheat. This versatile grain has superior flavor and can be used in salads and pastas.

Cereals and Meals

Culinary grains may undergo some type of processing (milling) before they reach the kitchen to produce meals and cereals. When a whole grain is milled, it is broken down into successively smaller particles. Depending on the grain, the result might be quite coarse (cracked wheat or groats) or quite fine (cornmeal or farina). Some grains are treated before milling. Bulgur wheat, for example, is steamed and dried before it is crushed.

Cereals include various forms of oats, buckwheat groats, and rye flakes, as well as cracked grains like bulgur. Meals include grits and polenta, farina, semolina, and cream of rice. (Flours are even more finely ground.) Cereals and meals vary widely according to the way in which they are processed. Meals and cereals may be ground coarsely or finely. The bran and germ may be left intact or removed. Coarser cereals produce a dense, porridge-like texture; finer grinds produce a smooth, even silky, texture similar to a pudding.

Water, stock, milk, or broth may be used as the cooking liquid, depending on the grain, the dish, and the menu. Cereals and grain meals are generally cooked in just as much liquid as they can absorb; each type of cereal or meal will absorb a different amount of liquid. (Refer to package or recipe directions for details.)

Additional ingredients may be added to develop more flavors, like aromatic vegetables, *bouquet garni*, *sachet d'épices*. Adding them directly into the grains or legumes will infuse flavor throughout the cooking process. Depending on the desired result, sweeteners like sugar, honey, or maple syrup can be added to achieve a different flavor, and rich and creamy ingredients like cheese or other dairy products may be added for a richer texture and flavor. Salt is generally added to the cooking water and sometimes spices or herbs are added as well. Taste and adjust the seasoning at the end of the cooking time. Grains tend to need considerable salt; otherwise, they taste flat.

Grain Cooking Methods

Measure the correct amount of grain and liquid necessary. Choose seasonings and aromatics, if using. Check the grain carefully and remove any debris. Certain grains such as basmati rice, quinoa, and sushi rice require careful rinsing before cooking.

Stovetop	Bring liquid to a boil. Add grain to boiling liquid. Stir once or twice. Reduce heat to low; cover tightly (according to grain type, if needed) and simmer (see cook times). Remove and fluff with a fork. If grain is not quite tender or liquid is not absorbed, replace lid, and cook two to four minutes longer.
Oven	Combine grain and boiling liquid, in a baking pan or casserole dish; stir. Cover tightly and bake at 350°F (see cook times). Remove from oven carefully and fluff with a fork.

Rice Cooker	Generally, all ingredients are combined in the rice cooker. Turn the rice cooker on and indicate if the rice is white or whole grain. It will stop cooking automatically by sensing a rise in temperature and change in moisture content that occurs when grain has absorbed the liquid and is fully cooked.

Grain Cooking Chart

All grains should be covered while cooking unless otherwise noted.

Grain	Description	Grain to Water Ratio	Cooking Time	Yield
Oat Groats	Sweet, chewy whole grain from which rolled oats are made	1 cup of grain to 2.5 cups of water	Simmer 40 to 45 minutes	3 ½ cups
Brown Rice including Basmati	Slightly sweet and nutty tasting	1 cup of grain to 2.5 cups of water	Simmer 35-45 minutes	3 ½ cups
Wild Rice	Pleasantly bitter	1 cup of grain to 2.5 cups of water	Simmer 50-60 minutes or until tender	4 cups
Pearl Barley	Very chewy and slightly sweet	1 cup of grain to 2 cups of water	Simmer 50 minutes or until tender	4 cups
Quinoa	A tiny high protein, high calcium grain. Taste is quite bitter and distinctive. Combines well with other grains after cooking	1 cup of grain to 1 cup of water	Simmer 15 - 20 minutes	2 cups
Millet	Slightly bitter, very high in protein	1 cup of grain to 1 cup of water	Simmer 15-20 minutes	2 cups
Fluffy Quinoa and Millet	A wonderful, high-protein combination. A rare partnership, in that you can successfully cook these two together.	1 cup each of millet and quinoa to 2 cups of water	Simmer 15-20 minutes, transfer to a pan, spread out, and fluff with a fork.	4 cups

Buckwheat Groats/Kasha	Pungent and nutty	1 cup of grain to 1.5 cups of water	Simmer 10 minutes	3 ½ cups
Bulgur, Cracked Wheat (Coarse)	Sweet and earthy. Not really a whole grain, as it is literally cracked grains of wheat	1 cup of grain to 2 cups of water	Simmer 15 minutes	2 ½ cups
Bulgur, Cracked Wheat (fine)	Sweet and earthy. Not really a whole grain, as it is literally cracked grains of wheat that are fine	1 cup grain to 3 ½ cups water	Soak grains in very hot water for 1 hour	3 cups
Amaranth	Glutinous and sweet, very nutritious	1 cup of grain to 1 1/2 cups of water	Simmer 2-minutes	2 cups
Wheat Berries	Slightly sweet and earthy	1 cup of grain to 2.5 cups of water	Simmer 30 to 45 minutes for hard (red) wheat, shorter for soft (white) wheat	3 cups
Spelt	Slightly sweet and earthy. An ancient form of wheat.	1 cup of grain to 1.5 cups of water	Simmer 50-60 minutes	2 cups
Kamut	Slightly sweet and earthy. Another ancient form of wheat.	1 cup of grain to 2 cups of water	Simmer 25-35 minutes	3 cups
Rye Berries	Very bitter and intense and terminally chewy. Best used in baking or combined with other grains.	1 cup of grain to cups of water	Simmer 25-35 minutes	3 cups
Bulgur	Slightly sweet and very nutty	1 cup of grain soaked in 2.5 cups of boiling water for 30 to 40 minutes	No cooking involved	3 ½ cups
Farro	Earthy, nutty, slightly chewy	1 cup grain rinsed in 3 cups boiling water	Simmer Pearled: 18 min	3 cups

			Semi-pearled: 25 min Whole: 35 min	
Fonio	Earthy, bitter	1 cup grain in 2 cups boiling water	Simmer 1 minute	3 cups

Couscous, North African	Sweet and nutty, Light fluffy texture	1 cup of grain soaked in 1 ½ cups of boiling water	5 minutes	2 ½ cups
Israeli couscous	Sweet and nutty, al dente texture like pasta	1 cup of grain boiled in water like pasta	8-10 minutes (uncovered)	3 cups
Hominy	Somewhat sweet, slightly chewy but soft	1 cup of grain to 4 cups of water	3 hours	3 cups
Corn Polenta	Earthy like porridge with slight granularity	1 cup of grain, simmered and stirred to 3-4 cups of water	20-25 minutes (uncovered)	3 cups
Rice, White, Long grain	Sweet and floral with a slightly chewy texture	1 cup of grain to 2 cups of water	18 minutes	3 cups
Rice, Brown, Long Grain	Earthy and sweet with a slightly chewy texture	1 cup of grain to 3 cups of water	40 minutes	3 cups
Rice, Brown, Short Grain	Earthy and sweet with a slightly chewy texture	1 cup of grain simmered in 2.5 cups of boiling water for 35 to 40 minutes	35-40 minutes	3 cups
Rice Basmati	Floral and aromatic, light and fluffy	1 to 1 ½ cups water	15 minutes	3 cups

Rice, Jasmin	Floral and aromatic, slightly chewy	1 cup grain simmered in 1 ¾ cups water	15 minutes	3 cups
Rice, Arborio	Earthy and sweet, creamy exterior, slightly al dente interior	1 cup grain simmered in 4-5 cups boiling water, stirring, uncovered	25-30 minutes	3 cups
Teff	Gritty and grainy, porridge -like consistency	1 cup of grain simmered in 3 cups of boiling water for 15 minutes	15 minutes	3 cups
Rice, converted	Earthy, chewy	1 cup grain rinsed in 2 cups boiling water	20 minutes	4 cups
Rice, Sushi, rinsed for several minutes until water runs clear	Slightly Sweet, Sticky, chewy	1 cup grain simmered in 1 ¼ cup water	18 minutes	3 ½ cups

Pasta and Noodles

The immense popularity of pastas and noodles is not at all surprising. Highly versatile, these foods are an important element of most cuisines. They are based on ingredients that are inexpensive and easy to store: flour or meal, and eggs. They adapt well to a number of uses and can be used as appetizers, entrées, salads, and even desserts.

Pasta and noodles have evolved into one of the most popular foods worldwide. Found in many cultures, they are the perfect vehicle for almost any accompaniment. Tossed in simple or complex sauces, swimming in an aromatic broth with morsels of meat and vegetables, or served cold as a salad, noodles possess a unique versatility that can be enhanced by a number of accompaniments.

The protein-rich durum wheat, common in Italy, provides pasta with its coveted sturdiness and chew. In addition to wheat flour–based noodles, Asian cuisines offer a great variety of noodles made from other starchy ingredients. Examples include Chinese cellophane noodles made from mung bean starch, Korean glass noodles based on sweet potato starch, and rice noodles, which are common across Southeast Asia. Unlike pasta, these noodles are not made from a stiff dough, but from a slurry or paste. This slurry is forced through a perforated disk into boiling water, where it instantly cooks into thin, long strands. For other varieties, the starch slurry is steamed into sheets and cut into fettuccine-like ribbons. Depending on the starch, these noodles can be crystal clear with a very smooth mouthfeel or opaque and slightly textured.

Cooking Pasta: Boiling

1. Measure the water in a steam-jacketed kettle. The basic recipe for pasta is 1-pound pasta, 1-gallon water, 1 ounce of salt. Increase all ingredients based on the number of pounds of pasta to be cooked.
2. Bring water to a rolling boil and add pasta gradually. Stir to separate the pieces. When cooking filled pastas such as ravioli, add it to boiling water and then gently simmer so filled pasta pieces are not broken.
3. Return water to a boil and begin timing. Cook uncovered until the pasta is al dente (the time will vary depending on size and shape of the pasta). Do not stir the pasta while it is cooking. Be careful not to overcook. If pasta is to be used in a recipe that will be cooked again, cooking can be reduced by about 2 minutes.
4. When pasta is done, drain immediately in a colander. Do not rinse pasta that is to be served hot. A small amount of oil can be tossed with the pasta to prevent sticking.
5. Serve hot pasta immediately. To cool pasta, cover with cold water until chilled. Drain, cover, and refrigerate until needed.
6. Pre-cooked pasta can be reheated by quickly immersing in boiling water. Do not allow it to cook. Drain. Add sauce or seasonings and serve immediately.

LEGUMES

Legumes are seeds that grow in pods. Beans, peas and lentils are each a type of legume and their seeds can be used in the kitchen either fresh or dried. When fresh, they can be treated as a vegetable. Dried, they are collectively known as pulses.

Legumes are a rich source of protein, complex carbohydrates, fiber, vitamins and minerals. The carbohydrates in beans are considered healthy because they are slowly digested. When cooked on their own, they can be used in appetizers, soups, salads and entrées. When mixed with a cooked grain, they will make a total and complete protein in regard to the amino acid content available. Creating dishes that feature a legume as the main ingredient in the entrée can give a higher protein value to the item.

Legumes are more than just a good sources of complex carbohydrates and proteins; they are both environmentally sustainable products and a low-cost food item. Since most beans are purchased either dry or canned they have a long shelf life and can be stored in a pantry rather than a refrigerator.

Cooking Legumes

Soaking the legumes helps considerably with the digestive factor. Generally, 12 to 24 hours is a good guideline for soaking legumes. If time constraints preclude soaking, place legumes in water and bring it quickly to a boil; then remove the pot from the heat and allow it to rest for about one hour. Then SIMMERING the legumes until they are tender will result in a quality product with little damage to them.

In cooking legumes, pay constant attention to the liquid level; over a prolonged period of cooking time the liquid will evaporate. Therefore, a supply of boiling water or stock to one side will keep the cooking action constant and the temperature at a proper level.

Avoid adding salt to legumes until toward the end of the cooking time, as it causes them to harden and take longer to cook. Other seasonings should also be added toward the end of the cooking time; otherwise they tend to neutralize and the flavors become lost. Lentils and split peas are the exception to the rule; for these two items, seasonings can be added at the start of the cooking action.

When reheating a dish that is comprised of beans, adjustment of the seasoning is very important as flavors are lost through the cooling action.

Baking soda (bicarbonate of soda) should never be added to beans to speed up the cooking process as the alkalinity of this product will destroy the vitamin content in the beans.

Keep water that beans have been cooked in. This is an excellent flavorful stock that can be used to enhance the overall taste of the dish.

Suggested Soaking and Cooking Times for Legumes

Dried beans will yield between 2 to 2 ½ times its original measure

Legume	**Long Method**	**Short Method**	**Cooking Time**
	Hours	**Hours**	**Hours**
Adzuki Beans	2 to 3	1	1 ½
Black Beans	12	3	1 ½ to 2
Black-eyed Peas	12	2	1 to 1 ½
Fava Beans	12	4	1 ½ to 2
Butter Beans	12	4	1 ½ to 2
Chickpeas	12	3	1 ½ to 2
Kidney Beans Red	12	2 to 3	1 to 1 ½
Borlotti Beans	12	2 to 3	1 to 1 ½
Cannellini Beans	12	2 to 3	1 to 1 ½
Dutch Brown Beans	12	2 to 3	1 ½ to 2
Egyptian Brown Beans	12	2 to 3	1 ½ to 2
Fagioli Beans	12	2 to 3	1 to 1 ½

Flageolets	12	2 to 3	1 to 1 ½
Great Northern Beans	12	2 to 3	1 ½ to 2
Lentils	No soaking needed		20 to 30 minutes
Mung Beans	12	4 to 60 minutes	45 minutes
Navy Beans	12	2 to 3	1 to 1 ½
Pigeon Peas	12	2	1
Pink Beans	12	2 to 3	1 to 1 ½
Pinto Beans	12	2 to 3	1 to 1 ½
Split Peas	No soaking needed		20 to 30 minutes
Soya Beans	24	3 to 4	1 to 1 ½
White Bean	12	2 to 3	1 to 1 ½

POTATOES

The potato is one of the world's most versatile ingredients. The potato consists of skin and flesh, which can both be used in cooking. There are more than 600 types of potatoes, all which vary in color, shape, and size.

They are relatively inexpensive and easy to grow, requiring less water than grains like wheat or rice. As they can be grown in many climates and keep well outside of refrigeration, they are a long-standing food in many cultures that have provided nourishment and sustenance.

Yet from a nutritional-guidance perspective they occupy a somewhat ambiguous role. While they deliver meaningful nutrients, including potassium (around 600 mg in a medium potato with skin), vitamin C and modest amounts of fiber (2–3 g, most of which is in the peel), they also behave more like a starchy carbohydrate than a typical non-starchy vegetable. Because potatoes are rich in rapidly digestible starch (mainly amylopectin) they can impose a high glycemic load, which is linked in research to higher risks of type 2 diabetes and weight gain, especially when consumed frequently or in fried/processed forms.

The components of a potato are around 80% water, 17% carbohydrates, 2% fiber—most of it comes from the skin—and 1% protein. Potato cookery is, put simply, a matter of gelatinizing the starch found within the flesh of the potato. This process is responsible for giving the cooked potato a specific texture, as well as making it palatable for humans. It's basically what happens when water and heat are applied to potato starch, making the potato's flesh soft and tender.

The potato consists mainly of carbohydrates in the form of starch. But in the presence of heat and water, the bonds of the starch molecules break down. The starch granules dissolve, and the newly opened bond sites soak up and retain the water causing the potato to swell slightly and soften.

The way potatoes are prepared matters a lot: plain baked or boiled potatoes are far different in health impact from French fries, chips or mashed potatoes loaded with butter and cream. Nutrition experts suggest treating potatoes more like a grain or bread substitute rather than simply a "vegetable,". It is better to choose whole grains over potatoes as a main carbohydrate source, when possible, because whole grains consistently show stronger protective associations for weight management, diabetes, cardiovascular disease and mortality risk.

The bottom line: although potatoes have nutritional value and can be included in a healthy diet (especially when their skin is eaten and they're prepared with unsaturated plant oils), popularity of processed potato products and large portion sizes means caution is warranted. Moderation, cooking method, and what you pair the potato with are the keys to making it a health-wise choice.

Potato Varieties

Potato varieties differ in starch and moisture content, skin and flesh color, and shape. Sweet potatoes and yams, although not botanically related to the potato, share several characteristics with it and can be treated in the same manner. Each cooking technique produces a different texture, flavor, and appearance in potatoes. Knowing the natural characteristics of each kind of potato and the ways in which a particular technique can either enhance or detract from these characteristics is important to any chef.

Raw potatoes will oxidize and discolor after they are peeled, first turning light pink and eventually, dark gray or black. To prevent this discoloration, submerge peeled or cut raw potatoes in cold water until time to cook. When possible, use the soaking water to cook the potatoes so any nutrients leached into it are retained. However, potatoes are best peeled just prior to cooking.

Low Moisture/High Starch

Potatoes in this category include Idaho or russet (also known as baking or bakers), purple potatoes, and some fingerling varieties. The higher the starch content, the more granular and dry a potato is after it is cooked. The flesh is easy to flake or mash. These potatoes, desirable for baking and puréeing, are also good for frying because the low moisture content makes them less likely to splatter. Their natural tendency to absorb moisture also makes them a good choice for scalloped or other casserole potato dishes.

Moderate Moisture and Starch

Potatoes in this category include so-called all-purpose, boiling, chef's, Maine, and US 1. It also includes red skin, waxy yellow (e.g., Yellow Finn and Yukon Gold), and certain fingerling varieties. Potatoes with moderate amounts of moisture and starch tend to hold their shape even after they are cooked until tender. This makes them a good choice for boiling, steaming, sautéing, oven roasting, and as a component of braises and stews. They are frequently used in potato salads and soups. Many chefs like to use waxy yellow potatoes for baking, puréeing, and casserole-style dishes because of their outstanding flavor.

High Moisture/Low Starch

Potatoes in this category include "new" (any potato that is harvested when less than 1 1/2 in/4 cm in diameter) and some fingerling varieties. The skin of new potatoes is tender and does not need to be removed prior to cooking or eating. Their naturally sweet, fresh flavor is best showcased by simple techniques such as boiling, steaming, or oven roasting

Raw potatoes will oxidize and discolor after they are peeled, first turning light pink and eventually, dark gray or black. To prevent this discoloration, submerge peeled or cut raw potatoes in cold water until time to cook. When possible, use the soaking water to cook the potatoes so any nutrients leached into it are retained. However, potatoes are best peeled just prior to cooking.

Sweet Potatoes and Purple Potatoes

Sweet, purple and white potatoes are considered root vegetables but are classified in different botanical families. Sweet potatoes are recognized by their orange or yellow flesh, which is created by a high content of beta-carotene. Purple potatoes are from the same botanical family as white potatoes, or Solanum tuberosum. Their nutrient and calorie content are similar. They also contain a plant chemical with antioxidant properties, called anthocyanin, that is found in blueberries, blackberries, grapes, red cabbage, and eggplant.

Sweet potatoes are a nutrient-dense root vegetable known for their naturally sweet flavor and vibrant color. While the most familiar variety features copper-colored skin and deep orange flesh, sweet potatoes come in hundreds of varieties that range in hue from cream and yellow to reddish-purple and even deep violet. Their natural sweetness intensifies when cooked—especially through roasting or baking—eliminating the need for added sugar. Beyond their appealing flavor, sweet potatoes are an excellent source of beta-carotene, a plant pigment that the body converts into vitamin A, which is essential for vision, immune function, and cellular health.

Nutritionally, sweet potatoes are rich in several important vitamins and minerals. They provide vitamin A in the form of beta-carotene, as well as vitamin B6, vitamin C, potassium, and dietary fiber. Orange-fleshed sweet potatoes are particularly high in beta-carotene, while purple-fleshed varieties contain anthocyanins, powerful plant compounds that give them their vibrant color and offer antioxidant and anti-inflammatory properties. Both beta-carotene and anthocyanins belong to a class of phytochemicals that researchers continue to study for their potential role in preventing chronic diseases, including heart disease, diabetes, and certain cancers.

Although sweet potatoes are often considered a healthier alternative to white potatoes, it is still important to pay attention to portion size. Despite their nutrient density, sweet potatoes have a relatively high glycemic index and glycemic load, meaning they can raise blood sugar levels more quickly than some other starchy vegetables. However, most people tend to eat sweet potatoes in smaller portions, and they are less likely to contribute to weight gain or insulin resistance when enjoyed in moderation and as part of a balanced diet.

In addition to the edible root, the leaves and shoots of the sweet potato plant are also consumed in many parts of the world. These greens are tender, mildly flavored, and rich in nutrients, adding to the plant's overall sustainability and versatility. Sweet potatoes are more

than just a holiday staple—they are a powerhouse of nutrition and culinary adaptability. Whether roasted, mashed, boiled, or incorporated into complex dishes, they offer a flavorful and healthful way to enrich the diet with essential vitamins, minerals, and protective phytonutrients.

Proper Cooling and Storing of Various Carbohydrates

It is important to cool cooked products as quickly as possible. Cooked grains, legumes, pulses, and pasta must be consumed within 7 days, if under refrigeration, or can be frozen for up to 3 months for best flavor.

Grains

- Once cooked, grains should be cooled as quickly as possible.
- Spread the cooked grain onto a parchment lined baking sheet to cool.
- Once cool, cover the pan and place it in the freezer. This will keep the grains separated once frozen and make it easier to thaw.
- Once frozen, place the grain into containers or freezer bags and freeze for up to 3 months.
- Alternatively, you can portion cooked grains but scooping into preferred portion sizes with a cup measure, invert the portions onto a tray and freeze the portions. When frozen you can remove the portions from the tray and store them in freezer bags or containers.

Cereals

- Once cooked, cereals such as polenta or cream of wheat should be cooled as quickly as possible.
- Place the cereal in a vessel that sits in an ice bath and stir occasionally. The cereal should reach a temperature of less than 70 degrees Fahrenheit within 2 hours.
- Alternatively, you may spread the cooked cereal onto a baking sheet, place a piece or plastic wrap directly onto the surface of the cereal, cool to room temperature and place into the refrigerator. Once cooled, the cereal can be divided into containers or freezer bags and consumed within 7 days or placed into the freezer for up to 3 months.

Beans

- Once cooked, beans should be cooled as quickly as possible in their cooking liquid to retain moisture and nutrients. To quickly cool beans in their liquid, place the beans in a vessel that sits in an ice bath and stir occasionally. The beans should reach a temperature of less than 70 degrees Fahrenheit within 2 hours.
- The beans can then be refrigerated in their cooking liquid for up to 7 days.
- To freeze beans for later use, drain them and rinse them under cold running water.
- Place the beans on a parchment lined tray in a single layer and place them into the freezer, covered.
- Once frozen, the beans can be stored in containers or freezer bags for later use for up to 3 months.

Legumes and Pulses

- Once cooked, legumes and pulses such as peas, lentils and should be cooled as quickly as possible.
- Spread the cooked legumes or pulses onto a parchment lined baking sheet to cool.
- Once cool, cover the pan and place into the freezer. This will keep the legumes or pulses separated once frozen and make it easier to thaw.
- Once frozen, place the legumes or pulses into containers or freezer bags and freeze for up to 3 months.

Pasta

- Once cooked, pasta should be cooled as quickly as possible and to prevent sticking together.
- Once drained, toss with a minimal amount of vegetable oil and spread the cooked pasta onto a parchment lined baking sheet to cool.
- Alternatively, you may rinse the cooked pasta under cold running water to remove excess starches if the pasta is to be used for cold preparations such as pasta salad.
- Once cooled, place into containers or freezer bags and store for up to 7 days under refrigeration. It is not recommended to freeze cooked pasta.

Potatoes

- Once cooked, potatoes should be cooled as quickly as possible.
- Once cooked, spread roasted potatoes on a baking sheet to cool to room temperature and then place into containers or freezer bags and refrigerate for up to 7 days or freeze for up to 1 month.
- Mashed potatoes should be spread out onto a baking sheet into a thin layer and then covered with plastic wrap directly on the surface of the potatoes to prevent a skin from forming.
- Refrigerate until chilled and then the potatoes can be portioned into containers or freezer bags and refrigerated for up to 7 days or frozen for up to 1 month.

Day Three: Learning from the Global Plant Forward Kitchen, Healthy Proteins and Fats, Fiber-Rich Foods, Nuts, Seeds, Herbs, Spices

Learning Objectives

By the end of this day, you should be able to …

- Define the difference between herbs and spices.
- Learn fundamental herb and spice blends from around the world.
- Identify herbs commonly used in the kitchen and in the herbal apothecary.
- Learn how herbs and spices can be prepared for more bioavailability of their nutrients.
- Produce recipes utilizing fresh herbs and spices.
- Learn to cook with nuts and seeds.
- Identify the key flavor profiles of The Mediterranean, Latin, African and Asian Diets
- Discuss the principles of the plant-based diet.
- Identify lean sources of protein and fiber-rich foods.
- Learn basic cooking principles for various vegetables.
- Define extra virgin olive oil and know its health benefits.
- Understand how to utilize healthy fats to maximize flavor.
- How to choose heart-healthy fats for a variety of dishes

Learning Activities

- Lecture and discussion
- Demonstrations
- Hands-on production

Key Terms

Herb	Fiber	Seed Oil
Spice	Antioxidants	Flavor Enhancer
Minerals	Omega-3	Fat
Planetary Health Diet	Chlorophyll	Saturated Fat
Vitamins	Pesto	Unsaturated Fat
Plant Forward Diet	Polyphenols	Polyunsaturated fat
Lean Protein	Immune Boosting	Nut
Phytochemicals	Anti-Inflammatory	Seed
Anthocyanin	Infusion	Tahini
Lecithin	Volatile Oils	Ghee

Instructor Demonstrations

- Herb and Spice Blends, Oils and Infusions
- Vegetable Cooking Techniques
- Fats and Oils Best usage and techniques

PROTEINS

Protein is a nutrient essential for the growth and maintenance of body tissues, hormone, enzyme, and antibody production, and the regulation of bodily fluids. Proteins are created from building blocks of amino acids. There are 20 different types of amino acids, including nine essential amino acids (histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine) that must be obtained through dietary intake because the body cannot produce them, the others can be synthesized within the body. Some can be conditionally essential, if the body cannot make enough to meet its needs it will need to be supplied through dietary intake. All protein-rich foods contain some of these amino acids.

Essential Amino Acids (body cannot make)	**Conditionally Essential (body usually makes enough)**	**Non-Essential Amino Acids (body makes enough)**
Histidine Isoleucine Leucine Lysine Methionine Phenylalanine Threonine Tryptophan Valine	Arginine Cysteine Glutamine Glycine Proline Serine Tyrosine	Alanine Asparagine Aspartic acid Glutamic acid Glutamine

Protein foods can therefore be categorized as either complete or incomplete, depending on whether they have all nine essential amino acids. Beef, poultry, fish, tofu, eggs, and dairy are good sources of complete proteins, there are only a select few plant-based sources of complete proteins: soy, amaranth, quinoa, hemp seeds and chia seeds.

Foods that provide protein are divided into two groups--complete and incomplete proteins. Complete proteins are those foods that provide all the essential amino acids in sufficient quantities to support growth and maintenance of body tissues. Foods which contain complete proteins provide a higher quality of protein; examples are meat, fish, poultry, cheese, eggs, milk and isolated soy protein. In short, animal and soy products contain complete proteins.

Incomplete proteins lack one or more of the essential amino acids in sufficient quantity to support growth and maintenance of body tissues. Foods which contain incomplete protein provide a lower quality of protein. Examples include grains, legumes, nuts and seeds, and vegetables. In short, plant products contain incomplete proteins.

Incomplete proteins, such as vegetables, grains, legumes, and nuts, have amino acids but do not contain all nine of the essential amino acids. Plant sources of protein can meet nutritional needs for protein if a sufficient variety of foods such as grains, cereals, legumes, and nuts and seeds are incorporated in the diet. Foods that have incomplete proteins can be combined with other incomplete protein foods to become complete proteins.

Proteins in the Diet

When choosing which protein source to include in balanced meals there is more to consider than just whether it contains all essential amino acids. The full "Protein Package" includes the other nutrients, macro and micro, that are part of the food. For example, red meat contains higher amounts of saturated fats and soy products.

Most Americans likely eat enough protein; the only food group the average American is eating the recommended USDA daily value. Requirements for protein can be calculated at .8 grams of protein per 1 kilogram of body weight.

Some stages of life, endurance athletes or those with certain ailments do require more protein to heal (i.e. cancer, wound healing (including from surgeries), burns, etc.) Needs for extra protein can range from 1.0-1.5 grams of protein per kilogram of body weight.
Women in a perimenopausal or menopausal state also have greater protein needs. Extra protein can help reduce muscle wasting that is common in these life stages. It is important to include plant-based protein sources to help ensure adequate amounts of nutrients needed for hormonal balance and regulation are being consumed. Soy is highly recommended because of its effect on estrogen levels. Fish and some dairy products such as yogurt can be a good source of additional proteins.

Fish is an excellent source of protein and healthy fats. For this reason, you can find information about fish in the following section under Omega-3 fatty acids.

While most people choose to include some animal protein in their diets, it is important to note that all the essential amino acids can be obtained by consuming a variety of vegetable foods, each with a different quality and quantity of amino acids. Plant sources of protein can meet nutritional needs for protein if a sufficient variety of foods such as grains, cereals, legumes, and nuts and seeds are incorporated in the diet.

Making incomplete proteins complete is as simple as eating a peanut butter and jelly sandwich or baked beans and brown bread. Bread is rich in the amino acid methionine, but low in lysine. Legumes (peanuts and beans) are rich in lysine, but poor in methionine. When both are combined, they "complement" each other and a complete protein is formed. Civilizations throughout history have combined foods to make complete proteins. Some examples include rice and beans (Mexican), tofu and rice (Oriental), pasta and beans (Italian), corn and lima beans (American Indian) and hummus and pita bread (Middle East). It is interesting to theorize whether this "natural" combining of foods to make complete proteins was by accident, belief, or a factor of cultural survival.

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The following combinations offer a sample of complementary pairings for complete proteins:

- Lentils and rice
- Pasta and beans
- Tortillas and beans
- Hummus and pita

Complete Proteins	Incomplete Proteins
Meats including beef, pork, poultry	Vegetables
Dairy	Legumes
Fish	Nuts
Amaranth and Quinoa	Most Grains
Soy	Seeds
Chia and Hemp Seeds	

SPECIFIC DIETARY NEEDS

Many individuals choose to adopt special diets for health or humanitarian purposes, or have been forced to do so because of allergies. Following are examples of some diets that require specific dietary restrictions and adaptations.

Vegetarian Diets

One segment of the population that has doubled in the last decade are vegetarians. Vegetarians prefer to reduce or eliminate animal foods from their diets. As a result, their protein needs must be met with alternative sources.

A well-planned vegetarian diet, rich in fruits, vegetables, whole grains, legumes, nuts, and seeds, has been consistently linked to a lower risk of chronic diseases such as heart disease, type 2 diabetes, hypertension, and certain cancers. These benefits are largely due to higher intakes of fiber, antioxidants, and unsaturated fats, along with lower levels of saturated fat and cholesterol. Vegetarian diets often lead to improved body weight, blood pressure, cholesterol, and blood sugar control.

However, diet quality matters; vegetarian patterns high in refined or processed foods offer fewer benefits. To maintain health, vegetarians should ensure adequate intake of key nutrients like vitamin B12, iron, zinc, calcium, and omega-3 fatty acids. Overall, a balanced, whole-food vegetarian diet supports long-term health and reduces chronic disease risk.

Type of Diet	Dietary Practice
Omnivore Semi-Vegetarian	Eats dairy products and eggs, as well as fish, chicken and beef.

Pesco-Vegetarian Pescatarian	Eats dairy products, eggs, and fish, but no other animal flesh.
Lacto-Ovo Vegetarian	Eats dairy products and eggs, but no animal flesh.
Ovo-Vegetarian	Eats eggs but no dairy products or animal flesh.
Vegan	Avoids all foods of animal origin.
Fruitarian	Eats only raw fruits, nuts, and greens.

Eggs

Eggs are a nutrient-dense food, providing high-quality protein with all essential amino acids, and key vitamins and minerals such as vitamin B12, choline, and selenium. They contribute to muscle maintenance, brain health, and satiety, making them a valuable part of a balanced diet when eaten in moderation. Eggs are lower calorie animal-based proteins. Egg whites are all protein and no fat - the fats of the egg are contained only within the egg yolk. These are largely monounsaturated fats but some saturated, in the form of cholesterol are also present. Current research shows that, for most people, dietary cholesterol has a limited effect on blood cholesterol levels compared to overall dietary patterns. An average large egg contains approximately 185mg of cholesterol. The American Heart Association recommends limiting dietary cholesterol to less than 300mg per day.

Eggs also contain beneficial fats like omega-9, omega-6, and a fat-soluble nutrient called lecithin, which contributes to the yolk's color and emulsifying properties. Lecithin is a source of choline, which is essential for brain function and the production of the neurotransmitter acetylcholine. It is thought to support cognitive function and memory.
Lecithin also helps protect the liver from damage caused by toxins and improve liver function. It is a moisturizer and can help improve skin elasticity and hydration. And it may help lower cholesterol levels, particularly LDL cholesterol, which can reduce the risk of heart disease.
From an environmental standpoint, egg production generally has a lower carbon footprint than many other animal protein sources, though impacts vary depending on farming practices. More sustainable systems—such as pasture-raised or organic operations—can improve animal welfare and reduce environmental harm, though they may require more land and resources.

Making Complete Proteins for Special Diets

Vegan		
		Examples
Cornmeal	Dried Beans	Bean Taco
Barley	Dried Peas	Barley and Pea Risotto
Whole Grain Breads	Peanuts	Peanut Butter Sandwich
Rice	Soy Products	Tofu with Rice
Pasta	Dried Beans	Pasta Fagioli
Lacto-Ovo Vegetarian		
Eggs	Whole Grains	French Toast
Cheese	Vegetables	Eggplant Parmesan

PLATE AND THE PLANET

Just as different foods can have differing impacts on human health, they also have differing impacts on the environment. Shifting towards a "planetary health diet" can nurture both people and the planet.

Human diets inextricably link health and environmental sustainability, and there is the potential to nurture both. [1] Increased food production over the past 50 years has helped improve life expectancy and reduce hunger, infant and child mortality rates, and global poverty. However, such benefits are now being offset by shifts towards unhealthy diets.

Globally, as nations have urbanized and citizen incomes have increased, traditional diets (typically higher in quality plant-based foods), have transitioned to a "Western-style dietary pattern," characterized by high consumption of calories, highly processed foods (refined carbohydrates, added sugars, sodium, and unhealthy fats), and high amounts of animal products. [2,3] Along with the negative human health impacts associated with this nutrition transition, this dietary pattern is also unsustainable. Current food production is already driving climate change, biodiversity loss, pollution, and drastic changes in land and water use.

Source: https://nutritionsource.hsph.harvard.edu/sustainability/

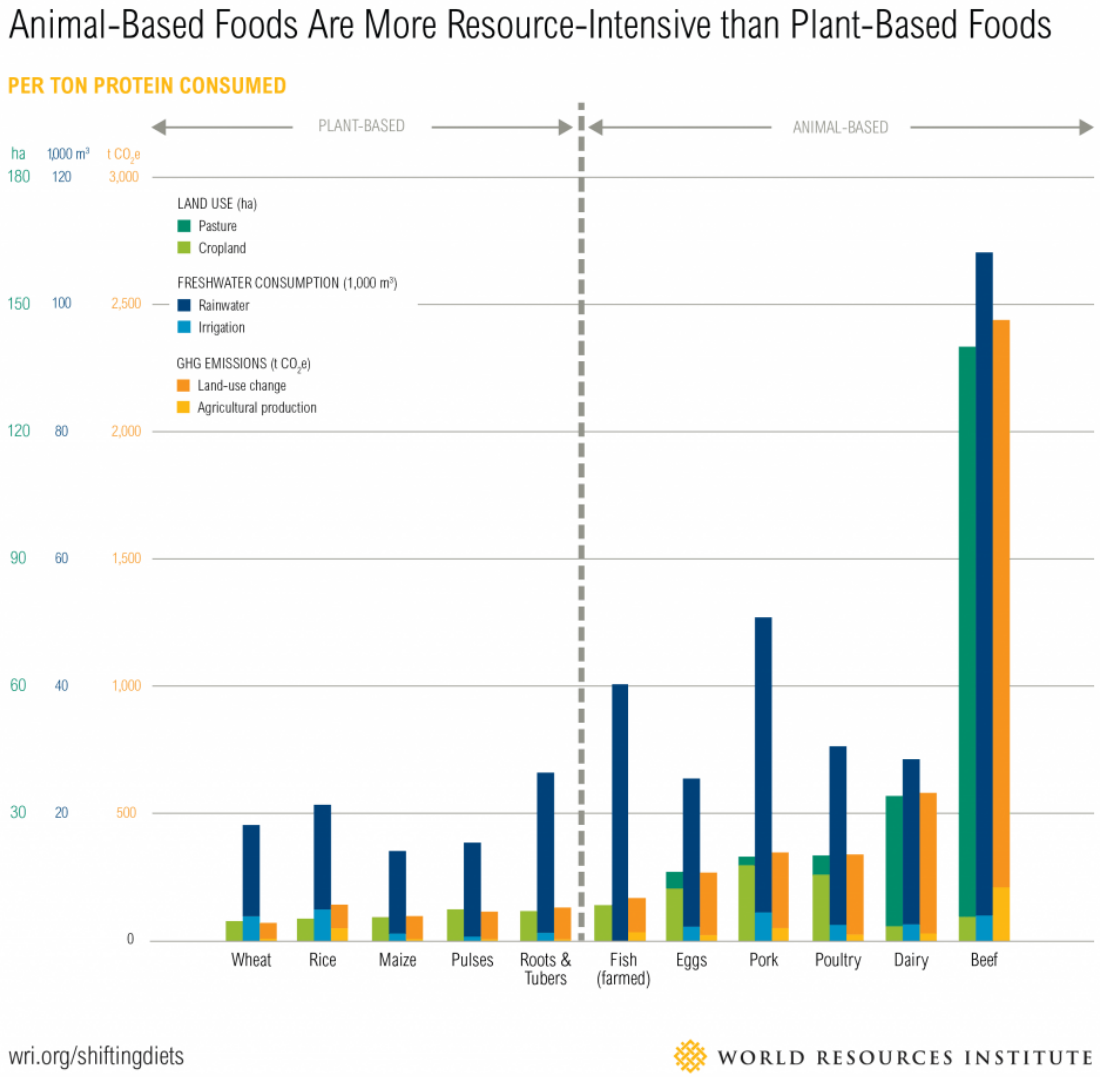
Different Food, Different Impact

Along with varying impacts on human health, different foods also have differing impacts on the environment. As shown in the figure below, the production of animal-based foods tends to result in higher greenhouse gas emissions (orange bars) than producing plant-based foods. Dairy and red meat (especially beef) stand out for their disproportionate impact. Red meat has been shown to be associated with unfavorable health outcomes. The impacts on health are most associated with the type of fat (saturated fat) and the impact on cardiovascular health. Red meats also contain "heme iron", which gives the red coloring to these meats, and is linked with inflammation. As an alternative, plant-based sources of iron (spinach, lentils, tofu, etc.) contain

non-heme iron. Red meat, like beef, is not only hard on the planet but also not healthy for our bodies.

Transitioning towards healthy diets from sustainable food systems—especially with our global population slated to reach 10 billion by 2050—poses an unprecedented challenge. However, research by an international working group of scientists shows this "Great Food Transformation" could be achievable through a combination of dramatic reductions in food losses and waste, major improvements in food production practices, and substantial dietary shifts toward mostly plant-based dietary patterns. [1] https://nutritionsource.hsph.harvard.edu/sustainability/food-waste/

Source: https://nutritionsource.hsph.harvard.edu/what-should-you-eat/protein/#protein-research



Source: World Resources Institute. [4] (Details about the data used to produce this figure available here.)

Foodprint Calculator

Want to know the environmental impact of your diet? Take this quick five-minute survey to find your carbon, nitrogen, and water footprints!

Beyond emissions, it's also important to note that food production places an enormous demand upon our natural resources, as agriculture is a major contributor to deforestation, species extinction, and freshwater depletion and contamination (in this figure, these impacts are represented by land use [green bars] and freshwater consumption [blue bars]). CAFOs or Concentrated Animal Feeding Operation, is a type of industrial agriculture where a large number of animals are confined in a small, densely populated area. These facilities are also known as factory farms and raise concerns about animal welfare and environmental pollution from animal waste. Pig farms are notoriously the biggest offender. Animal waste is put into large cesspools, often located near streams or rivers. Frequently animal waste run-off enters the streams and brings bacteria downstream. (This is one of the ways in which vegetables can become contaminated with animal borne bacteria like E.coli.) Additionally, because these animals are packed in so tightly, they are at greater risk of transferring illness/diseases between each other. To combat this, farmers will give antibiotics to the livestock to try and prevent them from getting sick. These antibiotics stay in the bodies and therefore the meats that consumers take home to eat.

The food label "antibiotic-free" means that the animals are raised without the routine or preventive use of antibiotics. If an animal becomes sick and requires antibiotic treatment, it is typically removed from antibiotic-free production programs to ensure label accuracy. This practice supports efforts to reduce the spread of antibiotic resistance in humans by limiting exposure through the food chain.

"Grass-fed" meat comes from animals that are raised primarily on pasture and eat a diet of grasses and forage rather than grain. This results in meat with a different nutrient profile, often containing higher levels of omega-3 fatty acids and conjugated linoleic acid (CLA), along with lower total fat content.

Sustainable Agriculture

Sustainability is a complex and multifaceted concept, particularly as it relates to our food systems and diets. The way food is produced, distributed, and consumed profoundly influences environmental stability, public health, and global equity. Achieving a healthy and sustainable food future is one of the defining challenges of our time—requiring coordinated global action across sectors, disciplines, and borders. At its core, sustainability is about balance: meeting present needs without jeopardizing the capacity of future generations to meet their own. The 1987 Brundtland Commission famously articulated this idea, defining sustainable development as progress that "meets the needs of the present without compromising the ability of future generations to meet their own needs." This principle underscores the urgent need to reconcile human development with ecological preservation.

Sustainability is not only an environmental issue—it encompasses economics, health, nutrition, and culture. As the Food and Agriculture Organization (FAO) defines it, sustainable diets are those that ensure food and nutrition security while minimizing environmental impacts. They protect biodiversity, respect cultural food traditions, remain accessible and affordable, and use natural resources responsibly. In other words, sustainable diets promote both planetary and

human health simultaneously. We cannot have a secure or equitable food supply without first ensuring that food production itself is sustainable. The stability of our environment is the foundation upon which nutrition security depends.

The importance of a sustainable food supply is magnified by global demographic and nutritional realities. More than three billion people are currently malnourished, while many others consume diets of poor quality. Meanwhile, the world's population is projected to approach ten billion by 2050, placing extraordinary demands on food systems already under stress. Achieving sustainability in this context means ensuring that all people—not just the privileged few—have reliable access to nutritious foods that are produced in ways that preserve ecosystems and natural resources. The challenge is both practical and moral: humanity must learn to feed itself without destroying the planet's life-support systems.

We live in what scientists now call the "Anthropocene"; a geological epoch defined by humanity's unprecedented influence on the Earth's systems. Agricultural activity is the single largest driver of this change. Food production contributes roughly 30% of global greenhouse gas emissions, with the livestock sector alone accounting for nearly half of that total. Agriculture occupies about 40% of the planet's land surface and consumes 70% of its freshwater. It is also the leading cause of deforestation, biodiversity loss, and species extinction, while contributing to nutrient pollution and "dead zones" in aquatic ecosystems. These human-driven pressures threaten to trigger irreversible environmental tipping points, marked by climate instability, food insecurity, and social conflict. In short, our current methods of food production are unsustainable—for the planet and for ourselves.

Transitioning to such a sustainable food system will not be simple, but it is feasible with collective will. Policies must incentivize the production and consumption of nutritious foods, making them affordable and accessible to all populations, while discouraging the overconsumption of resource-intensive and unhealthy foods. International collaboration, supported by science-driven policy and local implementation, will be vital to achieve this transformation. It is equally important that individual consumers understand the power of their choices. The foods we eat influence not only our personal health but also the health of the planet.

Ultimately, creating a sustainable food future depends on aligning human diets with ecological limits. This means adopting eating patterns that are predominantly plant-based, rich in whole foods, and mindful of waste. It also means supporting farming systems that value soil health, water conservation, and biodiversity. Governments, industry leaders, farmers, educators, and consumers must work together toward this shared goal. Achieving a sustainable and healthy food system is an urgent global priority—one that demands innovation, cooperation, and commitment at every level of society. The bottom line is that sustainability and health are inseparable. Every meal is an opportunity to shape the future of our planet. What is good for the planet—diverse, plant-forward, minimally processed foods—is also what is best for our health. A sustainable food system is not just an environmental imperative but a moral one, ensuring that future generations inherit a world capable of nourishing life in all its forms.

THE PLANETARY HEALTH DIET

In 2019, the EAT-*Lancet* Commission developed the world's first scientific targets for healthy and sustainable food systems, including a "planetary health diet" with defined daily consumption ranges for each food group. This dietary pattern—characterized by a variety of high-quality plant-based foods and low amounts of animal-based foods, refined grains, added sugars, and unhealthy fats—is designed to be flexible to accommodate local and individual situations, traditions, and dietary preferences.

The 2025 EAT-*Lancet* Commission on healthy, sustainable, and just food systems presents new evidence-based insights on nutrition and human health, within safe and just planetary boundaries. New to this Commission are updates to the planetary health diet, measurement and assessment of the impact food systems have in driving transgressions of planetary boundaries, an exploration of multi-dimensional and underlying issues of food justice, new research and extensive modelling insights, and transformative and action-based recommendations and roadmaps.

The Commission lays the foundations for food systems to take a central role in the post-SDG era, presenting global, regional, local, and individual means to achieve that while creating and retaining a just social foundation, that protects human health and minimizes harms to planetary health.

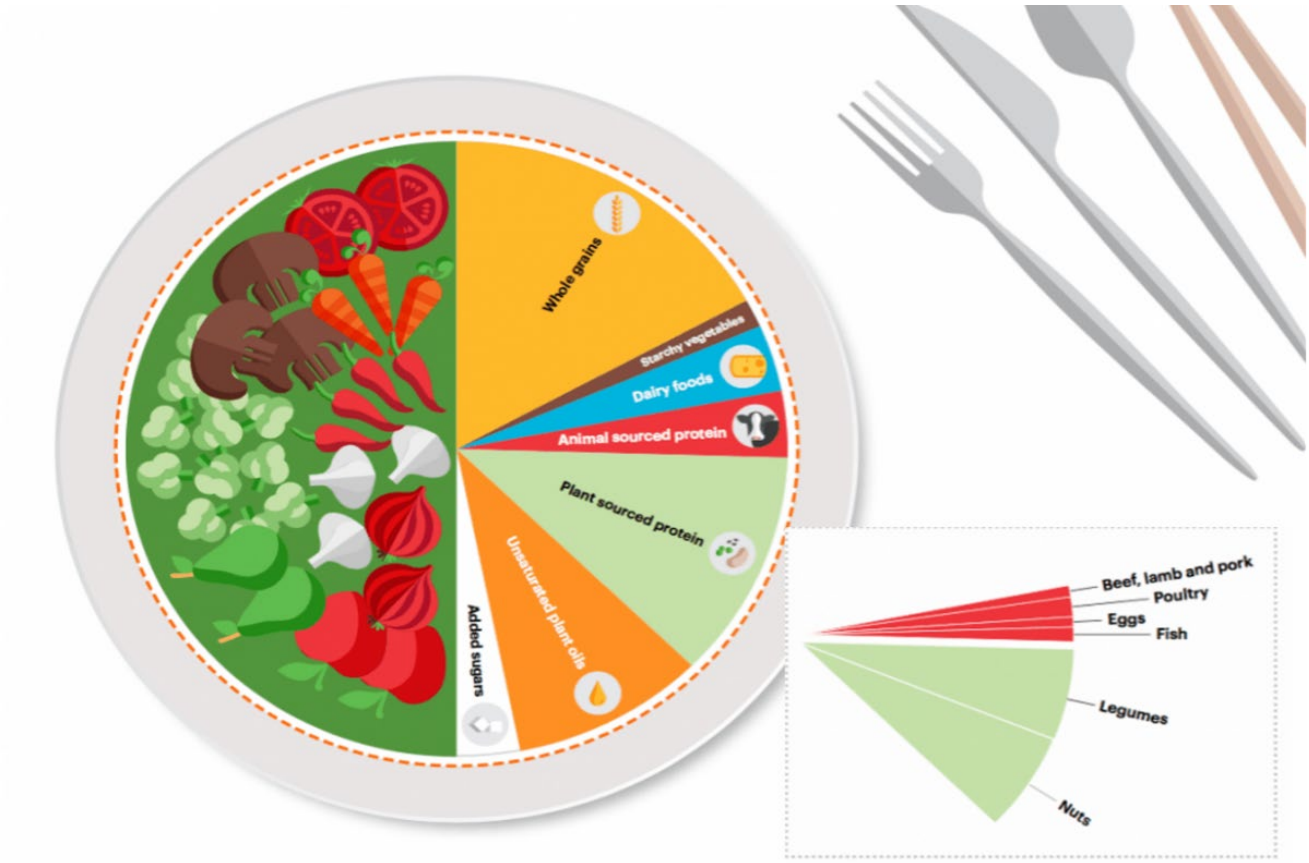
The "EAT-Lancet Commission" calls for what it terms a "Great Food Transformation." This global shift entails major changes in dietary patterns, agricultural practices, and food system governance. It requires a reorientation of agricultural priorities—from maximizing yield and volume to cultivating diversity, nutrition, and resilience. Healthy food production must replace high-volume monocultures as the focus of agricultural policy. Food waste and loss, which currently account for about one-third of all food produced, must be reduced by at least half. At the same time, innovations in farming technology, soil management, and carbon sequestration are needed to intensify yields sustainably while protecting biodiversity and ecosystem health. Coordinated governance of land, oceans, and water resources must ensure that natural habitats are preserved and restored.

The global context has shifted dramatically since publication of the first EAT–*Lancet* Commission in 2019, with increased geopolitical instability, soaring food prices, and the COVID-19 pandemic exacerbating existing vulnerabilities and creating new challenges. However, food systems remain squarely centered at the nexus of food security, human health, environmental sustainability, social justice, and the resilience of nations. Actions on food systems strongly impact the lives and wellbeing of all and are necessary to progress towards goals highlighted in the Sustainable Development Goals, the Paris Agreement, and the Kunming–Montreal Global Biodiversity Framework. Although current food systems have largely kept pace with population growth, ensuring sufficient caloric intake for many, they are the single most influential driver of planetary boundary transgression.

More than half of the world's population struggles to access healthy diets, leading to devastating consequences for public health, social equity, and the environment. Although hunger has declined in some regions, recent increases linked to expanding conflicts and

emergent climate change impacts have reversed this positive trend. Obesity rates continue to rise globally, and the pressure exerted by food systems on planetary boundaries shows no signs of abating. In this moment of increasing instability, food systems still offer an unprecedented opportunity to build the resilience of environmental, health, economic, and social systems, and are uniquely placed to enhance human wellbeing while also contributing to Earth-system stability.

Source: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(25)01201-2/abstract



https://www.thelancet.com/commissions-do/EAT-2025

Source: https://nutritionsource.hsph.harvard.edu/sustainability/plate-and-plane

FATS AND THEIR FUNCTIONS

Fats are one of the body's basic nutrients, providing energy by furnishing calories. All forms of fat are made up a combination of fatty acids, which are the building blocks of fats much as amino acids are the building blocks of proteins.

Fats and oils are either saturated or unsaturated, the latter classification being broken down into monounsaturated and polyunsaturated fats; which are the preferred source of fats and often referred to as the "good fats".

Fat is often a significant concern of those watching what they eat. While it is true that excess fat in the diet is unhealthy because it raises the risk of coronary heart disease, obesity, and certain cancers, it is still an essential nutrient that provides energy and fulfills bodily functions. Current dietary advice places emphasis on the type of fat as well as the amount of fat in the diet. General recommendations call 20-30% total calories to come from fats, with the majority from mono- and polyunsaturated sources. The American Heart Association recommends less than 6% of total calories to come from saturated fat. Consuming more than the recommended limit of fat is often associated with weight gain and obesity, excess total calories are the root of that problem. This is due to higher calories per gram of fat (9 calories per gram) than of carbohydrates and proteins (4 calories per gram).

Cholesterol is a fat-related compound; our bodies naturally produce cholesterol, and it is not an essential nutrient to consume. Dietary cholesterol is only found in animal-based foods, with higher amounts found in red meats than chicken and even less from fish. The American Heart Association recommends cholesterol intake not exceed 300 milligrams per day. High blood cholesterol levels, particularly LDL and LDL/HDL ratios are risk factors for heart disease. Research shows that dietary cholesterol from eggs does not have a significant impact on blood serum cholesterol levels when consumed in moderation. It is important to consider what other components make up the food - many animal products are high in saturated fats versus eggs that are largely monounsaturated fats and protein.

Diet has a significant influence on **triglyceride** levels, which are another key marker of cardiovascular health. Diets high in saturated fats, added sugars, refined carbohydrates, alcohol and overall high caloric intake can elevate triglycerides by increasing liver fat production and impairing fat metabolism. Saturated fats may reduce the liver's ability to clear triglyceride-rich lipoproteins from the blood, contributing to higher circulating triglyceride levels.

Diets rich in omega-3 fatty acids, fiber, and unsaturated fats can suppress hepatic triglyceride synthesis and promote fat oxidation, helping to maintain healthy lipid balance. Reducing intake of refined carbohydrates, alcohol and saturated fats and emphasizing whole grains, fruits, vegetables, and lean proteins like fish can help lower triglyceride levels. Regular physical activity, maintaining a healthy weight, and moderating portion sizes also play important roles in keeping triglycerides within a healthy range.

Oil vs. Fat

While they are similar in many ways, fat is solid at room temperature, while oil is liquid. Oils are produced by pressing a high-oil food, such as olives, nuts, corn, or soybeans. The liquid is

then filtered, clarified, or hydrogenated to produce an oil or a fat (shortening).

Fats are one of the body's basic nutrients, providing energy by furnishing calories. All forms of fat are made up a combination of fatty acids, which are the building blocks of fats much as amino acids are the building blocks of proteins.

Fats and oils are either saturated or unsaturated, the latter classification being broken down into monounsaturated and polyunsaturated fats; which are considered "good fats.

Type of Fat	**Main Source**	**State at Room Temperature**	**Effect on Cholesterol Levels Compared with Carbohydrates**
Monounsaturated	Olives; olive oil, canola oil, peanut oil; cashews, almonds, peanuts, and most other nuts; avocados	Liquid	Lowers LDL; raises HDL
Polyunsaturated	Corn, soybean, safflower, and cottonseed oils; fish	Liquid	Lowers LDL; raises HDL
Saturated	Whole milk, butter, cheese, and ice cream; red meat; chocolate; coconuts, coconut milk, and coconut oil	Solid	Raises both LDL and HDL
Trans	Most margarines; vegetable shortening; partially hydrogenated vegetable oil; deep-fried chips; many fast foods; most commercial baked goods	Solid or semi-solid	Raises LDL, decreases HDL, and increases triglycerides when compared to monounsaturated or polyunsaturated fat

*Trans fat increases LDL, decreases HDL, and increases triglycerides when compared to monounsaturated or polyunsaturated fat.

Grams of Fat Type in Select Oils

Oils are produced by pressing a high-oil food, such as olives, nuts, corn, or soybeans. The liquid is then filtered, clarified, or hydrogenated to produce an oil or a fat (shortening).

	Saturated	Monounsaturated	Polyunsaturated	Trans
Oils				
Canola	7	58	29	0
Safflower	9	12	74	0
Sunflower	10	20	66	0
Corn	13	24	60	0
Olive	13	72	8	0
Soybean	16	44	37	0
Peanut	17	49	32	0
Palm	50	37	10	0
Coconut	87	6	2	0
Cooking Fats				
Shortening	22	29	29	18
Lard	39	44	11	1
Butter	60	26	5	5
Margarine/Spreads				
70% Soybean Oil, Stick	18	2	29	23
67% Corn & Soybean Oil Spread, Tub	16	27	44	11
48% Soybean Oil Spread, Tub	17	24	49	8
60% Sunflower, Soybean, and Canola Oil Spread, Tub	18	22	54	5

Saturated Fat

Saturated fats are typically solid at room temperature and found primarily in animal-based foods such as butter, beef tallow, and high-fat dairy. Plant-based sources of saturated fats include coconut, palm and cocoa. Saturated fats have long been associated with elevated LDL cholesterol levels and attributed with a negative association with heart disease. However, their health impact is nuanced and depends largely on what replaces them in the diet. Compared with refined carbohydrates, saturated fat may have neutral or slightly adverse effects on cardiovascular disease (CVD) risk. But when replaced with unsaturated fats, particularly polyunsaturated fatty acids, the benefit is clearer: lower LDL cholesterol and reduced risk of heart disease.

Monounsaturated fats, particularly from plant sources such as olive oil and avocados, are consistently linked to reduced cardiovascular risk, unlike mono-unsaturated fats from animal sources, which may carry metabolic risks due to additional constituents like heme iron and TMAO precursor (trimethylamine N-oxide which is a compound produced by gut bacteria that is linked to an increased risk for various diseases, particularly cardiovascular and kidney disease).

Coconut Oil

In recent years, coconut oil has experienced a surge in popularity, largely due to its promotion as a "superfood" with a wide range of purported health benefits. It has been praised in popular media for claims such as aiding in weight loss, curbing appetite, boosting immunity, and protecting against diseases like heart disease and Alzheimer's. Celebrity endorsements and its inclusion in trending diets like the ketogenic and Paleo diets have fueled this enthusiasm. However, scientific consensus remains cautious. While 72% of Americans view coconut oil as healthy, only about a third of nutrition experts agree. Much of the perceived benefit is based on anecdotal claims rather than strong scientific evidence. Despite this, coconut oil remains a favored ingredient for those seeking plant-based fats, appreciated for its creamy texture and subtle coconut aroma.

Coconut oil is composed entirely of fat, with 80–90% of it being saturated fat. This high level of saturation gives the oil its solid form at cooler temperatures. The predominant fatty acid in coconut oil is lauric acid, which makes up nearly half of its composition, while smaller amounts of myristic and palmitic acids are also present. These particular fatty acids have been shown to raise LDL cholesterol—the "bad" cholesterol—when consumed in significant amounts. Although coconut oil contains trace amounts of monounsaturated and polyunsaturated fats, as well as minimal plant sterols, these are not sufficient to provide measurable health benefits. The oil also contains no cholesterol, no fiber, and only insignificant levels of vitamins or minerals.

Many of the health claims surrounding coconut oil stem from research involving medium-chain triglycerides (MCTs), a type of fat that is metabolized differently from the long-chain fatty acids found in most dietary fats. MCTs are quickly absorbed and converted into energy by the liver, which has led to theories that they promote satiety and prevent fat storage. However, the coconut oil available in grocery stores is not composed primarily of MCTs but of lauric acid, which behaves more like a long-chain fatty acid. Therefore, the results of MCT studies cannot be directly applied to commercial coconut oil. Observational studies of populations in tropical regions such as the Philippines, India, and Polynesia—where coconut is a dietary staple—often show low rates of cardiovascular disease. Yet these findings cannot be generalized, as these populations consume whole coconut products, such as fresh coconut meat or coconut cream, within diets that are high in fiber and low in processed foods.

Scientific reviews and meta-analyses have consistently found that coconut oil raises both LDL and HDL cholesterol when compared with unsaturated fats like olive or safflower oil. Short-term clinical trials have shown that coconut oil increases total and LDL cholesterol to levels similar to other saturated fats, such as butter or palm oil. A comprehensive analysis of multiple clinical trials reported that coconut oil raises total cholesterol by about 15 points and LDL cholesterol by 10 points compared with vegetable oils. Considering this evidence, the American Heart Association advises against using coconut oil as a primary fat source. They recommend

replacing saturated fats, including coconut oil, with unsaturated fats found in foods like nuts, seeds, and vegetable oils. Because just one tablespoon of coconut oil contains nearly 12 grams of saturated fat—almost reaching the daily limit for those at risk of heart disease—moderation is essential.

Coconut oil, like all fats, is calorie-dense, with approximately 120 calories per tablespoon. While it can be used occasionally to add flavor to certain dishes, it should not be considered a healthful food or consumed in large quantities. In cooking, its mild tropical flavor works well in baked goods, curries, and sautéed vegetables. Using refined coconut oil can reduce the coconut flavor if a more neutral taste is desired. Coconut oil melts at around 78°F and solidifies when cooled, so it can easily shift between liquid and solid forms depending on temperature. Coconut oil production involves pressing either fresh or dried coconut meat. Virgin coconut oil is made from fresh coconut meat, while refined coconut oil is extracted from dried coconut, known as copra. Refinement processes may include heat or chemical solvents to deodorize and filter the oil, producing a more neutral-tasting product with a higher smoke point suitable for moderate-heat cooking. Virgin coconut oil, which is less processed, retains a stronger coconut flavor and a lower smoke point, making it better suited for baking or light sautéing. Partially hydrogenated coconut oil should be avoided, as hydrogenation produces harmful trans fats. To preserve quality, coconut oil should be stored in a cool, dark place or in the refrigerator. Virgin coconut oil typically has a longer shelf life—up to three years if properly stored—while refined varieties last several months.

Beyond its culinary uses, coconut oil is also used in cosmetics and personal care for its moisturizing properties. It can be applied to the skin as an emollient or used sparingly on hair to help reduce dryness and frizz. The Philippines, India, and Indonesia are among the world's largest producers and consumers of coconut oil, reflecting its cultural and economic importance. Although coconut oil has appealing culinary versatility and sensory qualities, the scientific evidence does not support its widespread health claims. Used sparingly, it can be part of an enjoyable and balanced diet, but it should not replace healthier, unsaturated fat sources that are proven to support cardiovascular health.

Unsaturated Fats

Unsaturated fats are typically liquid at room temperature and are considered beneficial for heart and metabolic health. They are primarily found in plant-based oils (such as olive, canola, sunflower, and soybean oils), nuts, seeds, avocados, and fatty fish. Chemically, unsaturated fats contain one or more double bonds in their fatty acid chains, which influences their structure and how they function in the body.

There are two main types: **monounsaturated fats** and **polyunsaturated fats**. Monounsaturated fats, found in foods like olive oil and almonds, help reduce LDL cholesterol, increase HDL cholesterol and support insulin sensitivity. Polyunsaturated fats include omega-3 and omega-6 fatty acids, which play essential roles in brain function, inflammation regulation, and cell membrane integrity. Omega-3s are particularly helpful because they help to lower triglyceride levels; thereby reducing cardiovascular risk levels.

Overall, replacing saturated and trans fats with unsaturated fats can improve lipid profiles, support heart and brain health, and reduce inflammation, contributing to a lower risk of chronic diseases such as heart disease and type 2 diabetes.

Seed Oils and Polyunsaturated Fats

Seed oils—such as soybean, sunflower, safflower, and canola—are a major source of polyunsaturated fats, particularly omega-6 fatty acids (linoleic acid). These types of fats are essential for human health, playing key roles in cell membrane structure and inflammation regulation. Decades of randomized controlled trials and large-scale cohort studies support their role in lowering LDL cholesterol and reducing coronary heart disease risk when used in place of saturated fats.

Recently concerns have been raised about potential inflammatory effects of omega-6 fatty acids, but metabolic studies show that linoleic acid does not significantly increase pro-inflammatory markers. The human body regulates conversion of linoleic acid to arachidonic acid tightly, minimizing risk of excess inflammatory metabolite production. In fact, most evidence suggests an inverse relationship between linoleic acid consumption and markers of inflammation.
It's important to distinguish the role of seed oils in whole dietary patterns versus their presence in ultra-processed foods (UPFs). While much of the seed oil consumption in Western diets comes from UPFs, which are linked to negative health outcomes, the problem lies more with the broader nutrient-poor, hyper-palatable nature of these foods—especially refined starches and added sugars—than with the oils themselves. Seed oils used in home cooking, as salad dressings, or in reformulated convenience foods can offer a healthier fat alternative, particularly when replacing saturated or trans fats.

Roughly 20% of caloric intake in the U.S. comes from added fats, and many of these are consumed outside of UPFs—in sautés, dressings, table use, or added to breads and sides. This underscores the importance of ensuring these fats are health-promoting. Analyses of U.S. mortality data show that low intakes of unsaturated plant oils (especially high-PUFA oils) are among the top dietary risk factors, alongside high consumption of sugar-sweetened beverages and low cereal fiber intake.

Although olive and avocado oils are often preferred for culinary use, their production volumes are limited and not globally scalable. Therefore, using high-quality seed oils in processed foods can be a pragmatic strategy for improving population-level fat quality.
While the current ultra-processed food classification system draws attention to industrially formulated foods, it also has limitations—it fails to distinguish between refined and whole grains, doesn't fully address sugar or sodium content, and may classify fortified or beneficial additives as markers of poor quality. Additionally, some non-UPF artisanal products, such as white breads, are often low in nutritional value, while some UPFs (e.g., fortified cereals, whole grain breads, certain yogurts) may offer health benefits.

Thus, rather than vilifying seed oils categorically, the focus should be on the context in which they are consumed: their dietary matrix, the foods they are paired with, and what they are replacing. Replacing seed oils with animal fats or saturated plant fats (like coconut oil or palm oil) would likely worsen health outcomes. The emphasis should remain on improving the overall

quality of dietary fat—favoring unsaturated fats in place of saturated and trans fats—regardless of processing level.

Omega Three Fatty Acids

Omega 3 fatty acids are a type of polyunsaturated fat, most commonly found in fish but also present in seeds and nuts (chia, flax, walnuts, almonds, pecans, soybeans, brussels sprouts, kale, spirulina, etc.). The human body cannot produce these fatty acids so they must be consumed from dietary sources. There are three different types of omega-3 fatty acids; EPA (eicosapentaenoic acid) is a "marine omega-3" because it's found in fish; DHA (docosahexaenoic acid) is also a marine omega-3 found in fish; and ALA (alpha-linolenic acid) which is found in plants. EPA and DHA are readily absorbed whereas ALA needs to be converted to EPA or DHA to be used by the body. A person can therefore obtain more omega-3 fatty acids from fish-based dietary sources.

These fatty acids are renowned for their positive impacts on health because they alter the production of a group of biological compounds known as eicosanoids (prostaglandins, thromboxanes, and leukotrienes) which may result in a decreased risk for heart disease, inflammatory processes, and certain cancers.

Omega 3 oils are protective effects against coronary heart disease through several mechanisms including decreasing blood lipids (cholesterol, low density lipoproteins or LDL, and triglycerides); decreasing blood clotting factors in the vascular system; increasing relaxation in larger arteries and in blood vessels; and decreasing inflammatory processes in blood vessels.

Research studies have consistently shown that omega 3 fatty acids delay tumor appearance and decrease the growth, size, and number of tumors. Studies have also shown positive impacts of omega-3s for individuals with arthritis, psoriasis, ulcerative colitis, lupus erythematosus, and asthma.

Low-Fat Diets

A low-fat diet is an eating pattern that reduces the proportion of calories coming from fat, typically keeping it below 30% of total daily calories, which matches the recommendations for a healthy diet. A very low-fat diet is more restrictive, with only 10-15% of total daily calories coming from fat sources. This diet emphasizes foods that are naturally low in fat such as fruits, vegetables, whole grains, and lean proteins, while limiting full-fat dairy products, fried foods, fatty meats, and added oils.

This approach has long been promoted for improving heart health, managing weight, and lowering chronic disease risk. Studies have shown that reducing saturated fat and total fat intake can improve cholesterol levels and blood pressure, contributing to better cardiovascular health. Because fat provides more than twice the calories per gram as carbohydrates or protein, lowering fat intake can also help reduce overall calories, which may aid in weight management. In large-scale studies like the Women's Health Initiative, women who followed a low-fat diet rich in fruits, vegetables, and grains experienced modest improvements in diabetes progression, heart disease risk, and overall mortality after breast cancer.

However, not all fats are unhealthy, and extremely low-fat diets can carry risks. Healthy fats, such as those found in olive oil, avocados, nuts, seeds, and fish—support heart, brain, and hormonal function. Cutting fat too drastically can reduce the absorption of fat-soluble vitamins (A, D, E, and K) and negatively affect hormone balance and cell health. Historically, when people adopted "low-fat" diets, they often replaced fats with refined carbohydrates and added sugars, which undermined health benefits and sometimes worsened insulin resistance and weight gain. Very restrictive low-fat diets may also be difficult to sustain, leading to dietary boredom or nutritional deficiencies.

The most effective low-fat diets focus on quality rather than just quantity. This means limiting saturated and trans fats while including small amounts of unsaturated fats from plant and fish sources. Instead of removing fat and replacing it with processed or sugary foods, a better approach is to fill the diet with whole grains, vegetables, fruits, and lean proteins. Cooking methods such as baking, steaming, or grilling are preferred over frying, and portion control remains important. Health authorities generally recommend keeping fat intake between 20–35% of total daily calories, prioritizing unsaturated fats for optimal health.

In summary, a well-balanced low-fat diet can promote heart health, help manage weight, and lower chronic disease risk, but it is not inherently healthier if it leads to overconsumption of refined carbohydrates or excludes beneficial fats. The key is moderation—reducing unhealthy fats while maintaining a balanced intake of nutrient-rich foods that support long-term health and satisfaction.

Food-Based Fat Recommendations

The evidence supports a dietary pattern that limits saturated fats from animal sources and emphasizes plant-based unsaturated fats, including those from nuts, seeds, and minimally processed plant oils. In large cohort studies, consumption of plant oils (including seed oils) was associated with lower risks of cardiovascular disease, mortality, and even neurodegenerative conditions such as dementia.

Public health guidance remains clear: for improved cardiovascular and overall health, saturated fats should be minimized and replaced with high-quality plant-based oils rich in polyunsaturated fats. Seed oils, when used thoughtfully, are an important part of this strategy. Canned fish is a great economical option for healthy lean proteins with beneficial omega-3 properties. When choosing canned fish, aim for those that are packed in water rather than oil.

FISH

Fish, and other seafood, also offers lean, high-quality protein as well as many other important vitamins and minerals including vitamin E and omega-3 fatty acids. Modern science has provided evidence that suggests that fish consumption is an important part of a healthy diet because it can decrease the risk for coronary heart disease and certain cancers.

A study by the University of Washington confirmed that eating modest amounts (one salmon meal per week) can reduce the risk of primary cardiac arrest. The Zupthen Study, a twenty-year investigation of a Dutch population, confirmed similar benefits. The risk of coronary heart disease decreased (as much as 2.5 times) with increasing fish consumption. Other population studies confirmed heart protective findings and showed that fish-eating populations, other than the Eskimos, had less cardiovascular disease than did those who consumed meat-based diets. This suggests that modest amounts (one to two servings per week) of fish is of value in the prevention of coronary heart disease when compared with no fish intake.

The protective role of fish against heart disease and cancer may be attributed to the omega-3 fatty acid oils found in certain species of cold water fish, especially Alaska salmon. Other species include herring, mackerel, and sablefish and, to a lesser degree oysters, sardines, rainbow trout, and albacore tuna.

Salmon is also a good source of vitamin E, a powerful antioxidant. Antioxidants, which also include vitamin C and beta carotene, act at the molecular level to inactivate free radicals. Free radicals can damage basic genetic material, cell walls and structures to eventually lead to cancer and heart disease. Vitamin E lowers the risk of heart disease by preventing the oxidation of LDL cholesterols, thus reducing the buildup of plaque in coronary arteries. Other research has found that vitamin E plays a protective role against cancer and the formation of cataracts and may possibly boost the immune system in the elderly.

Fish and seafood should be part of a well-balanced diet which includes a wide variety of foods such as whole grains, beans, vegetables, fruits, nuts, vegetable oils, and low-fat dairy products.

There are some limitations and considerations when it comes to fish consumption. Certain fish can contain environmental contaminants such as mercury, polychlorinated biphenyls (PCBs), or dioxins, which can accumulate in the body over time. Large predatory species—such as shark, swordfish, king mackerel, and tilefish—tend to have higher mercury levels and should be limited, especially for pregnant individuals, nursing mothers, and young children. Opting for low-mercury options like salmon, sardines, anchovies, trout, and pollock is generally safer.

LEAST MERCURY

- Anchovies
- Butterfish
- Catfish
- Clam
- Crab (Domestic)
- Crawfish/Crayfish
- Croaker (Atlantic)
- Flounder*
- Haddock (Atlantic)*
- Hake
- Herring
- Mackerel (N. Atlantic, Chub)
- Mullet
- Oyster
- Perch (Ocean)
- Plaice
- Pollock
- Salmon (Canned)**
- Salmon (Fresh)**
- Sardine
- Scallop*
- Shad (American)
- Shrimp*
- Sole (Pacific)
- Squid (Calamari)
- Tilapia
- Trout (Freshwater)
- Whitefish
- Whiting

MODERATE MERCURY

EAT SIX SERVINGS OR LESS PER MONTH:

- Bass (Striped, Black)
- Carp
- Cod (Alaskan)
- Croaker (White Pacific)
- Halibut (Atlantic)*
- Halibut (Pacific)
- Jacksmelt (Silverside)
- Lobster
- Mahi Mahi
- Monkfish*
- Perch (Freshwater)
- Sablefish
- Skate*
- Snapper*
- Tuna (Canned chunk light)
- Tuna (Skipjack)*
- Weakfish (Sea Trout)

HIGH MERCURY

EAT THREE SERVINGS OR LESS PER MONTH:

- Bluefish
- Grouper*
- Mackerel (Spanish, Gulf)
- Sea Bass (Chilean)*
- Tuna (Canned Albacore)
- Tuna (Yellowfin)*

HIGHEST MERCURY

AVOID EATING:

- Mackerel (King)
- Marlin*
- Orange Roughy*
- Shark*
- Swordfish*
- Tilefish*
- Tuna (Bigeye, Ahi)*

***Fish in Trouble!** These fish are perilously low in numbers or are caught using environmentally destructive methods.

****Farmed salmon** may contain PCB's, chemicals with serious long-term health effects.

Information in this guide is based on averages from the FDA's test results for mercury in fish and the EPA's determination of safe levels of mercury for women of reproductive age. Some individual fish have mercury concentrations significantly higher than the average. For more details, see: www.nrdc.org/mercury.

Source: https://www.nrdc.org/sites/default/files/walletcard.pdf

AVOCADO

Avocados, often referred to as "alligator pears" for their bumpy skin and pear-like shape, are beloved around the world for their creamy texture and subtle, nutty flavor. Though they are most famously known as the main ingredient in guacamole, avocados are a versatile fruit used in a variety of dishes, from salads and sandwiches to smoothies and baked goods. Botanically, avocados are classified as a fruit—a large berry with a single pit—grown from the Persea Americana tree. They are thought to have originated in Mexico or Central America, and today, Mexico remains the leading global producer. Their culinary adaptability and rich nutrient profile have made avocados a staple across numerous cuisines and dietary patterns.

Nutritionally, avocados stand out for their unique composition. Unlike most fruits, they are rich in fat rather than carbohydrates, with approximately two-thirds of their fat content coming from monounsaturated fats—the same heart-healthy fats found in olive oil. They are also an excellent source of fiber, providing both soluble and insoluble types that support digestive health and help maintain satiety. In addition, avocados supply several essential nutrients, including vitamins C, E, K, B6, and folate, as well as potassium and magnesium. A medium avocado contains about 240 calories, 22 grams of fat, 10 grams of fiber, and no cholesterol, making it an energy-dense yet nutrient-rich food that can fit into many health-conscious diets.

The health benefits of avocados are largely attributed to their combination of healthy fats, fiber, potassium, and plant-based compounds such as carotenoids and phytosterols. These nutrients have been linked to a reduced risk of chronic diseases when consumed as part of a balanced diet. For cardiovascular health, avocados may support lower LDL cholesterol levels and higher HDL cholesterol levels when used to replace saturated fats like butter or processed meats. The primary fat in avocados, oleic acid, is known for its beneficial effects on heart health and inflammation. Furthermore, avocados contain plant sterols that may help block the absorption of dietary cholesterol in the intestines. Their high potassium content also supports heart function and helps regulate blood pressure by balancing sodium levels and maintaining healthy fluid balance.

Long-term population studies have shown promising associations between avocado consumption and cardiovascular health. Adults who ate two or more servings of avocado per week were found to have a significantly lower risk of heart disease compared with those who rarely consumed them. The benefits were particularly strong when avocados replaced foods rich in saturated fat, such as butter, cheese, or processed meats. However, replacing other plant-based fats like olive oil or nuts with avocados produced similar results, suggesting that they are one of many heart-healthy fat options that can contribute to overall cardiovascular well-being.

Avocados also have a favorable nutrient profile for blood sugar control and diabetes prevention. They have a low glycemic index of about 40, meaning they have minimal impact on blood glucose levels. Their combination of fiber and monounsaturated fats helps improve insulin sensitivity and promotes steady energy levels, making them a beneficial food for people with or at risk for type 2 diabetes. Additionally, their carotenoid content supports eye health. Lutein and zeaxanthin, two carotenoids found in avocados, are concentrated in the retina of the eye, where they protect against ultraviolet damage and reduce the risk of macular degeneration and cataracts.

Another emerging area of research focuses on avocados and gut health. The fiber in avocados serves as a prebiotic, providing nourishment for beneficial gut bacteria. This promotes microbial diversity in the colon and the production of short-chain fatty acids, compounds known for their role in reducing inflammation and supporting metabolic health. These interactions underscore how avocados can influence well-being beyond their vitamin and mineral content.

When it comes to purchasing and preparing avocados, ripeness is key. The most common variety, the Hass avocado, is available year-round and typically has dark green or nearly black pebbled skin. A ripe avocado yields slightly to gentle pressure, while unripe ones are firm and may take several days to soften at room temperature. Overripe avocados may feel mushy or show dark spots. To speed up ripening, place an avocado in a paper bag with a banana—the ethylene gas produced by the banana will accelerate the process. Once cut, the flesh oxidizes and turns brown quickly, a harmless but unappealing process known as enzymatic browning. Brushing the exposed flesh with lemon or lime juice, wrapping it tightly, or storing it in an airtight container with onion slices can help slow discoloration.

Avocado oil, extracted from the fruit's flesh, is another nutritious option for cooking. It has a neutral flavor, a very high smoke point of nearly 500°F, and a fatty acid composition similar to olive oil, making it suitable for sautéing, roasting, or as a base for salad dressings. In baking, mashed avocado can be substituted for butter or oil in a one-to-one ratio, offering a heart-healthy alternative that adds richness without excess saturated fat.

Avocados can be enjoyed in countless ways. They can be diced into salads, mashed on whole-grain toast, blended into smoothies, sliced into sushi rolls, or eaten simply with a squeeze of lemon or lime. Their creamy texture enhances soups and sauces, and their mild flavor pairs well with both savory and sweet dishes. Beyond the kitchen, avocados are also used in skincare, as the oil provides moisture and nourishment for dry skin and hair. Interestingly, half an avocado provides more potassium than a medium banana, emphasizing its nutritional potency.

Overall, avocados are a nutrient-dense, versatile food that supports heart health, eye health, blood sugar control, and digestive function. Whether enjoyed fresh, blended, or as an oil, they fit easily into various dietary patterns, including Mediterranean, plant-based, and diabetes-friendly eating plans. Their balanced profile of healthy fats, fiber, vitamins, and minerals makes them a valuable addition to a wholesome, sustainable diet.

Olive Oil

For thousands of years, olive oil has been a common ingredient among Mediterranean diets. It is this diet that nutritionists and medical researchers consider a role model for healthy eating. Central to any comparison of Mediterranean and American diets, is of course, the issue of fat. The majority of fat consumed in the United States is saturated fat (meat and dairy products) whereas in the Mediterranean it is monounsaturated (olives and nuts). The protective effects of the Mediterranean diet for heart disease and other chronic diseases are related to a combination of dietary factors such as their intake of monounsaturated fats, low consumption of saturated fats, and the wide variety of fruits, vegetables, grains, and legumes they consume at the center of their plates.

Monounsaturated fats work in the body to reduce total serum cholesterol levels by reducing low density lipoproteins (LDLs) and possibly increasing high density lipoproteins (HDLs). Polyunsaturated fats, on the other hand, reduce total blood cholesterol levels as well the good cholesterol known as HDLs. Saturated fats, which are considered the most dangerous for promoting heart disease, increase cholesterol levels as well as the bad cholesterol, LDLs. It is important to consider that monounsaturated oils, such as olive oil, can be beneficial in the diet as long as it is *not* added to existing fats but *replaces* them.

There are sixty varieties of olives and olive oil. Olives can portray a wide variety of flavor characteristics such as mild, fruity, nutty, zesty, peppery, sweet, rich, subtle, and delicate. It can be opaque or clear, deep olive green, pale green, or even golden in color. The characteristics of olive oil will vary depending on the soil, climate, olive type, and processing methods. Spain is the largest producer of olive oil in the world, followed closely by Italy. Greece is the third largest producer.

Olive Oil Key Terms

Cold Pressed Olive Oil: A descriptive term used for olive oil made from olives that have been crushed with a traditional millstone, or with stainless steel grindstones. No heat or chemicals are added during the process that produces a heavy olive paste. The paste is then spread over thick, round straw or plastic mats that are placed in a press. This press extracts the liquid from the paste - a combination of oil and water. The oil is separated from the water either by decanting or by centrifuge, and then filtered to remove any large particles.

Extra Virgin Olive Oil: The finest oil considered to have perfect taste and aroma. his oil has the lowest acidity, 1% or less. Because of its purity, distinct taste, and limited production, extra virgin olive oil is the most expensive olive oil.

Virgin Olive Oil: This is produced without heat or additives, just like the Extra virgin olive oil. It has excellent taste and aroma but may portray a higher acidity level than Extra virgin, anywhere up to 2%. Virgin olive oil is rarely available in the US.

Olive Oil: This is a widely marketed grade of olive oil. It was also referred to as Pure olive oil or 100% Pure olive oil. Olive oil is less than a quarter of the price of Extra Virgin and has an acidity level less than 1.5%. Olive oil is actually a blend of refined olive oil and Virgin olive oil. When Virgin olive oil is flawed in flavor or high in acidity, it is not discarded, but rather refined by a heating process to remove its color, flavor, aroma, and oxidized elements. To restore some of the character and replace some elements such as vitamin E, it is blended with Virgin Olive Oil. The amount of Virgin olive oil in a blended oil varies from five to twenty-five percent, depending on the flavor desired by the producer. The new "lite" olive oils are lighter in flavor and texture, but identical in calories and fat composition to Virgin Olive Oil.

Extra virgin, Virgin, and Olive oils are offered in a vast range of prices and allow the food professional to choose the oils best suited to his or her needs.

Smoke Points of Cooking Fats

The smoke point generally refers to the temperature at which a cooking fat or oil begins to break down to glycerol and free fatty acids.

The smoke point of a fat or an oil greatly determines its appropriate use. For example, the higher the smoke point, the better suited it is for frying because it can withstand higher heat ranges.

The smoke point of a specific oil dictates the maximum temperature, and therefore, how a particular fat may be used. For instance, stir-frying is a very high temperature process requiring fat/oil with a high smoke point. Oils with a low smoke point (those under 350° Fahrenheit/177° Celsius) are generally not heated.

The flash point, the point at which combustion or fire occurs, is considerably higher than the smoke point and should be avoided at all cost.

High heat causes molecules in oils to break apart, burn, become bitter, lose nutrients, and release smoke. Most oils have a "smoke point" between 400° and 500°.

Sturdy oils good for sautéing, stir-frying, or roasting foods include avocado, canola, corn, grapeseed, regular or light olive oil (not virgin or extra-virgin), peanut, rice bran, safflower, soybean, and sunflower oils.

Oils that have a low smoke point can lose flavor and structure quickly at high heat, so they're better for. drizzling on food or using in a salad dressing. These include flaxseed oil, extra-virgin or virgin olive oil, certain nut oils (almond, hazelnut, macadamia, pistachio, or walnut), and sesame oil.

Refining oils, takes out impurities, volatile oils, and often a lot of the flavor)increases their smoke point.

Complete Guide to Cooking Oils & Smoke Points

Oils & Fats	Fahrenheit	Celsius	Neutral Flavor?
Avocado Oil	520°F	271°C	Yes
Rice Bran Oil	490°F	260°C	Yes
Mustard Oil	490°F	260°C	No
Grapeseed Oil	485°F	252°C	Yes
Tea Seed Oil	485°F	252°C	No
Olive Oil, Extra Light	465°F	240°C	Yes
Safflower Oil	450°F	232°C	Yes
Peanut Oil	450°F	232°C	Yes
Soybean Oil	450°F	232°C	Yes
Corn Oil	450°F	232°C	Yes
Ghee, Clarified Butter	450°F	232°C	No
Sunflower Oil, Refined	450°F	232°C	Yes
Palm & Palm Kernel Oil	450°F	232°C	Yes
Hazelnut Oil	430°F	220°C	No
Olive Oil, Refined	428°F	220°C	No
Almond Oil, Refined	420°F	215°C	No
Cottonseed Oil	420°F	216°C	Yes
Sesame Oil, Refined	410°F	210°C	No
Macadamia Oil	410°F	210°C	Yes
Canola Oil	400°F	205°C	Yes
Walnut Oil	400°F	205°C	No
Beef Tallow	400°F	205°C	No
Chicken Fat, Schmaltz	375°F	190°C	No
Duck Fat	375°F	190°C	No
Lard	370°F	195°C	No
Vegetable Shortening, Crisco	360°F	180°C	Yes
Butter, Salted	350°F	176°C	No
Butter, Unsalted	350°F	176°C	No
Coconut Oil	350°F	176°C	No
Sesame Oil, Unrefined	350°F	175°C	No
Olive Oil, Extra Virgin	331°F	166°C	No
Hemp Oil	330°F	165°C	No
Olive Oil, Virgin	320°F	160°C	No
Margarine, Soft	320°F	160°C	No
Margarine, Hard	300°F	150°C	No
Flaxseed Oil	225°F	107°C	No

Source: Anova Culinary https://anovaculinary.com/blogs/blog/the-anova-overview-to-cooking-oils-smoke-points

Nuts

Looking for more inspiration from healthy traditional plant based diets such as in the Mediterranean, Latin America, and Asia? More recently, nuts have tended to be principally characterized as a high fat food and grouped with other high fat food items to avoid or be eaten in small amounts.

Today, the lessons that are emerging from these traditional cuisines suggest that nutrients found in nuts may be protective against certain cancers and heart disease. Although nuts are high in fat, it is important to realize that not all fats exert the same health effect. Therefore, nuts, which are cholesterol free are composed of primarily monounsaturated fat. Nuts do not have the same cholesterol raising properties as animal fats that are primarily composed of saturated fats. Nuts also have completely different micronutrient profiles when compared to other fatty animal products. For example, nuts contain fiber. They are also a good source of magnesium and arginine, both of these nutrients have protective roles against heart disease.

Nuts also contain antioxidant properties and other beneficial functions from vitamins such as vitamin E and various plant chemicals. A moderate approach of healthy eating recommends that nuts, like olive oil, be used to replace saturated fats in the diet when possible.

Nuts can be used in many ways that will add new dimensions to their dishes. Nuts, used in inventive as well as in traditional manners add texture, flavor and can lend a rich touch to lean dishes. Indian and Southeast Asian cooks incorporate nuts, often cashews and almonds, into grain based dishes, stews, and in raw vegetable salads called sambals. Traditional Chinese cuisines also use nuts extensively in dishes such as Sichuan hot and spicy stir-fried chicken with almonds, cashews, and walnuts. Japan, too, is a large consumer of nuts, including almonds and walnuts. In Spain, dishes which require preparations with a mortar, pound bread, almonds, and garlic to be used in sauces or as a base in Ajo Blanco (chilled soup).

Nuts are also a key ingredient throughout the Mediterranean. In Spain they are used to thicken sauces and as an accompaniment to cheese. In Turkey they are made into soups, sauces and desserts. In Italy, there are numerous variations of biscotti studded with almonds or hazelnuts. In Morocco, nuts are mixed with couscous. And, in France they are incorporated into salads, pastries, nougats, and pastes.

Nutritional Components of Nuts

- Fiber
- Magnesium
- Selenium
- Potassium
- Riboflavin
- Phytochemicals: Ellagic Acid, Flavonoids, Luteolin, Phenolic Compounds
- Vitamin E
- Zinc
- Copper
- Biotin
- Niacin
- Monounsaturated oil and Polyunsaturated oil

Source: *Tree Nuts, Health and the Mediterranean Diet*. A summary report from the Oldways Preservation and Exchange Trust Conference

Tree Nut Allergies

Tree nut allergies are immune-mediated hypersensitivity reactions to proteins found in nuts. The allergic response is primarily driven by an IgE-mediated mechanism (upon initial exposure, antigen-presenting cells process nut proteins and stimulate Th2 lymphocytes, which in turn promote B cells to produce allergen-specific IgE antibodies. These IgE molecules bind to high-affinity receptors on mast cells and basophils, sensitizing them.) Whereby additional exposures lead to faster and potentially more intense triggering of reactions produced by histamine, leukotrienes and other mediators. Depending on which mediators are released will determine the type of reaction the person has. Tree nut allergy responses can range from itching and hives or severe anaphylaxis. Some of the storage proteins found in tree nuts are highly stable to heat and digestion, which leads to both persistence in triggering responses as well as the degree of allergenicity. It is unlikely for someone to outgrow a tree nut allergy.

A person that is allergic to one type of nut may safely be able to eat other types of nuts. There are some common cross-reactive nuts due to similar botanical makeup of their protein structures such as walnuts and pecans, cashews and pistachios, and almonds and hazelnuts. Cross-reactivity between tree nuts and other seeds or legumes can also occur due to structural homology among these proteins such as almonds and pistachios with mangos. A common substitute for peanuts and tree nuts is sunflower seeds. However, sunflower seeds have similar lipoproteins to tree nuts. Sunflower seeds are not a common allergen but if a person is allergic to sunflower seeds they may also have an allergic response to some tree nuts. It is important to note that peanuts and coconuts are botanically not tree nuts, and their protein structures are not the same. However, 20-30% of people with a peanut allergy also have a tree-nut allergy.

SEEDS

Seeds (sesame, poppy, chia, hemp, flax, pumpkin or pepitas, pine nuts or pignoli) are nutrient-dense foods that serve as concentrated sources of macronutrients, micronutrients, and bioactive compounds essential for human health. They are rich in healthy unsaturated fats—particularly omega-3 and omega-6 fatty acids—which support cardiovascular and neurological function.

Seeds such as chia and hemp are complete proteins while others like pumpkin and sunflower seeds are notable for minerals such as magnesium, zinc, and iron. The complex carbohydrates and dietary fiber in seeds promote glycemic control, satiety, and gut health through modulation of the microbiome.

Seeds also contain phytochemicals, including polyphenols, lignans, and phytosterols, which exhibit antioxidant and anti-inflammatory properties that may reduce the risk of chronic diseases such as atherosclerosis, diabetes, and certain cancers. However, similar to nuts, their dense caloric content warrants mindful consumption. In some individuals, seed proteins can trigger allergic responses with sesame seeds being the 9th most common food allergy found in the United States. Overall, regular inclusion of seeds in the diet contributes to improved cardiometabolic health, nutrient adequacy, and long-term disease prevention.

- **Flaxseeds** – rich in alpha-linolenic acid (ALA), a plant-based omega-3 fatty acid, and lignans with antioxidant properties.

- **Chia seeds** – high in fiber, omega-3 fatty acids, calcium, and magnesium; they form a gel when hydrated, aiding digestion.
- **Hemp seeds** – an excellent source of complete plant protein, omega-3 and omega-6 fats, and vitamin E.
- **Pumpkin seeds (pepitas)** – provide zinc, magnesium, and iron, supporting immune and metabolic health.
- **Sunflower seeds** – high in vitamin E, selenium, and healthy fats; beneficial for skin and cardiovascular health.
- **Sesame seeds** – rich in lignans (sesamin, sesamolin) and calcium; commonly used in tahini and as a culinary garnish.
- **Poppy seeds** – source of calcium, phosphorus, and polyunsaturated fats, often used in baking.

Economical Ways to Source Herbs and Spices

There are several strategies for sourcing herbs and spices economically. Buying from bulk bins or ethnic grocery stores can significantly reduce costs compared to purchasing small supermarket jars. Whole spices such as cumin seeds or cinnamon sticks often last longer than pre-ground versions and can be ground as needed to retain freshness and potency. Proper storage—in airtight containers, away from light and heat—also helps extend shelf life and maintain quality.

Growing fresh herbs at home is another affordable and sustainable option. A few pots of basil, parsley, or thyme on a windowsill can provide a steady supply of fresh flavor. For those who prefer dried varieties, purchasing small amounts of frequently used herbs and spices prevents waste and ensures consistent freshness. Making homemade spice blends can also stretch the budget and eliminate the need for costly pre-mixed seasonings.

Vegetables

Proper selection, purchasing, handling and preparation of vegetables will enhance the flavor, presentation, and nutritional value of vegetables.

Flavors

As vegetables cook, flavor loos begins to occur. Additionally, cooking changes the flavor of each vegetable. Cooked vegetables do not taste like raw vegetables because cooking causes chemical changes.

To avoid excessive loss of flavor:

- Cook short time as possible.
- Use boiling salted water. Starting vegetables in boiling water shortens cooking time while salt reduces flavor loss and seasons the vegetable.
- Steam vegetables whenever appropriate. This reduces leaching out of flavors and shortens cooking time.

Color and Pigments

Pigments are compounds give vegetables color. Different pigments can signify various nutritional aspects of the vegetables.

Different pigments react differently to heat, acids and other elements present during cooking.

White vegetables- Have white pigments called *flavones*, primary coloring compounds in potatoes, onions, cauliflower, and white cabbage, and parts of celery, cucumbers, zucchini

White pigments stay white in acid and turn yellow in alkaline water. Too keep vegetables such as cauliflower white, add lemon juice or cream of tartar to cooking water- be careful, too much cause toughness. Cook short time, holding too long will turn grey or yellow

Red Vegetables- Have red pigments called *anthocyanins*, found only in few- mainly red cabbage and beets, blueberries.

Red vegetables react strongly to acid and alkalis. Acid turn them brighter red, alkalis turn them blue or blue-green. Red beets and Cabbage best color when cooked with acid. Apples and/or vinegar. Add small amount first because toughens. Add rest later when vegetables are tender.

Red pigments dissolve easily in water. To prevent color loss:

- Use short cooking time
- Use only necessary amount of water
- Cook beets whole and unpeeled to protect color

Green Vegetables- Green pigment, or chlorophyll is present in all green plants.

Acids and long cooking times are enemies of green vegetables.

To avoid excessive color changes:

- Cook uncovered to allow plant acids to escape
- Cook for the shortest possible time
- Cook in small batches- Do not hold in a steam table for long periods of time

Steaming is a preferred method for cooking green vegetables. Steam cooks vegetables rapidly and lessens vitamin and flavor loss, but be careful not to overcook.

Yellow/Orange Vegetables- Have pigments are called carotenoids. Carrots, corn, winter squash, rutabaga, sweet potatoes, tomatoes, and red peppers all have this pigment. Carotenoids are very stable, meaning they're affected very little by acids and alkalis. Long cook times can dull color, short cook time preserves vitamins and flavors.

Pairing Vegetables

When cooking ingredients together, do you ever ask yourself "Why am I doing it this way and what is the overall function of this dish"?

When vegetables and other ingredients are paired together and cooked in certain ways, they can support one another for better digestion, absorption, and even healing.

The way a vegetable is prepared can affect the nutrient content. Some nutrients can be destroyed by heat and some dissolve in water. The culinary techniques described in this lesson are based on culinary principles designed to keep the nutrients in vegetables.

Some examples include:

- Slow simmering tomatoes in olive oil to increase lycopene availability.
- Pairing spinach with lemon to improve iron absorption.
- Blanching broccoli before stir-frying to preserve color and antioxidants.

In Traditional Chinese Medicine (TCM) and Ayurveda the synergy between foods has always been a cornerstone of the way dishes are prepared. The kitchen has been an underrated space for healing in modern society and, for too long, we have separated medicinal herbal medicine from our food. Flowers, leaves and barks, or what we call "Herbs and Spices", in all their forms, add intrigue and depth, but they can also benefit our bodies in myriad ways. Some of the most widely used herbs and spices in the culinary world are added for visual appeal, preservation, aroma and flavor. But they are staples of the Herbal Medicine world as well, and are not only quite delicious, but are also nutritious, immune-boosting, gut healthy and spiritually uplifting. They were also the only source of medicine available to keep populations healthy and thriving.

It is no coincidence that spices are cooked in Ghee in so many beloved Indian dishes, or that dark leafy greens are dressed with lemon juice in Greece. Some other examples include:

- **Curcumin + Piperine:** Turmeric's anti-inflammatory compound, curcumin, is poorly absorbed on its own. Piperine from black pepper increases its bioavailability by up to 2,000% (Shoba et al., 1998).
- **Iron + Vitamin C:** Non-heme iron from plants (e.g., lentils, spinach) is better absorbed when paired with vitamin C-rich foods like citrus, bell peppers, or strawberries (Zimmermann and Hurrell, 2007).
- **Fat-Soluble Vitamins + Healthy Fats:** Vitamins A, D, E, and K need fat to be absorbed. That's why drizzling olive oil over roasted carrots or eating guacamole with leafy greens isn't just tasty—it's smart nutrition (Zhou et al., 2015).
- **Prebiotics + Probiotics:** Prebiotics like garlic, oats, or bananas feed beneficial gut bacteria. When paired with probiotic-rich foods (like yogurt or miso), they help create a more balanced microbiome (Liska et al., 2019).

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Purchasing Forms of Vegetables

Form	Advantages	Disadvantages
Fresh vegetables	• Tastes good • Good texture • Product acceptability	• Limited shelf life • Quality varies • Requires preparation
Frozen vegetables can be cooked by most of the methods used for fresh vegetables.	• Year-round availability • Less waste • Less labor • Practical for some types of vegetables	• Loss of texture due to freezing • Quality variance between producers • Flavor loss
Canned vegetables When using canned vegetables, reheat them in the liquid from the can, adjust seasonings.	• Shelf life • Practical for some vegetables	• Poor color (green vegetables) • Mushy • Poor flavor (taste canned)
Dry vegetables must be reconstituted in a liquid.	• Shelf life • Convenient	• Takes time to reconstitute

Processed Vegetables

In general it is agreed that frozen or canned vegetables can never equal the quality of a fresh product. But, because of the high perish ability of fresh produce, the amount of labor required to handle fresh produce, seasonal availability, and price, many people rely on processed vegetables

Frozen Vegetables

Frozen vegetables have been partially cooked, so less time is needed for cooking them than fresh produce. Most frozen vegetables need no thawing. They can go directly into steamer pans or boiling salted water. Exceptions are corn on the cob and vegetables frozen into a solid block such as spinach- they need to be thawed first.

Most frozen vegetables are slightly salted during processing, so add less salt as you would to fresh products.

When checking for quality:

1. Separated, individual pieces: Check that the vegetables have not begun to thaw during shipment.
2. Large ice crystals: A little frost is normal, but large ice crystals means poor handling.
3. Signs of leakage: Another sign of thawing.

4. Freezer burn: Open the package and check the vegetables. Is the color bright and natural or is there yellowing and drying?

Canned Vegetables

To prepare canned vegetables:

1. Wipe the top of the can clean.
2. Drain vegetables or reserve some of the liquid to reheat the vegetables.
3. Heat the reserved liquid before adding vegetables, this shortens cooking time. Season the liquid while it is coming to a boil to give the flavors of herbs and spices time to blend.
4. Add vegetables and heat to serving temperature. Do not boil for a long time. The vegetable is already fully cooked.
5. Heat as close to serving time as possible.
6. Season and flavor.

When handling canned vegetables:

1. Do not purchase damaged cans. Puffed or swollen cans indicate spoilage. Large dents may mean the can's protective lining has been damaged.
2. Know the drained weight to calculate the number of servings the can contains.

Cooking Vegetables

Blanching

Blanching means dipping a food into boiling water for a very short time, only a minute or two. This method briefly and partially cooks a food. Blanching is used to:

- Prepare vegetables for further cooking (example broccoli)
- Remove strong or bitter flavors (example kale)
- Soften firm foods (example carrots)
- Set colors of vegetables (example snow peas)
- Loosen skins for peeling (for example ripe tomatoes)

Quick steps for Blanching

1. Bring a large pot of water to a boil. Season with salt.
2. Immerse vegetables in boiling water for 30 seconds to 1 minute, depending on ripeness or firmness desired.
3. Remove the vegetables from the boiling water.
4. Immediately immerse in ice water to chill.
5. Once chilled, spread the vegetables out on a tray to dry.

Steaming

Nearly all vegetables can be cooked by steaming and this method is frequently used because it is easy and economical. This basic cooking method often requires additional steps to make the product ready to serve. This may include adding sauces, seasonings, and flavorings. Steaming is especially good for vegetables that easily become broken or mushy when simmered.

Quick steps for Steaming

1. Place the fresh or frozen vegetable in a perforated colander or pan with enough room to allow room for the steam to circulate round the vegetables. Place the pan over a pot or pan that contains rapidly simmering water. The water should not touch the vegetables.
2. Cover tightly with a lid or foil. Cook until tender-crisp.
3. Season with salt, herbs, and spices.
4. Serve the hot vegetables at once.

Roasting/Baking

Roasting vegetables in the oven gives them a caramelized exterior and flavor while keeping the inside moist and tender.

Quick steps for roasting and baking

1. Preheat the oven to 375-425 °F. The smaller the vegetable, the higher the temperature.
2. Cut vegetables into uniform shape and size.
3. Toss vegetables with oil. Season with salt, pepper, garlic, spices, or herbs.
4. Place vegetables in a single layer on a parchment lined sheet pan. Do not crowd the vegetables as this will cause them to steam.
5. Bake until vegetables are tender and slightly golden brown.

Quick Pickles

Quick pickles, also known as refrigerator pickles, are simply vegetables or fruits that are pickled in a vinegar, water, salt, and sugar solution and stored in the refrigerator. Quick pickles don't develop the deep flavor that fermented pickles do, but they also only require a few hours in the brine before they can be enjoyed. Quick pickles are a lower-sodium version to a traditional pickle. They offer a sweet-sour, flavor-packed addition to a sandwich or salad bar. Almost any vegetable can be quick pickled.

Basic Quick Pickle Brine Recipe

1 quart of brine will pickle about 2 pounds of vegetables.

Ingredients	Amounts	Directions
Vinegar Rice wine vinegar, red or white wine vinegar, apple cider vinegar	2 cups	1. Bring vinegar, water, sugar, salt, and seasonings to a boil in a medium pot over high heat, stirring occasionally. Reduce heat to medium-low and simmer 10 minutes. 2. Place vegetable in a heatproof container or jar. Pour hot brining liquid over vegetable. 3. Cover and chill at least 2 hours before serving.
Water	2 cups	
Sugar	2 tablespoons	
Salt, kosher	1 tablespoon	
Seasonings	1 tablespoon fresh herbs and whole spices 1 tsp dried herbs and ground spices	

Flavoring Quick Pickles

Fresh herbs	dill, thyme, oregano, and rosemary
Dried herbs	thyme, dill, rosemary, oregano, or marjoram
Garlic cloves	smashed for mild garlic flavor, or sliced for stronger garlic flavor
Fresh ginger	peeled and thinly sliced
Whole spices	mustard seed, coriander, peppercorns, red pepper flakes
Ground spices	turmeric or smoked paprika are great for both color and flavor

Try these vegetables for pickling:

Asparagus
Beets
Brussels sprouts
Carrots
Corn
Cucumbers
Eggplant
Green beans
Onions
Peppers
Snap peas
Summer squash
Turnips
Zucchini
Mushrooms

NUTRIENTS AND COOKING

- Most vegetables are naturally low in fat and calories. None have cholesterol. (Sauces or seasonings may add fat, calories, or cholesterol.)
- Vegetables are important sources of many nutrients, including potassium, dietary fiber, folate (folic acid), vitamin A, vitamin E, and vitamin C.
- Diets rich in potassium may help to maintain healthy blood pressure. Vegetable sources of potassium include sweet potatoes, white potatoes, white beans, tomato products (paste, sauce, and juice), beet greens, soybeans, lima beans, winter squash, spinach, lentils, kidney beans, and split peas.
- Dietary fiber from vegetables, as part of an overall healthy diet, helps reduce blood cholesterol levels and may lower risk of heart disease. Fiber-containing foods such as vegetables help provide a feeling of fullness with fewer calories.

Factors responsible for most nutrient losses:

- High temperature
- Long Cooking
- Leaching (dissolving out)
- Alkalis, (baking soda or hard water)
- Plant enzymes
- Oxygen

With a few exceptions, do not soak vegetables for long periods because flavor and nutrients can be lost.

Exceptions include:

- Cabbage, broccoli, brussels sprouts, and cauliflower may be soaked cold water for 30 minutes to remove insects.
- Limp vegetables can be soaked briefly to restore crispness.
- Dried legumes that need to be softened.

Cooking Tips

- Cook close to service. Holding vegetables hot continues to cook them.
- If vegetable are cooked in advance, slightly undercook, cool rapidly, drain, refrigerate, reheat when needed.
- For uniform doneness, cut vegetables into uniform pieces.
- Vegetables with both tender and tough parts need special treatment- peel stalks of asparagus, split broccoli stalks, pierce base of brussels sprouts.
- Don’t mix when cooking because many cook at different rates. Cut only when ready to use.

- Cook small batches at a time to prevent overcooking.

Green vegetables:

- Use plenty of water, vegetables should be covered by water. Exception to the rule: tender spinach can be cooked using very little water in a covered pot.
- Do not cover during cooking.
- Acids, such as vinegar or citrus juice, destroys color.

White vegetables:

- Acid intensifies the color of white vegetables.
- Alkaline (baking soda) makes white vegetables turn yellow.

Red/ orange vegetables:

- Do not peel beets before cooking.
- Acid intensifies the red color.
- Beets can also be baked in their skins, then peeled.
- Acid will brighten the color of carrots slightly.
- Most orange vegetables are good for glazing.

VITAMINS AND THE COOKING PROCESS

Water Soluble

Vitamin	Food Source	Losses in Food Preparation
Vitamin C	Citrus fruit, tomatoes, strawberries, peppers, broccoli and green	The least stable of all vitamins
Thiamin (B1)	Pork, organ meats, whole grains, enriched grains and cereals	Destroyed by heat and air
Riboflavin (B2)	Milk, liver, eggs, cereal/grains, dark leafy greens	Unstable in light or alkali
Vitamin B6	Whole grains, vegetables, meat and fish	Water soluble
Niacin	Lean meats, whole grains, eggs and legumes	Water soluble

Fat Soluble

Vitamin	Food Source	Losses in Food Preparation
Vitamin A	Dark leafy greens, yellow-vegetables, cantaloupe, milk, and eggs	Cooking losses are minimal. Slowly destroyed by air and light.
Vitamin D	Fortified milk, salmon, tuna sardines	Generally stable
Vitamin E	Vegetable oils, whole-grains, cereals, leafy vegetables, nuts and beans	Generally stable
Vitamin K	Leafy vegetables, vegetables oils, wheat bran	Sensitive to acids and light

Minerals and the Cooking Process

Minerals are generally stable in cooking; loss results only from trimming and fabrication.

Mineral	Function	Food Source
Calcium	Bone and tooth formation, nerve transmission	Milk, dairy, dark green vegetables, sardines and legumes
Potassium	Fluid balance, nerve function	Meats, fish, vegetables and legumes
Iron	Component of hemoglobin Involved in energy metabolism	Liver, meats, eggs, legumes, dark green vegetables and whole grain
Iodine	Constituent of thyroid hormones	Iodized salt, marine fish and shell fish
Fluorine	Important in bone and tooth structure	Drinking water, tea, coffee, and rice
Zinc	Constituent of enzymes involved in digestion	Milk, liver, shell fish, and wheat

THE MEDITERRANEAN DIET

Geography

The lands that ring the Mediterranean Sea receive a fraction of the rainfall of say, Northern Europe, and support only limited agriculture. The presence of the sea, the absence of rainfall and the often searing temperatures of this Southern climate shaped the region's food supply. Examples include:

- Limited amount of meat and dairy products
- Dairy products largely consumed as cheese or yogurt
- Olive oil as the principal fat (native to the region, the olive tree grows well throughout the coastal zone)
- Extensive use of fish and shellfish in coastal Mediterranean areas
- Plentiful use of dates and citrus in North Africa.

Mediterranean Cuisine

The Mediterranean rim designates the identity of approximately 15 countries and island nations that are located around the continents of Africa, Europe, and Asia and situated on the Mediterranean Sea. All these areas enjoy the same hot dry summers and wet warm winters. The culinary theme of Mediterranean cuisine was created from centuries of travel, trade, and colonization through the Mediterranean, mostly by the Phoenicians, Greeks, Romans, Egyptians, Persians, Moors, and Turks.

Mediterranean cuisine is largely a plant based with common ingredients: olive, wheat, and wine. Fresh seasonal vegetables are so important that they are served as a dish in their own right. The various cooking techniques, ingredients, spices, and herbs which exist today reflect cross-cultural influences from the east and west.

The most extensive research reflects dietary patterns of the early 1960's for Greece, southern Italy and other Mediterranean regions in which olive oil was the principal source of dietary fat. A historical study by Ancel Keys first acknowledged the beneficial effects of these dietary habits. The seven county study by Dr. Ancel Keys was a landmark study which established the association between diet, blood cholesterol levels, and heart disease. Keys found that Crete was the area with the lowest heart disease prevalence in incidence, possibly due to their low blood cholesterol levels, their active lifestyles, and consumption of a plant based diet with low intakes of saturated fat and high intake of monounsaturated fats (olive oil). One of his major conclusions was the strong evidence for the effect of the type of dietary fat on serum cholesterol and coronary artery disease risk. Also, there are other numerous substances in food, such as dietary antioxidants and plant chemicals found in vegetables, fruits, and beans, which may exert protective benefits against heart disease and certain cancers. Table 1 displays the age standardized death rates for men aged 50-54 yr. from 1959 for countries in the Seven Countries Study. It is interesting to note that Greece reflects the lowest rate of heart disease, despite a higher total fat intake which exceeds the 30% figure recommended by most US. public health agencies.

The Mediterranean diet of the 1960's constitutes the original concept for the development of the current Dietary Guidelines by the USDA. The Mediterranean diet challenges the conventional and popular concept that makes restriction of all types of fat the cornerstone of healthy eating. Today, current researchers are recognizing that the type of dietary fat (saturated, monounsaturated, and polyunsaturated) has a greater impact of health than the total amount of dietary fat.

Table 1: Ancel Keys: Seven Countries Study

Age Standardized Death Rates per 100,000 in men aged 50 -54 yr.

Country	Ischemic Heart Disease	All Causes
Finland	422	1290
United States	466	1150
Netherlands	162	690
Italy	145	890
Greece	48	650

Characteristics of the Mediterranean Diet

- An abundance of plant foods such as seasonal fruits and vegetables, breads, cereals, beans, nuts, seeds, and potatoes.
  - These plant foods were at the center or focal point of the plate. In North Africa plants at the center of the plate included couscous, vegetables, and legumes.
- Pasta, polenta, rice or potatoes, along with vegetables and legumes were characteristic of southern Europe.
  - In the Eastern Mediterranean, bulgur, rice, chickpeas, and other vegetables were at the center of the plate. Bread, eaten with no margarine or butter, was a fundamental component of all meals.
- Minimally processed, seasonally fresh and locally grown foods.
- Fresh fruit as typical daily dessert.
- Consumption of added sugar, which displaces foods containing important nutrient qualities, was very low.
  - Citrus fruits, melons, figs, pomegranate, quinces, and prickly pears conjure up the Mediterranean, yet many of these fruits originally came from Persia via Turkey.
- Olive oil as the region's principle source of dietary fat and was used in place of animal fats (saturated fat) typical of Northern European diets.
  - The caloric percentage of dietary fat intake varied among the Mediterranean regions; 28% in southern Italy to as much as 40% in Crete and other parts of Greece.
  - The use of butter and margarine were rare in this time period.
- Dairy products (cheese and yogurt) consumed daily in low to moderate amounts.
- Eggs (0-4) consumed weekly.
- Fish and poultry consumed in low to moderate amounts, whereas red meat consumed in very low amounts.

- Moderate consumption of wine and typically served with meals.
  - Wine is an everyday accompaniment to meals. One might even classify it is an “essential ingredient”.
- Regular physical activity.
- Lifestyle factors such as social support and the pleasure which accompanies the sharing of food with family and friends was an important part of the culture.

Source: Oldways Preservation and Exchange Trust

The Traditional Asian Diet

Asia represents an enormous land mass that contains a large variety of people, cultures, and cuisine's. Inspiring countries which contribute to the flavorful cuisine of South and East Asia are China, Japan, South Korea, India, Thailand, Vietnam, Cambodia, Indonesia, Malaysia, Philippines, and other related Pacific Rim areas. Throughout much of Asia, as in the Mediterranean, many of the chronic illnesses (many related to diet and lifestyle) that affect Western civilizations are quite rare. In both Japan and China, the rate of heart disease and it's risk factors (hypertension and elevated blood cholesterol), breast cancer, colon, prostate, and rectal cancer incidence are much lower than in the United states.

In China, the rate for heart disease among men is one-sixteenth that of the United States, while the rate for colon cancer is about two-fifths of the United States rate. Japan now has the highest life expectancy rate of 79 years.

Characteristics of the Asian Diet

- Plant based foods contribute the core of the daily intake whereas food from animal sources is complementary.
  - Plant based foods common in Asia include rice and other grains, noodles, flatbreads, potatoes, fruits, and vegetables (including sea vegetables), nuts, seeds, beans, various soy foods, other legumes, vegetable and nut oils, herbs, spices, and plant-based beverages such as tea, wine, and beer.
- Typically low in total fat and saturated fat (animal source, coconut, and palm oil).
  - The type of dietary fat used is mostly from plant oils such as peanut oil.
- Dairy products are generally absent in the diets of East and South Asia.
  - The exception to this is India, where moderate amounts of yogurt and cheese are consumed.
  - The small amounts of dairy products consumed in China (Mongolia to Tibet) come mostly from goats and sheep.
- Fish is generally consumed in low to moderate amounts on a weekly basis.
  - The exception to this is in areas where fish is not available or vegetarian traditions exist. There is a wide variation in the consumption of fish and seafood in traditional Asian diets between large land mass areas, such as the interior of China, Korea, and India and the seacoast and island areas, where fish is a daily staple.
- Traditional Asian diets included food from land animals in limited amounts.
  - They combined healthy and flavorful recipes and techniques to flavor large amounts of plant-based foods (noodles, rice, vegetables, legumes, nuts, and seeds) with very small

amounts of meat. The flavor is often supplied by as little as one ounce of meat per person per day.
    - In other parts of Asia, such as in India, healthy, appealing vegetarian traditions that use no meat, utilize various spices to create flavor and excitement in their meals.
- Japan and other Asia countries moderately consume wine, beer, and other alcoholic beverages.

THE TRADITIONAL LATIN AMERICAN DIET

The American regions as well as the lands of the Incas, Aztecs, Mayas, and Anasazi have given the world more commonly used ingredients than most other continents. Many everyday foods we use today have their origins in the Americas. For example, yellow, white, and blue corn, potatoes, cactus paddles (nopales), vanilla, chocolate, tomatoes, squashes, beans, leeks, peppers (sweet and sharp), pecans, and avocados. There are also lesser known foods that are becoming more popular again, such as amaranth, quinoa, and the purple potato. The cross influence of food abounds, with the Europeans exacting a strong hold over South America's cooking practices, while ingredients from the New World reshaped recipes on the continent after the 16th century.

The advanced civilizations of the Americas were "discovered" by Western explorers as a direct result of the slumping overland spice trade with the East. Spain and Portugal were the powers that settled the Americas. Pizarro and Cortez are names that we immediately associate with Central and South America. After the Spanish conquest, the advanced agricultural and farming system of this civilization was destroyed. For example, the Incas had developed a sophisticated irrigation system and constructed immense storage areas for grain and other dried foods that could feed millions of people for years. The Spaniards wanted the natives to adopt their Christian traditions and grow Old World food such as wheat and broad beans. The Spaniards also brought new ingredients which helped to evolve various cuisines throughout Latin America. In Mexico, the native diet was primarily plant based, with corn, beans, and squash at the heart of Mexican cooking. After the Spanish conquest, the consumption of meats, fat (primarily saturated), and rice increased in the Mexican diet. This led to the term, “Mestizo”, meaning a mix of Spanish and Indigenous (pre-Columbian) heritage.

Characteristics of the Latin American Diet

- Foods are available from different parts of these countries almost year around which allows for a stable diet.
- Fruits and starchy vegetables are prevalent.
- Seafood is common in most of these countries.
- Meat, especially beef in Argentina, is very important and readily available. This is less true of Central America, where meats are of lesser quality and availability. Meats are very often stewed and shredded because of their toughness.
- Peppers are frequently found in almost every part of the diet in the countries closer to the equator, including Mexico.

The Traditional African Diet

The African Heritage Diet reflects the culinary traditions of the African diaspora: Africa; the Caribbean; parts of South America; and the American South.

The African Heritage Diet is a delicious, plant-based eating pattern—one that brings leafy greens, vegetables and fruits, nuts and seeds, whole grains and pastas, beans and peas, healthy oils, and earthy tubers like sweet potatoes to our tables. Meats and other animal products play a small role, generally used as flavoring or eaten on very special occasions.

Africa is home to leafy greens, root vegetables, mashed tubers and beans, and many different plant crops across its lands. In Central and Western Africa, traditional meals are often based on hearty vegetable soups and stews, full of spices and aromas, poured over boiled and mashed tubers or grains.

In Eastern Africa, whole grains and vegetables are the main features of traditional meals, especially cabbage, kale, and maize (cornmeal). In the Horn of Africa, where Ethiopia and Somalia are found, traditional meals are based on flatbreads like injera (made out of teff, sorghum, or whole wheat) and legumes like lentils, fava beans, and chickpeas blended with spices. Today, many meals in the Horn are still prepared in halal style meaning that they include no pork or alcohol, and only meat from animals who have died on their own.

Across Africa, couscous, sorghum, millet, and rice are enjoyed as the bases of meals, or as porridges and sides. Watermelon and okra are both native to Africa, and many believe that cucumbers are too. Beans were eaten in abundance everywhere, especially black-eyed peas, which were often pounded into a powder for tasty bean pastes seared as fritters.

Characteristics of the African Diet

- Meals are built around abundant, colorful fruits, vegetables, and leafy greens, along with whole grains, beans, and legumes.
- Root vegetables such as yams and sweet potatoes are a staple and source of nutrients.
- Peanuts and various nuts and seeds are important parts of the diet.
- Olive oil, canola oil, sesame oil, or coconut oil are used for cooking, replacing less healthy fats.
- Homemade sauces and marinades featuring herbs and spices add flavor to meals.
- Fish, eggs, poultry, and small amounts of meat are eaten in smaller portions, often as garnishes or on special occasions.
- Dairy is consumed in smaller quantities than other cultures, with calcium-rich plant-based options recommended for those who are lactose intolerant.
- Sweets are limited to special occasions or once a week.

Source: https://oldwayspt.org/explore-heritage-diets/african-heritage-diet

The Traditional Indian Diet

India is a vast country and food varies from region to region, as strongly influenced by religion and custom as it is by geography. From the rich meat-based dishes of the North to the simple legume-based diet of the South, food is a way of life, with many religious and social rituals surrounding it, and throughout the whole country it is a source of great enjoyment and celebration.

The uniqueness of this particular cuisine comes from the nature of the spices used. India has long been renowned for its abundant and aromatic spice varieties. Its cuisine is famed for its variety and infinitely subtle blends of aromatic spices and seasonings that flavor meat, legumes, and vegetables. The word curry does not do justice to the sheer range of Indian dishes, which reflects the diversity of geography, culture, and religion that this vast country has to offer. What does not vary is the care and sophistication with which food is prepared and cooked, and the value that is attached to its excellence and flavor.

Chiles are essential to most Indian cooking. Green and red when fresh, a brownish-red when dried, they can be mild or fiery hot, and must be used with discretion. The seeds are the most pungent part of the chile and may be removed and discarded before the chile is used. Chiles must be handled with care because the juice is strong enough to make the skin tingle and the eyes burn. Hands must be thoroughly washed after handling chiles.

Even more commonly used as flavorings are garlic and onions, which also give body to a dish. Such fresh herbs as hara dhania (coriander leaves), pudina (mint), kari patha (curry leaves) and tulsi (sweet basil) are used in many dishes and to make chutneys and sauces.

Besides vinegar and lemon juice, the most commonly used souring agent is imli (tamarind). A bean-like seed pod, imli is sold dried or in pulp form. Before the pod is used it is soaked in hot water for an hour, strained and the pulp pushed through the strainer. Only the pulpy water is used. The seeds and pod are discarded.

Chutney

Chutney is a sweet and sour condiment, made of fruit and/or vegetables, cooked in vinegar with sugar and spices, until it has the consistency of jam. Chutneys may contain exotic fruits as well as temperature ones. Some are reduced to a purée, others remain recognizable pieces of their ingredients; all are characterized by a syrupy and sometimes highly spiced juice which coats the ingredients.

Few Indian meals are served without the traditional fruit or vegetable chutneys. Unlike Western chutneys, they often are not cooked but are more like relish salads and are notable for their fresh flavors. They can be mild or very hot and they’re made with everything from mangoes and bananas to apples and cucumber.

Sources: *Condiments*, by Kathy Gunst; *All Around The World Cookbook* by Sheila Lukins

PANTRIES AROUND THE WORLD

Caribbean

Rice	Thyme	Curry	Sugar
Yams	Cilantro	Mint	Garlic
Limes	Capers	Avocados	Tomatoes
Pepper	Beans	Coconuts	Bananas
Allspice	Raisins	Plantains	Oregano
Scallions	Callaloo	Dried Peas	Dried Salt Cod
Ackee		Scotch Bonnet Peppers	Calabaza

South American

Rice	Basil	Garlic	Scallions
Chilies	Beef	Papayas	Onions
Limes	Bananas	Coconuts	Peaches
Raisins	Oranges	Calabaza	Grapefruits
Tomatoes	Black Beans	Chickpeas	Black Olives
Hearts of Palm	Coconut Milk	Collard Greens	Suckling pig
Dried Salt Cod			

Mexican

Rice	Thyme	Almonds	Cumin
Cloves	Olives	Cilantro	Onions
Garlic	Vanilla	Oranges	Raisins
Oregano	Lemons	Tomatoes	Chayote
Red Onions	Dried Beans	Cinnamon	

Greek

Lamb	Thyme	Oregano	Figs
Mint	Garlic	Rosemary	Dill
Yogurt	Raisins	Almonds	Currants
Spinach	Lemons	Zucchini	Olive oil
Vanilla	Cinnamon	Coriander	Red Onions
Hazelnuts	Pistachios	Cucumbers	White Beans
Marjoram	Bell Peppers		

Tunisian

Dates	Cloves	Basil	Garlic
Capers	Olives	Okra	Raisins
Harissa	Yams	Chilies	Pumpkins
Turnips	Tuna	Oranges	Tomatoes
Anchovies	Almonds	Pine Nuts	Chickpeas
Bell Peppers	Red Onions	Olive Oil	Bay Leaves

Turkish

Dill	Cloves	Mint	Saffron
Thyme	Sage	Anise	Honey
Capers	Basil	Garlic	Rosemary
Turmeric	Cumin	Nutmeg	Shallots
Cinnamon	Olives	Quinces	Eggplants
White Beans	Cucumbers	Pastrami	Pumpkins
Pomegranates	Almonds	Pistachios	Walnuts
Cayenne Pepper	Phyllo Pastry	Bell Pepper	Feta Cheese

Moroccan

Mint	Cumin	Cloves	Dates
Raisins	Capers	Parsley	Garlic
Coriander	Prunes	Yams	Turnips
Tomatoes	Carrots	Onions	Turmeric
Pine Nuts	Squash	Lemons	Oranges
Cinnamon	Olive Oil	Honey	Chickpeas
Hard-Cooked Eggs	Phyllo Pastry		

Italian

Anchovies	Salamis	Capers	Sausages
Arugula	Fennel	Rosemary	Hazelnuts
Almonds	Polenta	Arborio Rice	Cannelloni Beans
Ricotta Cheese	Dried Red Chilies	Prosciutto di Parma	Wild Mushrooms
Flat-Leaf Parsley	Parmigiano-Reggiano	Extra Virgin Olive Oil	Sage
Oregano	Basil	Pears	

Southeast Asian

Mint	Mace	Cloves	Turmeric
Cumin	Basil	Rice	Cilantro
Coriander	Palm Sugar	Ginger	Papayas
Bean Sprouts	Bananas	Cardamon	Fish Sauce
Mangoes	Mushrooms	Lemongrass	Mung Bean
Soy Sauce	Chili Paste	Shrimp Paste	Coconut Milk

Indonesian

Ginger	Nutmeg	Cloves	Cumin
Coriander	Turmeric	Tamarind	Garlic
Cinnamon	Cilantro	Peanut Oil	Sugar

Chinese

Pork	Cilantro	Shallots	Bean Sprouts
Onions	Bok Choy	Cabbages	Rice Noodles
Vinegar	Sesame Oil	Peanut oil	Chili Oil
Chili Paste	Plum Sauce	Hoisin Sauce	Rice Wine
Sesame Seeds	Red chiles	Wrappers	Soy Sauce

Japanese

Garlic	Ginger	Sugar	Fluke
Daikon	Soy Sauce	Scallions	Scallops
Tofu (Bean Curd)	Rice Wine Vinegar	Salmon	Cucumber

African

Garlic	Ginger	Dende (Palm Oil)	Okra
Plantain	Fish	Long Beans	Callaloo
Teff	Chicken	Yams	Tomato
Fonio	Cassava	Groundnuts	Cod
	Pigeon Peas	Dried Shrimp	Cinnamon

Indian

Garlic	Ginger	Mustard	Ghee
Nigella	Tamarind	Jaggery	Basmati Rice
Tomatoes	Lentils	Yogurt	Asafetida
Coconut	Lemons	Fennel seed	Cilantro
Mangoes	Lamb	Chickpeas	Chiles
Split Peas	Turmeric	Fenugreek	Cumin

Day Four Syllabus: Functional Ingredients and The Gut Microbiome: Fermented Foods, Mushrooms, Seaweed, Anti-Inflammatory and Immune Boosting Foods, Blue Zones Diet, Beverages

Learning Objectives

By the end of this day, you should be able to …

- Identify anti-inflammatory foods
- Learn about foods that promote a healthy gut micro-biome
- Discuss immune boosting ingredients in the kitchen
- Learn about a variety of medicinal and culinary mushrooms
- Discuss the benefits of eating fermented foods
- Identify a variety of simple fermented foods
- Discuss eating patterns and behaviors of a Blue Zones Diet.
- Understand how to use meat as a flavoring agent or garnish rather than center of the plate
- Identify seaweeds commonly used in the kitchen and how to prepare them
- Discuss soy products such as tofu, soy milk and miso
- Understand the health benefits of honey
- Know various ways to prepare seaweed for culinary use
- Utilize gut healthy and immune boosting ingredients to create a variety of healthy beverages
- Explain how the gut-brain axis connects digestive health with overall well-being.
- Identify the roles of prebiotics and probiotics in supporting a balanced and diverse gut microbiome.
- Discuss how pesticide exposure impacts microbiome health and inflammation.
- Recognize the health-promoting functions of phytochemicals and describe strategies for incorporating phytonutrient diversity (“eating the rainbow”).

Learning Activities

- Lecture and discussion
- Fermented food tasting
- Culinary demonstrations
- Hands-on production

KEY TERMS

Fermented
Mushrooms
Dashi
Microbiome
Iodine
Wakame
Shitake
Fermentation
Dysbiosis
Lacto-fermented
Miso
Blue Zones
Plant Based
Plant Forward
Amino Acids
Tofu
Wild Foods
Gut-Brain Axis
Omega Fatty Acids
Seaweed
Longevity Ingredients
B-Vitamins
Kombu
Whole Grain
Lions Mane
Prebiotic
Isoflavone

INSTRUCTOR DEMONSTRATIONS

- Primary vs. Vegetarian Dashi
- How to use miso for marinade, soup, dressing
- Working with Tofu
- Honey tasting
- Tasting of Traditional Fermented Foods

Popular Diets

In today's world, information about diet and nutrition is everywhere—from bookstores and online articles to podcasts and social media influencers. Yet, sorting credible science from fleeting diet fads can be challenging. What works for one person may not work for another, as diet effectiveness is influenced by genetic factors, activity levels, and overall lifestyle. While calorie balance is central to weight management, research consistently shows that the quality of food is equally important for preventing chronic disease and supporting sustainable health. Ultimately, successful diets tend to be those that are realistic and adaptable to one's daily habits, preferences, and long-term goals.

Among the many dietary approaches, the **anti-inflammatory diet** has gained popularity as a way to reduce chronic inflammation—a biological process linked with conditions such as heart disease, arthritis, and diabetes. This eating pattern emphasizes fruits, vegetables, whole grains, fish, nuts, and healthy oils while minimizing refined carbohydrates and processed meats. Though inflammation itself is a normal immune response, persistent low-grade inflammation can be harmful, and studies suggest that diet can help moderate it. Evidence supports the anti-inflammatory diet's potential benefits for cardiovascular and metabolic health, though more research is still needed to clarify long-term outcomes.

The concept of **clean eating** has evolved from a buzzword into a mainstream dietary philosophy. It generally encourages consuming foods in their most natural or minimally processed form—favoring whole grains, fruits, vegetables, lean proteins, and unrefined oils. However, because "clean" is not a regulated term, interpretations vary widely. While the emphasis on whole foods can promote better nutrition, extreme versions of clean eating risk becoming overly restrictive or fostering anxiety about food purity. A balanced approach that values moderation and flexibility aligns best with evidence-based nutrition principles.

The **DASH diet**, or Dietary Approaches to Stop Hypertension, is one of the most thoroughly studied eating patterns and is often prescribed to lower blood pressure. It prioritizes fruits, vegetables, whole grains, lean proteins, and low-fat dairy while limiting sodium, saturated fats, and added sugars. Research shows that the DASH diet not only reduces blood pressure but also supports heart health and weight management. Its evidence-based structure makes it one of the most reliable dietary plans for long-term health improvement.

A **gluten-free diet** is medically necessary for individuals with celiac disease or gluten sensitivity, as gluten can trigger harmful immune reactions in these populations. However, many people without these conditions have adopted gluten-free eating as a weight-loss strategy. The evidence does not consistently support this use; gluten-free foods are not inherently lower in calories or more nutritious. In fact, some processed gluten-free products contain higher levels of sugar or fat to improve flavor and texture, potentially negating any intended health benefits.

Intermittent fasting focuses less on what is eaten and more on when food is consumed. It alternates between periods of fasting and eating, with popular versions including alternate-day fasting, the 5:2 method, and time-restricted feeding. Some research suggests that intermittent fasting can support weight loss and improve insulin sensitivity, but individual results vary. It may not be suitable for everyone—particularly people with certain medical conditions or a history of disordered eating—and long-term data are still limited.

Intuitive eating shifts attention away from external diet rules and toward internal cues of hunger, fullness, and satisfaction. It encourages individuals to build a healthier relationship with food by trusting their bodies' signals rather than adhering to restrictive plans. Research has found that intuitive eating can improve psychological well-being and reduce overeating, though it may not lead to rapid weight loss. Its strength lies in fostering a sustainable, mindful approach to nourishment.

The **ketogenic diet**, commonly known as keto, is a high-fat, very low-carbohydrate plan designed to shift the body into ketosis—a metabolic state in which fat is used as the primary energy source. Originally developed to treat epilepsy, it has gained attention for weight loss. Studies show that keto can promote short-term weight reduction and improved blood sugar control, but its long-term safety and sustainability remain subjects of debate. The diet's restrictive nature can make adherence difficult and may limit intake of important nutrients found in whole grains and certain fruits.

The **Mediterranean diet** stands out as one of the most consistently supported eating patterns in scientific research. Rooted in traditional dietary habits of countries bordering the Mediterranean Sea, it emphasizes plant-based foods, olive oil, fish, legumes, nuts, and moderate wine consumption. Rather than prescribing strict rules or portion sizes, it promotes a flexible lifestyle centered on fresh, minimally processed ingredients. The Mediterranean diet has been associated with lower risks of heart disease, stroke, diabetes, and cognitive decline.

Building on that foundation, the **MIND diet**—short for Mediterranean-DASH Diet Intervention for Neurodegenerative Delay—was developed to promote brain health and reduce the risk of dementia. It merges the principles of the Mediterranean and DASH diets, highlighting foods such as leafy greens, berries, nuts, olive oil, and fish while limiting red meat and sugary foods. Studies suggest that adherence to the MIND diet is linked to slower cognitive decline and reduced Alzheimer's disease risk, making it an appealing approach for healthy aging.

Mindful eating focuses on the experience of eating itself. It encourages awareness of the taste, texture, and satisfaction of food, along with attention to hunger and fullness cues. This approach aims to reduce mindless or emotional eating and promote a more balanced relationship with food. Evidence indicates that mindful eating can help with weight control, emotional well-being, and improved digestion.

Finally, the **Paleo diet** seeks to replicate the presumed eating patterns of early humans, emphasizing meat, fish, fruits, vegetables, nuts, and seeds while eliminating grains, legumes, dairy, and processed foods. Advocates argue that modern diseases stem from dietary departures from this ancestral model. While the Paleo diet may support short-term weight loss and improved glucose control, its exclusion of major food groups can pose nutrient challenges if not carefully managed. Balanced, evidence-informed adaptation is key to maintaining health while drawing on its beneficial aspects.

No single diet is universally effective. The most successful eating plans are those that align with individual preferences, support long-term adherence, and emphasize nutrient quality. Sustainable nutrition is not about restriction or trend-following but about developing a balanced, evidence-based approach that supports both physical and mental well-being.

Gut Microbiome

The human microbiome refers to the vast community of trillions of microorganisms—bacteria, fungi, viruses, and archaea—that inhabit the body, with the highest concentrations found in the gastrointestinal (GI) tract. Often considered a "supporting organ," the microbiome is essential for digestion, immunity, metabolism, and even neurocognitive function. Each person's microbiome is uniquely shaped by genetics, birth mode (vaginal vs. cesarean), diet, environment, medication use, and lifestyle exposures.

In healthy individuals, these microbes coexist in a delicate symbiosis. However, disruptions—such as those caused by antibiotics, ultra-processed diets, or illness—can lead to microbial imbalance, or dysbiosis, which is associated with increased susceptibility to chronic diseases.

The gut microbiome plays a vital role in maintaining digestive and overall health through several key mechanisms. Microbes assist in digestion by breaking down indigestible carbohydrates and producing short-chain fatty acids such as acetate, propionate, and butyrate, which help preserve the integrity of the gut lining, modulate immune responses, and reduce inflammation. Certain microbial strains also synthesize essential nutrients, including vitamin K and B vitamins like B12, which humans cannot produce on their own. Additionally, beneficial microbes protect against pathogens by competing with harmful bacteria for nutrients and binding sites, forming a natural defense barrier. Beyond local effects, the gut microbiome actively educates and regulates immune cells, influencing both gut and systemic immunity.

The microbiome is an emerging frontier in medical science. Key research areas include developing microbiome-based biomarkers for early disease detection; using microbiota manipulation (e.g., fecal microbiota transplantation) as therapeutic tools; understanding the gut-brain axis and the microbiome’s role in mood and cognition; and investigating personalized nutrition approaches based on individual microbiome profiles. Continued exploration of the microbiome promises new pathways for prevention, diagnosis, and treatment of both metabolic and immune-mediated conditions.

Diet and Microbiome Composition

Diet is a primary modulator of the microbiome. A fiber-rich, plant-forward dietary pattern promotes microbial diversity and abundance of beneficial bacteria. Prebiotic compounds—non-digestible carbohydrates fermented by gut microbes—are particularly important. Common prebiotics include:

- Inulin (found in garlic, onions, leeks, and asparagus)
- Resistant starches (from cooked-and-cooled potatoes, lentils, and oats)
- Fructooligosaccharides (in bananas and wheat)

These compounds fuel beneficial microbes and increase short-chain fatty acid production, which enhances gut and metabolic health. Conversely, diets high in refined starches, sugars, and saturated fats reduce microbial diversity and may foster pro-inflammatory bacterial species.

Dysbiosis, an imbalance in the composition and function of the body's microbial communities, typically referring to the gut microbiota, has been linked to multiple chronic diseases, such as inflammatory bowel disease (IBD), type 2 diabetes, obesity, cardiovascular disease as well as

neurodegenerative diseases. Low-fiber Western diets and high antibiotic exposure are two major drivers of modern-day dysbiosis. Encouraging gradual, sustained dietary changes that emphasize plant diversity and fiber intake can help restore microbial balance.

Probiotics and Fermented Foods

Probiotic-rich foods contain live microorganisms that may help restore microbial balance and improve digestive and immune function. These include:

- Yogurt with live active cultures
- Kefir
- Kimchi and sauerkraut
- Miso and tempeh
- Kombucha

Not all fermented foods contain live microbes (e.g., pasteurized products or baked sourdough), so label reading is key. Probiotic supplements may offer benefits, but their effects are strain-specific and may be most useful following antibiotic use or for certain clinical conditions.

Prebiotics and Microbiome

Prebiotics are the non-digestible fibers and compounds found in certain plant foods that nourish beneficial bacteria in the gut, helping them grow and thrive. Unlike probiotics, prebiotics act as a food source for these microbes, supporting a healthy and diverse gut microbiome. When gut bacteria ferment prebiotics, they produce short-chain fatty acids like butyrate, acetate, and propionate, which help maintain the gut lining, regulate inflammation, and support immune function. By promoting the growth of beneficial microbes, prebiotics contribute to improved digestion, enhanced nutrient absorption, and potentially better metabolic and mental health outcomes. Common prebiotic sources include foods such as garlic, onions, leeks, asparagus, bananas, and whole grains.

A diverse, fiber-rich diet not only supports digestive health but also strengthens immunity, reduces inflammation, and helps prevent chronic disease—through the dynamic, metabolically active world of the gut microbiome.

Gut-Brain Axis

The gut-brain connection refers to the bidirectional communication between the gastrointestinal tract and the central nervous system, linking digestive health with mood, cognition, and overall mental well-being. This relationship is mediated through neural, hormonal, and immune pathways, particularly the vagus nerve and gut microbiota. The gut microbiome plays a key role by producing neurotransmitters (like serotonin and GABA) and metabolites that influence brain function and inflammation. Disruptions in gut health, such as dysbiosis or inflammation, have been associated with conditions like anxiety, depression, and cognitive decline. Conversely, diets rich in fiber, fermented foods, and diverse plant-based nutrients support a healthy microbiome, which may enhance emotional resilience and brain function, underscoring the strong link between nutrition and mental health.

Other Factors Impacting Microbiome

While diet is one of the strongest influences on the gut microbiome, many other factors can affect its composition and function. Antibiotic and medication use (including proton pump inhibitors, NSAIDs, and certain antidepressants) can disrupt microbial balance, sometimes reducing diversity or allowing harmful species to overgrow.

Stress and sleep patterns also play a major role, as the gut-brain axis links emotional and physiological stress responses to microbial changes that can impact digestion and immunity. Physical activity tends to support a more diverse and resilient microbiome, while sedentary behavior may have the opposite effect.

Age, genetics, and mode of birth (vaginal vs. cesarean) influence early microbial colonization and long-term diversity.

Environmental exposures, such as hygiene practices, pollution, and contact with animals or natural environments, can further shape microbial communities. Pesticide exposure can influence the gut microbiome by altering its composition, diversity, and metabolic activity. Certain pesticides, particularly organophosphates, glyphosate, and other commonly used agricultural chemicals, have been shown to disrupt the balance between beneficial and harmful bacteria. These disruptions can lead to reduced microbial diversity, changes in short-chain fatty acid production, and increased intestinal inflammation or permeability ("leaky gut").

Over time, such imbalances may contribute to metabolic disturbances, immune dysregulation, and heightened susceptibility to disease. While the extent of these effects in humans is still being studied, animal and cell-based research suggests that chronic low-level pesticide exposure can impair microbiome health, potentially influencing digestion, nutrient absorption, and even neurological and endocrine functions. Minimizing pesticide exposure by choosing organic produce when possible, thoroughly washing fruits and vegetables, and supporting sustainable agricultural practices may help protect gut microbial balance and overall health.

Altogether, these non-dietary factors interact dynamically with lifestyle and health status to influence the balance and resilience of the gut microbiome.

Organic Foods and Dirty Dozen

Organic food labels indicate that a product has been produced according to specific agricultural standards designed to promote environmental sustainability, animal welfare, and reduced chemical use. In the United States, foods labeled **"USDA Organic"** must meet strict regulations set by the U.S. Department of Agriculture. These standards prohibit the use of synthetic pesticides, fertilizers, genetically modified organisms (GMOs), antibiotics, and growth hormones. Organic livestock must be raised on organic feed, have access to the outdoors, and be managed without routine antibiotics or synthetic hormones.

There are several labeling categories under the USDA system:

- **"100% Organic"** means all ingredients and processing aids are certified organic.
- **"Organic"** indicates at least 95% of ingredients are organic, with the remaining 5% from an approved list.

- **"Made with Organic Ingredients"** means at least 70% of ingredients are organic, though the USDA seal cannot be used.

While these labels can help a consumer identify foods with reduced chemical exposure, they do not indicate a higher nutritional value compared to conventionally grown foods and are typically higher in price. Many small local farmers use minimal synthetic fertilizers but may not be labeled organic due to the costs and time associated with organic compliance.

The Environmental Working Group (EWG) publishes an annual report called the Dirty Dozen and Clean Fifteen, which ranks fruits and vegetables based on pesticide residue levels found in testing by the U.S. Department of Agriculture and the Food and Drug Administration.

The Dirty Dozen includes produce items that tend to have the highest pesticide residues, even after washing and peeling. Common examples often include strawberries, spinach, kale, apples, grapes, and peppers. The EWG recommends buying these items organic when possible to reduce pesticide exposure.

The Clean Fifteen, on the other hand, lists produce with the lowest levels of pesticide residues, making them safer choices to purchase conventionally grown. Items often featured include avocados, sweet corn, pineapple, onions, and mangoes.

These lists are updated each year and are intended to help consumers make informed decisions about when choosing organic may have the greatest impact on reducing pesticide intake, while still encouraging high fruit and vegetable consumption overall.

Source: https://www.ewg.org/foodnews/

Omega Three Fatty Acids: A Clue to Good Health

Modern science has provided evidence that suggests that fish consumption is an important part of a healthy diet because it can decrease the risk for coronary heart disease and certain cancers. A classic study of Greenland Inuit showed that a high consumption of fish resulted in a low incidence of coronary heart disease and cancer. Subsequently, other population studies confirmed these similar protective findings and showed that fish-eating populations other than the Inuit had less cardiovascular disease than did those who consumed meat-based diets.

One of these studies focused on Japan, which incidentally now boasts the longest life expectancy - 79 years. This longevity may be related to high fish intake. The protective role of fish against heart disease and cancer may be attributed to the type of oil found in certain species of cold-water fish, especially Alaska salmon. Other species include herring, mackerel, and sablefish and, to a lesser degree, oysters, sardines, rainbow trout, and albacore tuna.

These fish oils, referred to as omega 3, are a polyunsaturated oil. Their chemical structure and metabolic function are quite different from the polyunsaturated oils found in vegetable oils, referred to as omega 6. The type of dietary fat (monounsaturated, saturated, polyunsaturated) we consume had biological influences on blood pressure, blood clotting, inflammation, immune function, and coronary spasms.

Omega 3 oils also exert additional protective effects against coronary heart disease by:

- Decreasing blood lipids (cholesterol, low density lipoproteins or LDL, and triglycerides).
- Decreasing blood clotting factors in the vascular system.
- Increasing relaxation in larger arteries and in blood vessels.
- Decreasing inflammatory processes in blood vessels.

Additional studies have provided exciting news about the benefit of omega 3 oils for individuals with arthritis, psoriasis, ulcerative colitis, lupus erythematosus, asthma, and certain cancers. Research studies have consistently shown that omega 3 fatty acids delay tumor appearance and decrease the growth, size, and number of tumors.

A study by the University of Washington confirmed that eating modest amounts (one salmon meal per week) can reduce the risk of primary cardiac arrest. Cardiac arrest claims the lives of 250,000 Americans each year. Other studies, such as the Zupthen Study, a twenty-year investigation of a Dutch population, confirmed similar benefits. The risk of coronary heart disease decreased (as much as 2.5 times) with increasing fish consumption. This suggests that modest amounts (one to two servings per week) of fish is of value in the prevention of coronary heart disease when compared with no fish intake.

The type of dietary fat we consume is especially important. It has been well documented that saturated fat can increase the risk of heart disease. The amount of saturated fat in both high oil fish and lean fish is minimal. Fish, and other seafood, also offers lean, high-quality protein as well as many other important vitamins and minerals.

Salmon is also a good source of vitamin E, a powerful antioxidant. Antioxidants, which also include vitamin C and beta carotene, act at the molecular level to inactivate free radicals. Free radicals can damage basic genetic material, cell walls and structures to eventually lead to cancer and heart disease. Vitamin E lowers the risk of heart disease by preventing the oxidation of low-density lipoproteins (LDL), thus reducing the buildup of plaque in coronary arteries. Other research has found that vitamin E plays a protective role against cancer and the formation of cataracts and may possibly boost the immune system in the elderly.

Fish and seafood should be part of a well-balanced diet which includes a wide variety of foods such as whole grains, beans, vegetables, fruits, nuts, vegetable oils, and low-fat dairy products.

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Soy and Soy Products

Soybeans are a nutritional wonder which have a long history in the typical Asian diet. Like other legumes, soybeans are rich in nutrients; however, the nutrient profile of soybeans differs in some interesting ways from most other legumes. Soybeans are higher in protein and fat, lower in carbohydrate, and contain beneficial plant chemicals known as isoflavones.

Soybeans are comprised of 35-38% protein (other legumes are 20-30% protein). What distinguishes the soybean from other legumes is the nature of its protein. Soybeans are the only vegetable that contain complete protein - that is- it supplies all eight essential amino acids needed for human health.

Soy protein has some health benefits when compared to animal proteins. It does not contain significant amounts of saturated fats and cholesterol as animal proteins do.

There are five plant-based substances called "phytochemicals" which have anti-cancer properties. All five of these phytochemicals are naturally found in soy foods, including "isoflavones". Isoflavones are plant estrogens that are 1/100,000 the strength of human estrogen. The primary isoflavone is genistein, and it is found only in soy foods.
There are distinct advantages to obtaining these phytochemicals naturally through consuming soy foods rather than in "supplement form". Soy foods provide these isoflavones in non-toxin levels and whole soy foods contain other suspected anti-cancer properties.

Soybeans differ from other legumes in terms of dietary fat composition. Approximately 40% of the calories in soy are derived from fat. Most other legumes contain between 2 and 14% fat. The fat portion of the soybean is used extensively by the food industry and consumers. Soybean oil, also commonly known as vegetable oil, is readily available and inexpensive. Most of the vegetable oil consumed in the U.S. today is soybean oil. Like all vegetable oils, soybean oil is cholesterol free. Soybeans are mostly polyunsaturated and are one of the few plant sources of linolenic acid, an omega 3 fatty acid. Omega 3 fatty acids, a type of polyunsaturated fat, have been found to reduce the risk of cancer and heart disease.

Soybeans are also a good source of dietary fiber. One serving of soybeans provides approximately 8 grams of dietary fiber. When soybeans are processed into different forms such as in tofu, soy sauce, or soy milk, the fiber content is virtually absent. Soy foods that utilize the whole bean, such as tempeh, soy flour, and texturized vegetable protein are higher in fiber.

Soy foods are good sources for calcium, iron, zinc, and B vitamins (folacin, niacin, and B6). The table below illustrates the nutrient content of soy foods.

Soy and Estrogen

Soy contains naturally occurring plant compounds called phytoestrogens, specifically isoflavones, which have a chemical structure similar to human estrogen. Because of this similarity, they can bind to estrogen receptors in the body, although they are much weaker than the body's own estrogen. Rather than acting as a direct hormone replacement, soy isoflavones have a modulating effect—they can mildly mimic estrogen in low-estrogen environments (such as after menopause) or block stronger estrogen activity when levels are high.

Research shows that moderate soy intake—through foods like tofu, edamame, soy milk, or tempeh—is safe for most people and may offer health benefits, including a reduced risk of heart disease, improved cholesterol levels, and relief from menopausal symptoms. In populations with high lifelong soy consumption, such as many Asian cultures, rates of hormone-related cancers like breast and prostate cancer are generally lower, though this is influenced by overall diet and lifestyle. Current evidence indicates that soy does not increase cancer risk and may even be protective, including for breast cancer survivors. For the greatest benefit, experts recommend choosing whole soy foods over highly processed soy supplements or protein isolates.

Nutrient Content of Soy Foods

Food (1/2 cup)	**Kcal**	**Protein (g)**	**Fat (g)**	**Calcium mg**	**Folic Acid (ug)**	**Isoflavone mg**
Soybeans	149	14	8	88	47	35
Soy Protein Isolate (4 oz.)	380	100	4			15
Tempeh	165	16	6.5	77	43	40
Texturized Veg. Protein	120	22	.4	170	0	35
Soy Nuts	404	30	22	120	180	50
Tofu, firm	95	10	6.0	130*	40	40
Tofu low fat	45	8	1	*	30	30
Tofu, extra firm	80	8	4	*	30	45
Soy Flour, defatted	160	24	.6	120	160	50
Soy Milk, plain	40	3.3	2.5	5	2	40
Miso, 4 oz.	140	8	4	92	40	10

* The calcium content of tofu ranges from 120-175 mg per serving depending on how the tofu was processed. Sources: US Department of Agriculture Handbook, Pat Murphy, Ph.D., and Steven Barnes

Tofu

Tofu is a bland, cheese-like cake formed from soy milk which has been curdled. Tofu is sold fresh or frozen and can be cooked in many ways, often replacing beef or chicken. Silken tofu is a Japanese form which has a smoother and creamier texture. Depending on how much liquid is contained, the texture will be extra firm, firm, or soft.

Tofu and Beef Comparison

4 ounces raw	Calories	Protein	Fat	Carbohydrate
Tofu	95	10 gm	6 gm	2 gm
Round steak	150	26 gm	5 gm	0 gm

Miso

A thick high protein paste made from soybeans, salt, and a fermenting agent, usually aspergillus oryzae mold culture. Rice or barley is usually added to the mixture for additional flavor. Research has shown antioxidant properties of miso which may inhibit the formation of plaque in the arteries, thus reducing the risk for heart disease. Miso soup is a popular appetizer and breakfast drink in Japan.

Tempeh

Tempeh, which possibly originated in Indonesia, is a thin dense cake made from fermented whole soybeans. When cut into pieces, tempeh is a good substitute for beef.

Natto

This Japanese specialty is used as a spread or in soups. It is made of fermented, cooked whole soybeans. Natto is strong smelling with a chewy texture.

Soy Sauce

Soy sauce is the most widely recognized of the soy foods. It is fermented from a mixture of whole soybeans, white flour, and fermenting agents. The liquid is then extracted and processed. Soy sauce adds flavor to many dishes and can also be a high source of sodium in the diet.

Soy Milk

Soy milk is made from ground soybeans that are mixed with water to form a milk-like liquid. It is used in place of cow milk by cow milk sensitive individuals as well as strict vegetarians. Soy milk can be an excellent source of calcium and B 12 if fortified with these items.

Soy Flour

Soybeans are cracked, dehulled, and rolled into what is called full fat flour. This is the basis for soy flour. Soy flour is also available in a defatted form. The protein content of soy flour is approximately 52% higher than in flour from grains. Soy flour is quite versatile and is used in many baked products. Soy flour improves crust color and shelf life of baked goods.

Soy Protein Products

Full fat flakes of soybeans are immersed in a solvent bath to extract the oil. The solvent is then removed and the flakes are dried, creating defatted soy flakes. This is also the basis for soy protein and soy isolates. When soy protein replaces meat content in meat products, such as in lunch meats, it retains the flavor.

Soy isolates are formed through a chemical process which removes the protein from the defatted flakes. Isolates contain no fiber, carbohydrate, or fat. The soy protein isolates are in a powder form used to add texture to meat products and are the chief component of many dairy-like products such as cheese, soy milk, infant formula, nondairy frozen dessert, and coffee whitener.

Soy concentrates contain more fiber than soy isolates and slightly less protein. Soy concentrates can be used to add texture and moisture to foods such as protein drinks, soup bases, gravies, and surimi.

Texturized Soy Protein

Texturized Vegetable or Soy Protein, or TVP, comes in a form which mimics meat or poultry products.

Essential Phytochemicals

Phytochemicals and **antioxidants** are a new frontier in nutritional research. They are good news for people concerned with healthy eating because, after years of hearing about foods that are bad for us and should be avoided, we now have a nutritional champion to focus on.

Phytochemicals, like vitamins, are compounds that occur naturally in fruits, vegetables, legumes, and grains. Unlike vitamins, phytochemicals have not yet been recognized as essential to life and clear deficiency levels have not been identified. As more is discovered about phytochemicals, deficiency levels may eventually be established for some of these compounds. Although phytochemicals are a relativity new subject for scientific study, research results so far indicate that they are quite effective in reducing the risk of cancer, heart disease, and other chronic diseases.

The Nutritional Significance of Phytonutrient Diversity

Encouraging individuals to “eat the rainbow” is a practical and evidence-informed strategy to enhance micronutrient density, antioxidant intake, and dietary variety—all of which are central to preventative health and metabolic resilience. Beyond the quantity of 3-5 servings of fruits and vegetables a day, the diversity of plant color is increasingly recognized as a key factor in maximizing nutritional benefit.

Each color group reflects the presence of distinct phytonutrients that exert unique physiological effects:

- Red-hued foods (e.g., tomatoes, strawberries, watermelon) are rich in *lycopene* and *anthocyanins*, compounds known for their antioxidant, anti-inflammatory, and cardioprotective properties.
- Green vegetables (e.g., broccoli, kale, spinach) contain bioactive compounds such as *sulforaphane* and *chlorophyll*, which support hepatic detoxification pathways, hormonal regulation, and oxidative stress mitigation.
- Orange produce (e.g., carrots, sweet potatoes, butternut squash) are concentrated sources of *beta-carotene*, a provitamin A carotenoid that enhances immune function, visual acuity, and epithelial tissue integrity.

Herbs (leaves and stems), spices (roots, seeds, bark or fruit), and aromatics are potent sources of phytonutrients. Though used primarily to enhance flavor and aroma, these ingredients are densely packed with bioactive molecules such as polyphenols, flavonoids, terpenes, and sulfur compounds, which play protective roles in human physiology. Many exhibit antioxidant and anti-inflammatory properties that support cardiovascular, metabolic, and cognitive health while also bolstering immune and detoxification systems.

Specific compounds in common herbs and spices demonstrate distinct biological effects. Curcumin in turmeric, gingerols in ginger, and capsaicinoids in chili peppers help regulate inflammatory pathways and oxidative stress. Organosulfur compounds in garlic and onions enhance vascular and immune function, while polyphenols in rosemary, thyme, and oregano protect against free radical damage. Some combinations amplify benefits—for instance, piperine in black pepper improves curcumin absorption, and cooking herbs in oil boosts uptake of fat-soluble antioxidants like carotenoids. Incorporating herbs and aromatics into daily meals offers a simple, low-calorie strategy to enhance both flavor and nutrition. Diets rich in these phytonutrient sources—such as Mediterranean and Asian cuisines—are consistently linked with lower rates of chronic disease. Beyond their health effects, herbs and spices help reduce reliance on salt, sugar, and fat, making them powerful tools for improving dietary quality and supporting long-term metabolic health.

Highlights of Phytochemicals in Plants

PLANT FOOD	PHYTOCHEMICAL	PROTECTIVE EFFECTS: SUMMARY POINTS
Grains and Beans Soy Beans	Sapponins Isoflavones Genistein	• Neutralize cancer causing enzymes in the gut • Reduce serum cholesterol and plaque formation • Alter hormone metabolism
Allium Vegetables: garlic, onions, chives, leeks, scallions	Sulfur allyl cysteine Allicin	• Helps the liver detoxify cancer-causing chemicals • Cholesterol reduction

Cruciferous vegetables: broccoli, kale, Brussels sprouts, cabbage, cauliflower, cabbage	Sulforane Brassinin Indoles Glucosinolates Indoles Isothiocyanate	• Antioxidant
Citrus fruits	Terpenes (limonene)	• Boost the protective enzyme activity
Wines, grapes, cranberries	Flavonoids Ellagic acid	• Combats oxidation and blood clots • Antioxidant properties: prevent DNA damage
Tea	Polyphenols, catechins Flavonoids	• Antioxidant properties: prevent DNA damage and cancer cell growth • Reduce serum cholesterol
Tomatoes	P-coumaric acid lycopene	• Bind with nitrites before they form nitrosamines (cancer causing) • Antioxidant: colon and bladder cancer protection.
Fiber	Phyto estrogens	• Reduce risk of hormone related cancers

BLUE ZONES

What began as a New York Times bestseller by National Geographic Fellow Dan Buettner has evolved into a global movement that's inspiring people to live longer more active lives.

Blue Zones Project® is a community-wide well-being improvement initiative designed to make healthy choices easier. They do this by encouraging sustainable changes in the built environment, building environments and social networks, often supporting locally-driven policy changes throughout a community including such places as worksites, schools, restaurants, grocery stores, faith-based communities, convenience stores and neighborhoods.

By helping people live longer and better through behavior change, communities can lower healthcare costs, improve productivity, access grants and funding available locally and nationally, and enjoy a higher quality of life as they live, work, learn, worship and grow. The program is based on principles identified during an ongoing twenty-year worldwide longevity study commissioned by National Geographic about the regions of the world with the highest concentrations of centenarians (people who live to be 100 years or older).

There are five original blue zones regions: Loma Linda, California; Okinawa, Japan; Nicoya, Costa Rica; Sardinia, Italy; and Ikaria, Greece.

After locating the world's blue zones areas, Buettner and National Geographic took teams of scientists to each location to pinpoint lifestyle characteristics that might explain the unusual longevity. They found that though the blue zones communities are located in vastly different

parts of the world, their residents share nine specific traits that lead to longer, healthier, happier lives. They call these The Power 9®.

The Power 9 includes:

1. **Move Naturally**: Find ways to move more! You will burn calories without thinking about it.
2. **The 80% Rule:** Eat mindfully and stop when 80% full.
3. **Downshift:** Reverse disease by finding a stress-relieving strategy that works for you.
4. **Belong:** Belong to a faith-based community and attend services regularly to add up to 14 years to your life.
5. **Purpose:** Wake up with purpose each day and add up to seven years to your life.
6. **Plant Slant:** Put more fruits and vegetables on your plate.
7. **Right Tribe:** Surround yourself with people who support positive behaviors – and who support you.
8. **Wine @ 5:** If you have a healthy relationship with alcohol, enjoy a glass of wine with good friends each day.
9. **Loved Ones First**: Invest in time with family and add up to six years to your life.

Source: https://info.bluezonesproject.com/origins

Longevity: A Lesson from Okinawa

Japan now boasts the longest life expectancy, an average of 79 years. The greatest longevity is seen in the Japanese region of Okinawa, where the 2020 census recorded an average age of 80.27 for men and 87.44 for women. What researchers find even more remarkable is that Okinawans not only live longer but they are very healthy at this age. They can avoid diseases such as osteoporosis, prostate and breast cancer, heart disease, diabetes, and stroke. Researchers have concluded that these healthy traits are not completely due to genetic traits among this population but to a way of living and eating that is based on tradition, religious beliefs, culture, and geographical location.

Okinawans who move to mainland Japan or other parts of the world adopt a more westernized lifestyle and thus, have shortened lifespan and a higher prevalence of stroke. Mainland Japan reflects different dietary patterns, such as a high sodium intake and a very low cholesterol intake. A high salt intake can lead to high blood pressure (hypertension) which then increases the risk of weakened cell membranes. In the United States, stroke is more often related to fat clogged blood vessels which feed the brain and in Japan the stroke is related to a high salt intake and possible very low cholesterol levels.

The Okinawan diet is more varied than that the typical Japanese diet. While the Okinawan diet was also based on fish and rice, it was influenced by the crossroads of traders from Asia and beyond. Trading opportunities introduced pork from China and fibrous vitamin rich crops such as taro and sweet potatoes.

Americans eat an average of 12 ounces of meat daily - more than three times the average eaten by Okinawans. The major source of protein in the Okinawan diet is derived primarily from plants

such as tofu and fish. These dietary differences appear to be the key to the healthy long lives of Okinawans.

A common saying in the Okinawan culture is “Food is Medicine.” Isoflavonoids, found in tofu and other soybean products may deter osteoporosis by aiding the body to absorb and retain calcium more efficiently. Japanese women, especially Okinawan women, seem to suffer less bone fractures than American women. This is despite a much lower dietary intake of calcium when compared to American women. Isoflavonoids have also been found to have protective properties against breast and prostate cancer. Omega-3 fatty acids which are found in seaweed and seafood also have protective properties for heart disease and hypertension.

The second and more important secret to a long and healthy life in Okinawa is related to *yurimaru*, which comes from the Japanese words for “circle” and “connection”. It is that sense of belonging or being necessary which results in work and independence across all ages. In Okinawa, work, whether it is farming, weaving, managing a market, or fishing is possible for even an 80- or 90-year-old individual.

The Asian and the Mediterranean diets have plenty in common. Both include plant-based foods as the center of the plate. There is an abundance of fresh vegetables and complex carbohydrates. Pasta being the most common for the Mediterranean and rice or wheat noodles throughout much of Asia. However, there are some interesting differences between the two cuisines. Inhabitants of Crete consume close to 40% of their total caloric intake from fat (primarily olive oil) whereas in traditional diets of Asia there was a far less intake of dietary fat. Approximately 15% of the total calories were comprised of plant oils. As modern science has learned, there are other dietary characteristics besides the amount of fat, which contribute to health and longevity in the Asian diet. Unique health benefits have been linked to their sources of dietary protein, soybeans, and tea.

Blue Zone Top 10 Longevity Ingredients

The concept of anti-aging now places a large emphasis on promoting a healthier quality of life, rather than simply promoting a longer life. The World Health Organization (WHO) defines aging as an "irreversible, progressive, and universal decline in the function of multiple-system organs." To promote vitality and longevity, choosing ingredients that contain specific compounds known to support healthy cellular function is key. Below is a selection of ingredients consumed in the Blue Zones that are consumed alone or in combination with one another on a regular basis.

Sardinia, Italy

- **Barley:** Grind into flour or add to soups
- **Cannonau Wine:** Made from sun-dried Grenache grapes
- **Fava beans:** Eaten in soups and stews protein + fiber
- **Kohlrabi:** Copper, magnesium, iron, potassium, calcium + fiber
- **Fennel:** Vegetable (bulb), herb (fronds), or spice (seeds); rich in fiber, B vitamins, vitamin A + C; diuretic; healthy blood pressure
- **Olive Oil:** Anti-inflammatory properties + healthy monounsaturated fats
- **Potatoes:** Help lower cholesterol + heart disease risk
- **Rosemary:** Enhance memory, improve digestion, prevent brain aging + cancer

- **Sourdough Bread:** Made from whole wheat + lactobacillus (instead of yeast) = lower glycemic index
- **Tomatoes:** Vitamin C + potassium

Okinawa, Japan

- **Imo:** "supercharged" sweet potato
- **Dashi Broth:** Amino acid rich
- **Green Onions:** Vitamins K + C
- **Miso:** Rich in various vitamins + beneficial bacteria
- **Sesame Oil:** Zinc + copper; boost heart health + improve circulation
- **Bitter Melon:** Regulates blood sugar
- **Seaweed + Kelp-Filling:** low calorie; carotenoids, folate, magnesium, iron, calcium + iodine
- **Mushrooms:** Shiitake-contains >100 compounds with immune-protecting properties
- **Tofu:** Eating in place of meat = lower cholesterol + lower heart disease risk
- **Turmeric:** Powerful anticancer, antioxidant + anti-inflammatory agent

Nicoya, Costa Rica

- **Small Sweet Peppers:** Rich in vitamins-vitamin C; reduced risk of some chronic diseases
- **Black beans:** Fiber + protein
- **Ground corn:** Make tortillas, eaten at breakfast, lunch + dinner; increases body's ability to absorb calcium, iron + minerals
- **Cilantro:** Lower blood sugar levels + reduce cardiovascular risk; aids in digestion
- **Coconut:** Healthy saturated fats (boost fat burning); increases HDL
- **Culantro:** "Mexican coriander"; calcium, iron + riboflavin
- **Chilero Sauce:** Most popular condiment in Costa Rica; probiotic boost to dishes + antioxidants + antibacterial
- **Papaya:** Vitamins A, C, E + papain (counters inflammation)
- **Squash:** Several varieties; carotenoids

Ikaria, Greece

- **Beans:** Chickpeas + black-eyed peas; snacks, soups + stews; unsaturated fat, fiber, protein, complex carbs, vitamins/mins.
- **Fennel:** From bulb to seeds; calcium, iron, manganese + potassium; herbal teas
- **Wild Greens:** Purslane, dandelion + arugula; minerals + carotenoids (colorful pigments the body converts to vitamin A)
- **Lemons:** Whole; control blood glucose + control/prevent diabetes
- **Olive Oil:** at least 4 Tbsp. daily; protect against heart disease
- **Oregano:** Antioxidants + compounds to help fight bacteria
- **Potatoes:** Eaten daily unlike any other Mediterranean diets; can reduced blood pressure, fight diabetes + prevent inflammation
- **Honey:** Used to treat colds to wounds; stir into coffee + spoonful in the morning and before dinner
- **Sage:** Lower Alzheimer's and dementia; properties that help strengthen bones
- **Rosemary:** Improve digestion + enhance memory; herbal teas

Loma Londa, CA, United States

- **Soy Milk:** Unsweetened; alternative to dairy; high protein, low in fat + phytoestrogens (may protect against some cancers)
- **Weetabix:** Whole grain cereal; promotes skin + bone health; digestive health
- **Corn Flakes:** Staple Adventist breakfast; rich in vitamins/mins. (folate + thiamine)
- **Brewer's Yeast:** Chromium (may help control blood sugar levels + improve glucose tolerance) + immune-boosting properties
- **Nuts:** Protein, healthy fats, fiber + vitamins/mins.
- **Oatmeal:** Healthy fats, complex carbs, plant protein, iron + B vitamins.
- **Avocados:** Potassium, low in sodium; may help reduce blood pressure and risk of stroke
- **Vegemite:** Spread made from brewer's yeast, salt + veg. extract; supports brain health
- **Beans:** Important protein source
- **Spinach + other greens:** vitamins/mins. + fiber

Wild Foods

Wild food, from plants to mushrooms and even fish and game, are as much a part of our history as humans as we humans are ourselves. We were hunters and gatherers, relying on what was around us to survive. The plants and animals that we searched for had evolved on this planet to survive themselves for millions of years. And, with that evolution, the idea of seasonality was born. Wild herbs such as Nettles, Seaweeds, and Mushrooms have a window of time in which they grow, much the same way that salmon have a "run," or herds of wild elk pass through during Autumn.

Many cultures forage for mushrooms and berries as a way of life and a pastime that is as much a part of the culture as sports. In Scandinavia, and particularly Sweden, there is a term for foraging, called Allemansrätten, where children are taught to forage with respect for the land, the forest, and to leave some of what they are foraging for others who follow their paths.

When we look at the composition of wild foods we find that most of them have what our bodies may need in that particular time, whether it is liver cleansing compounds of cleavers or the highly nutritive vitamins and minerals in nettles that only arise in spring after our bodies have hibernated over a long winter, or rosehips that arise right before the winter to provide immune boosting before the cold and rainy season. Wild foods seem to know what our body needs to survive any season, if we know what to search for.

They are also more nutritious than their cultivated varieties. Wild varieties struggle more to survive than their cultivated cousins and therefore are higher in antioxidants, vitamins and minerals. For instance, wild blueberries have a higher skin-to-pulp ratio than cultivated blueberries which not only equals more intense blueberry flavor, but also more antioxidant-rich pigment, and more fiber.

The same can be said for wild mushrooms such lion's mane which contain more protein, fiber, and antioxidants than store-bought varieties. Mushrooms are one of the most notorious wild foods and have a long history of being used as medicine throughout history. Some cultures across the globe have known the medicinal properties of mushrooms and other fungi not as folklore but as fact, even when scientific proof may not have been available. Mushrooms have medicinal status in many parts of Asia such as China, Japan and Korea and the scope of their

medicinal potential has spread widely across the United States in recent years. Just walk into a Traditional Chinese medicine Apothecary and you will see a wide variety of medicinal and edible mushrooms ready to be made into a therapeutic remedy for what ails you.

The same is true for the shelves of many supermarkets and pharmacies in the United States, as the shelves are filled with pills, tinctures, and powders made from so many of the wild herbs and greens you can find on a morning hike or even in your backyard. No one will ever complain about you picking their dandelions! This herb is one of the most nutritious greens that one can eat, from root to flower and everything in between.

Some caution about foraging: While creating exotic and even twists on your favorite dishes with your exciting finds, don't eat anything unless you are absolutely 100% sure that you have identified it correctly. There are many poisonous plants and some of them look similar to ones you may find at the store. Roadsides are often contaminated with heavy metals and oil which can have a variety of problematic health outcomes if it builds up in your body. Urban environments can have all sorts of toxic chemicals, and old houses were often coated with lead paint. Many old fruit orchards were typically sprayed with DDT up until the 1960s, so many orchard soils are still contaminated with these chemicals.

Source: Chef Rebecca Peizer CEC, CHE

Day Five Syllabus: Reimagining Favorite Foods: Promoting Dietary Behavioral Changes and Mindfulness

Learning Objectives

By the end of this day, you should be able to …

- Compare plant based and plant forward diets.
- Select ingredients for that implement the Protein Flip.
- Modify traditional recipes for plant-based versions.
- Discuss how to easily swap plant-based proteins for animal protein.
- Identify ways to swap out saturated fats with healthier plant-based fats to maximize flavor and texture.
- Use plant-based milk for animal milk in a variety of preparations.
- Describe the health benefits of eating less animal protein.
- Find ways to incorporate healthier protein into everyday recipes.
- Describe alternatives to ultra processed food.
- Evaluate how coffee and tea support metabolic and cardiovascular health.
- Discuss how GLP-1 medications influence dietary needs and identify food-based strategies to support individuals using them.
- Describe the impact of ultra-processed and refined foods on metabolic health.
- Apply behavior change and motivational interviewing strategies to help individuals sustain healthier eating patterns.
- Understand how to Integrate a patient's food story and food access/choices into a diet plan.
- Create a balanced grain bowl for any meal using previously prepared and staple pantry ingredients.
- Find ways to become more mindful in the selection, preparation, and eating of food.

Learning Activities

- Lecture and discussion
- Mindful Eating Exercise
- Demonstrations
- Hands-on production
- Creating Healthy Bowls from Previously Prepared Ingredients

Key Terms

Meat Analogue
Amino Acids
Food Additives
Nitrates/Nitrites
GLP-1
Plant Based Milk
Processed Food
Phosphorous
Clean Label
Nutritional Yeast
Ultra-Processed Food
Mindfulness
Polyphenols

Instructor Demonstrations

- Basic Mushroom Meat Blend
- Walnut Chorizo
- Baking with plant-based fats and egg replacers

Evaluating Nutrition Science: How to Discern Strong Evidence from Distraction

In the constantly shifting landscape of dietary advice, it's easy to get lost in conflicting headlines, overhyped claims, and industry influence. Whether you're a clinician, educator, chef, or foodservice leader, understanding how to critically evaluate nutrition science is essential to making informed, responsible decisions.

High-quality nutrition evidence is built on several core principles that help ensure scientific rigor and real-world relevance. Strong studies are based on human research with adequate sample sizes, since animal or cell studies often fail to reflect true human physiology and behavior. The most valuable evidence focuses on real health outcomes—such as cardiovascular disease, diabetes, cancer, or overall well-being—rather than relying solely on biomarkers like cholesterol or blood sugar. Prospective study designs, including cohort studies that follow participants over time and randomized controlled trials (RCTs), provide stronger evidence for cause and effect, though RCTs are less common in nutrition due to long-term feasibility challenges. Reliable conclusions require confirmation across multiple studies in diverse populations using varied methodologies. Controlled feeding trials that include biomarker measurements add valuable mechanistic insight and help establish causality when supported by long-term data. Comprehensive systematic reviews and meta-analyses synthesize results across many studies and are most credible when conducted transparently by experts in the field. Finally, publication in peer-reviewed, high-quality journals—such as *JAMA*, *The Lancet*, or *The New England Journal of Medicine*—increases confidence in the study's validity, though all research should still be critically evaluated within the broader context of existing evidence.

Red Flags: What to Watch Out For

The toolkit also highlights a "Checklist for Confusion"—12 common red flags that can derail sound decision-making:

- **Poorly Constructed Studies**: Often small, retrospective, and biased.
- **Outlier Studies**: Contradicting established evidence, usually with weak designs.
- **Low-Quality Meta-Analyses**: Especially when conducted by non-specialists.
- **Economic Influence**: Industry funding can bias study design and reporting.
- **Political Interference**: Lobbying can affect public health guidelines.
- **Status Quo Bias**: Resistance to change even when new evidence emerges.
- **Media "Experts"**: Influencers and diet book authors with little scientific background.
- **Lack of Context ("Compared to What?")**: Evaluating foods without considering replacements can distort interpretation.
- **Half-Truths**: Replacing refined carbs with red meat is not a health win.
- **Sensationalism**: "Miracle" headlines often mask modest, mixed, or unconfirmed findings.
- **Personal Bias**: Our cultural food beliefs can block objective assessment.
- **Environment Disconnect**: Many Americans face barriers to healthy food access, skewing public health messaging.

Translating Science to Practice

Nutrition is complex, influenced not only by biology but also by economics, culture, industry, and media. Evaluating diet studies therefore requires a careful and multi-layered approach. Professionals across food and health systems must consider whether a study is well-designed and published in a reliable source, whether its findings align with the broader body of evidence, and whether funding sources or conflicts of interest may have influenced the results. It is also essential to assess whether a dietary claim holds up when considering substitutions, context, and real-world applicability. Ultimately, the goal is to translate scientific information into practical, equitable, and sustainable food choices. By applying these principles, professionals can resist misinformation, promote clarity in nutrition discussions, and help guide both individual behaviors and institutional policies toward improved health outcomes and environmental stewardship.

Ultra Processed Foods

Processed carbohydrates and ultra-processed foods have become defining elements of the modern food landscape, with significant implications for metabolic and public health. Ultra-processed foods (UPFs) are industrially manufactured products composed largely of food-derived substances such as refined starches, added sugars, hydrogenated oils, and artificial flavorings or colorings, rather than whole or minimally processed ingredients. These products—ranging from sugary cereals and packaged snacks to soft drinks, instant noodles, and fast food—are engineered for convenience, long shelf life, and sensory appeal. They are typically high in calories, sodium, unhealthy fats, and added sugars, yet low in fiber, vitamins, and minerals. Because of their highly palatable and energy-dense nature, UPFs promote overconsumption and energy imbalance while displacing nutrient-dense foods from the diet.

A growing body of research links high consumption of UPFs with adverse health outcomes, including obesity, type 2 diabetes, cardiovascular disease, hypertension, and increased all-cause mortality. Mechanistically, UPFs contribute to metabolic dysfunction by disrupting appetite regulation, promoting inflammation, and altering gut microbiota. Moreover, frequent intake of these foods has been associated with poorer mental health outcomes, including elevated risks of depression and anxiety. These effects stem not only from their poor nutrient composition but also from additives, emulsifiers, and artificial sweeteners that interfere with metabolic and gut health. From a public health perspective, UPFs have become ubiquitous due to their affordability, accessibility, and aggressive marketing, particularly in urban and low-income communities. While their convenience is undeniable, regular consumption poses profound long-term health risks. Optimal dietary patterns should therefore emphasize whole or minimally processed foods—such as fruits, vegetables, legumes, whole grains, nuts, and lean proteins—while limiting UPFs to occasional use.

Recent survey data from the International Food Information Council in 2024 reveal both the pervasiveness of UPFs and the limited public understanding of their health implications. The study, which included over 3,000 adults in the United States aged 18–80 years, found that only one in three respondents were familiar with the term “ultra-processed food.” Among those surveyed, 54 percent reported following a specific eating pattern, with “Mindful Eating” and “Clean Eating” ranking among the five most common. Notably, individuals earning more than $75,000 annually were more likely to follow a structured diet. Of those who practiced mindful

eating, 77 percent did so with the goal of improving their health. Participants identified foods such as beef, pork, cooking oils, dairy, and eggs as items they aimed to reduce or avoid, while showing a marked increase in the consumption of fresh produce—viewed as the healthiest available food choices. These findings suggest a growing awareness among certain demographic groups of the benefits of minimally processed foods, even if broader recognition of the term "ultra-processed" remains limited.

The consumption of refined carbohydrates, a key component of most UPFs, compounds these health challenges. Refined carbohydrates are extracted from whole foods through mechanical and chemical processes that dismantle their natural food matrix—a structure containing fiber, protein, fats, and micronutrients that collectively moderate digestion and absorption. Once removed from this matrix and reconstituted into products such as high-fructose corn syrup, maltodextrin, and refined flours, these carbohydrates are rapidly absorbed, causing sharp spikes in blood glucose and insulin. Repeated exposure to these fluctuations contributes to insulin resistance, inflammation, and adipose accumulation.

Corn is among the most heavily utilized raw materials in this context. Through wet milling and hydrolysis, corn kernels are deconstructed into starches that are further refined into sweeteners such as glucose syrup and high-fructose corn syrup. These ingredients are economically advantageous for manufacturers, due to both agricultural subsidies and their functional versatility, but physiologically detrimental, as they deliver concentrated, rapidly digestible sugars. Similarly, the refinement of grains—through milling that removes the bran and germ—produces flours and starches devoid of fiber and key micronutrients. Even "100% whole grain" flours are often recombined products that digest much faster than intact grains such as oats, quinoa, or barley, leading to greater glycemic responses. White rice and similar processed staples follow comparable patterns, functioning metabolically like refined starches despite occasional enrichment with vitamins and minerals.

Modern food manufacturing technologies, including puffing and extrusion, further exacerbate these issues. By exposing starches to intense heat and pressure, these methods create light, porous products such as breakfast cereals, snack puffs, and energy bars. These foods dissolve quickly in the mouth, encourage rapid consumption, and contribute to overeating before satiety signals can regulate intake. Even products marketed as "healthier" alternatives—such as vegetable-based chips—often lose most of their original nutrients through pulverization, extrusion, and frying. What remains is largely starch, oil, and salt, compositionally similar to conventional snack foods.

The proliferation of additives further distinguishes UPFs from naturally derived foods. Ingredients such as emulsifiers, humectants, dough conditioners, and modified starches enhance texture, moisture, and shelf life but offer no nutritional value and may alter gut microbiota or promote inflammation. While certain types of food processing—such as canning beans, freezing produce, or grinding nuts—can improve food safety and accessibility without undermining nutritional quality, the extensive refinement and recombination that define UPFs transform food into a vehicle for excess calories and rapid glucose absorption.

From a policy and public health standpoint, the dominance of processed and ultra-processed foods reflects the intersection of industrial efficiency, economic incentives, and consumer behavior. Many refined carbohydrate ingredients currently hold "generally recognized as safe"

(GRAS) status in food regulation, permitting their widespread use without ongoing safety evaluation. However, accumulating evidence links chronic exposure to these ingredients with metabolic and inflammatory disorders, suggesting that reevaluation of their regulatory classification may be warranted.

Ultra-processed foods and refined carbohydrates have restructured modern dietary patterns in ways that undermine metabolic stability and public health. They blur the line between nourishment and consumption, offering abundance without balance. As research continues to elucidate their biological and societal consequences, the imperative for both education and policy reform becomes clear: to realign food systems toward whole, minimally processed, nutrient-dense sources that sustain human health rather than erode it.

Dairy

Dairy foods include a wide range of products that have long been part of traditional diets—such as milk with cereal, cheese and crackers, yogurt with fruit, and even occasional treats like ice cream. While indulgent dairy products like ice cream and cream cheese are best enjoyed occasionally, there remains uncertainty about the health impacts of other dairy foods that provide valuable nutrients such as protein, calcium, vitamin D, and potassium. Common questions include whether cheese can be considered healthy, and whether low-fat or non-fat dairy products are better for heart health than full-fat versions. Historically, full-fat dairy products were viewed as less healthful because they contain higher amounts of saturated fat.

In the 1970s and 1980s, saturated fat became a dietary focus due to concerns about heart disease risk, leading the 1980 Dietary Guidelines for Americans to recommend non-fat and low-fat dairy products. The 2010 Healthy, Hunger-Free Kids Act reinforced this approach in schools, increasing consumption of low-fat and fat-free dairy despite complaints about reduced flavor and satisfaction. The 2015–2020 Dietary Guidelines for Americans continued recommending three daily servings of low-fat dairy to promote calcium intake and reduce fracture risk. However, research beginning in the 2000s challenged these assumptions, suggesting that full-fat dairy might be just as healthful as lower-fat versions. Scientists began to recognize that dairy products are diverse—fermented options like yogurt and cheese may offer unique benefits, including improved digestibility due to lower lactose content and the presence of beneficial microbes.

The way dairy is consumed also matters. For example, cheese eaten in moderation with fruit or whole grains provides protein and calcium, but when consumed frequently on foods already high in sodium, refined carbohydrates, and saturated fats (like pizza or burgers), it can contribute to poor dietary quality. Frequency and portion size influence overall fat and calorie intake, meaning multiple servings of low-fat dairy could provide as much saturated fat as a smaller portion of full-fat dairy.

Sheep, goat, and yak milks contain about the same if not more calcium than cow’s milk. The amount of protein and carbohydrate are about the same. They all contain some lactose but less than found in cow’s milk, so they may be easier to digest for people with lactose sensitivity.

Dairy and Health

The nutrients and types of fat in dairy are involved in bone health, cardiovascular function, and other physiological processes. Calcium, vitamin D, and phosphorus support bone structure, while potassium may help lower blood pressure. However, research on dairy and health remains mixed, partly due to limitations in study design. Observational studies may not fully control for lifestyle differences between dairy consumers and non-consumers, while randomized clinical trials are often short in duration and include small participant groups, making it difficult to evaluate long-term outcomes such as heart disease or fractures. Longer epidemiological studies are needed for clearer conclusions.

Dairy production also has environmental implications. It requires substantial land, water, and feed resources, and ruminant animals like cows and goats produce methane, a potent greenhouse gas. To balance health and sustainability, the "planetary health diet" recommends around 250 grams of dairy per day (approximately one 8-ounce cup of milk, yogurt, or an ounce of cheese). If global populations were to consume two or more servings daily, achieving climate goals would become more difficult.

Bottom line is that both full-fat and low-fat dairy foods can provide important nutrients—protein, calcium, B vitamins, and vitamin D—and fermented options like yogurt and certain cheeses offer added gut health benefits. Still, **dairy is not an essential food**; its nutrients can be obtained from other sources. The health impact of full-fat versus low-fat dairy depends largely on what replaces the dairy fat in the diet. Replacing saturated fat with added sugars offers no benefit, while replacing it with unsaturated fats (from nuts, seeds, and plant oils) can be advantageous. Total consumption also matters—at one serving per day, fat content is less significant, but with three or more servings, moderation becomes important. Ultimately, dairy can fit into a healthy eating pattern based on personal preference, tolerance, and overall diet quality. Whether choosing non-fat milk for cereal, low-fat Greek yogurt, or a small portion of full-fat cheese, balance and context are key to incorporating dairy in a healthful and sustainable way.

Milk and Health

Milk, produced by the mammary glands of mammals, is a primary source of nutrition for infants but can also play a role in adult diets. Cow's milk is about 87% water, with the remaining 13% containing protein, fats, carbohydrates, vitamins, and minerals. Variations include reduced-fat (2%), low-fat (1%), and skim (non-fat) milk, created through fat removal. Cow's milk naturally contains hormones like insulin-like growth factor-1 (IGF-1), estrogens, and progestins, which may vary depending on whether cows receive hormonal treatments to boost milk production.

Milk provides calcium, protein, riboflavin (vitamin B2), vitamin B12, potassium, phosphorus, and often vitamins A and D (added during processing). The Dietary Guidelines for Americans recommend three 8-ounce servings of milk or equivalent dairy products daily to help prevent osteoporosis. However, scientific evidence does not consistently show a direct benefit for bone health and, in some studies, suggests potential risks, such as an association with prostate cancer. Differences in results may be due to variations in study populations, types of milk consumed

(whole, reduced-fat, skim, or organic), the breed and diet of dairy cows, and overall dietary context (e.g., fruit and vegetable intake, processed food consumption).

The health benefits of dairy foods appear to be stronger for fermented types like yogurt, which play a role in the gut microbiome. Milk possesses several individual nutrients that can affect blood pressure and bone health, but some of their health-promoting effects may be weakened by whole milk's high saturated fat content. Although popular media articles have speculated that whole milk is not less healthful than skim milk, research has not supported this statement regarding diabetes and heart disease, and a high intake of any type of milk can lead to weight gain due to the extra calories.

Plant-Based Milk

Plant-based milks contain no lactose so may be better tolerated than dairy milk in some people. Also, plant-based milk has no cholesterol, and most have little saturated fat. However, the nutritional content varies widely, so be sure to read the food label to ensure you are getting the desired nutrients. This chart compares dairy milks to a sample of plant-based milks. As you will see, nutrients vary across types of plant-based milks, as well as among different brands selling similar options. Specific brands may contain more or less of the nutrients depending on if products are fortified, or if added flavors or sweeteners are included. Generally, plant-milks labeled "original" will include added sugars, so look for unsweetened options and be sure to check the Nutrition Facts label and ingredients list so you know what you're buying.

Type of Milk [all entries for 1 cup (8 fluid oz/240 mL)]		Cal	Prot. (g)	Sugar (g)	Fat (g)			Calc. (mg)	Pot. (mg)	Fiber (mg)
				Natural/ Added	Sat.	Mono.	Poly.			
Cow	Whole milk (3.5% fat)	149	7.5	12/0	4.5	2	0.5	276	322	0
	Low fat milk (1% fat)	102	8	12.5/0	1.5	0.7	0.1	305	366	0
Soy	Plain	80	7	1/0	0.5	1	2.5	300	350	2
	Sweetened	110	8	1/5	0.5	1	2.5	450	380	2
	Sweetened	140	10	3/7	0.5	N/A	N/A	276	512	N/A

Almond	Plain	35	1	0/0	0	N/A	N/A	430	35	1
	Sweetened	60	1	0/5	0	N/A	N/A	429	40	1
	Sweetened	60	1	0/7	0	1.5	0.5	450	170	1
Cashew	Plain	50	1	0/0	0.5	N/A	N/A	44	N/A	N/A
	Sweetened	80	1	1/5	0.5	N/A	N/A	44	N/A	N/A
	Sweetened	130	4	1/1	1.5	N/A	N/A	15	150	0
Coconut	Plain	45	0	0/0	3.5	N/A	N/A	130	40	1
	Sweetened	70	0	0/7	4	N/A	N/A	130	40	1
	Sweetened	70	0	0/5	4	N/A	N/A	460	170	0
Rice	Plain	70	0	<1/0	0	1.5	0.5	325	N/A	0
	Sweetened	120	1	<1/10	0	1.5	0.5	26	N/A	0
Hemp	Plain	60	3	0/0	N/A	0.5	3.5	257	100	N/A
	Sweetened	140	4	0/12	1	0.5	4	263	145	N/A
	Sweetened	100	2	0/6	0.5	1	4.5	390	N/A	0
Oat	Plain	60	1	0/0	0	N/A	N/A	460	170	1
	Sweetened	80	2	0/4*	0	N/A	N/A	460	190	1
	Sweetened	120	3	0/7*	0.5	N/A	N/A	350	390	2

**Some sugars are created in the processing of oats to make oat milk, which are listed as "added sugars" even if no other sweeteners are added.*

Beverages

Water is the body's most essential beverage and has served as humanity's primary source of hydration for millions of years, meeting all biological needs without added calories, sugar, or chemicals. Proper hydration supports every major physiological function, including temperature regulation, blood pressure control, digestion, and cognitive performance. Over time, as agriculture and civilization developed, humans began consuming a wider variety of beverages—first milk, then fermented drinks such as wine and beer, and eventually brewed options like coffee and tea. Today, the beverage landscape is vast, encompassing everything from sugary sodas and sports drinks to artificially sweetened "diet" beverages, each with its own health implications.

For everyday hydration, water remains the best choice—calorie-free and essential for optimal health. Unsweetened coffee and tea also offer benefits, providing antioxidants and phytochemicals; moderate intake is linked to a reduced risk of type 2 diabetes, Parkinson's disease, and certain cancers. Some beverages are best enjoyed in moderation, such as milk, which provides calcium, protein, and vitamin D but also contains saturated fat and natural sugars, and 100% fruit juice, which, despite being vitamin-rich, lacks fiber and delivers concentrated sugars. Low-calorie or "diet" drinks can serve as sugar-free alternatives, though their long-term effects on metabolism and gut health are still being studied, and they may sustain a preference for sweetness without nutritional benefit. In contrast, sugary drinks—including soda, sweetened teas, energy drinks, and many sports beverages—should be limited or avoided altogether, as they deliver large amounts of rapidly absorbed sugar that can raise blood glucose levels and contribute to weight gain, type 2 diabetes, and fatty liver disease.

The bottom line is that water remains the gold standard for hydration, providing everything the body needs without added calories or chemicals. Coffee and tea, when consumed without added sugar, can offer additional health benefits due to their antioxidant and phytochemical content. Alcohol, while it may provide some cardiovascular benefits in moderation, carries significant risks and is not advisable for everyone. In contrast, sugary and heavily sweetened beverages should be avoided, as they contribute to poor metabolic health, weight gain, and chronic disease risk. Overall, encouraging healthier beverage choices is an essential strategy for promoting long-term wellness, reducing the burden of chronic disease, and supporting sustainable, health-conscious dietary habits.

Alcohol

Alcohol has played a central role in human society for thousands of years, serving as both a cultural tradition and a source of health debate. It functions like a double-edged sword—offering potential cardiovascular and metabolic benefits when consumed moderately yet contributing to serious health risks when misused. In the United States, one standard drink contains roughly 12 to 14 grams of alcohol, equivalent to 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of distilled spirits. Moderate drinking is typically defined as up to one drink per day for women and up to two for men, according to the U.S. Dietary Guidelines.

More than 100 prospective studies have suggested that moderate alcohol consumption may lower the risk of coronary heart disease, ischemic stroke, and sudden cardiac death by 25–40%,

while improving HDL cholesterol, insulin sensitivity, and blood clotting regulation. Some evidence also suggests reduced risk of type 2 diabetes and gallstones, along with possible social and psychological benefits, such as stress reduction and enhanced social bonding. These benefits, however, apply primarily to light to moderate drinkers, and regular, evenly spaced consumption provides greater protection than binge drinking.

Heavy or excessive drinking remains a major cause of preventable death, linked to liver disease, cardiomyopathy, hypertension, and at least seven types of cancer, including breast, liver, and colon cancer. It also contributes to mental health issues, dependency, violence, impaired judgment, and poor sleep. In the U.S., tens of millions of adults engage in binge or heavy drinking each year, with alcohol involved in one-third of violent crimes and over 10,000 traffic fatalities annually, costing the economy nearly $250 billion.

Alcohol also plays a clear role in breast cancer risk, especially among women with low folate intake or a family history of the disease. Women who consume 2–5 drinks per day have up to a 41% higher risk of breast cancer compared to abstainers, though adequate folate intake (at least 400 mcg/day) may mitigate some of this risk. Alcohol raises estrogen levels, which can fuel hormone-sensitive tumors. Additionally, alcohol contributes to weight gain, as each standard drink adds about 100–150 calories—more if mixed with sugary beverages—which can undermine weight management over time.

Individual responses to alcohol vary depending on genetic factors. Variants in genes like *ADH1C*, which influence alcohol metabolism, affect both tolerance and potential health outcomes. Those with slower metabolism may gain more cardiovascular benefit from moderate drinking, whereas others may experience greater harm. Certain populations should avoid alcohol entirely, including pregnant individuals, people with liver disease, those taking medications that interact with alcohol, and anyone with a personal or family history of alcohol use disorder.

The balance of risks and benefits also shifts across the lifespan. Young adults face higher risks of injury and little protective cardiovascular benefit, while middle-aged adults at risk for heart disease may see moderate benefits. For older women, the breast cancer risk often outweighs potential cardiovascular gains.

Recent research headlines claiming “no amount of alcohol is safe” have reignited debate. A 2022 Mendelian randomization study found that genetic variants linked to heavy drinking were associated with higher cardiovascular disease risk yet still showed the lowest risk among light to moderate drinkers (1–15 drinks per week). Similarly, a 2018 *Lancet* analysis concluded that no safe level of alcohol exists, but experts such as Dr. Walter Willett of Harvard T.H. Chan School of Public Health argue this oversimplifies complex data—particularly since global disease burdens differ by region.

Ultimately, decisions about alcohol use should be personalized. Non-drinkers should not start drinking for health reasons, as diet and exercise provide similar or greater benefits. Those who do drink should do so moderately, maintain adequate folate intake, and consult healthcare professionals to assess individual risks. While alcohol can support heart health when consumed responsibly, its misuse poses serious and far-reaching consequences. Emerging evidence continues to refine our understanding, but current data suggest that light to moderate intake,

paired with an overall healthy lifestyle, may offer net benefits for some individuals while still requiring careful, informed decision-making.

Coffee

Coffee has long been one of the world's most beloved beverages, yet its health effects have been debated for decades. Once thought to be potentially harmful, coffee was listed by the World Health Organization in 1991 as a possible carcinogen. However, after years of rigorous research, it was cleared of suspicion in 2016 when evidence showed that coffee consumption was not associated with an increased risk of cancer; rather, regular drinkers demonstrated a lower risk for certain cancers when smoking was accounted for. The complex chemistry of coffee—comprising over a thousand distinct compounds, including caffeine, polyphenols, and diterpenes—appears to contribute to these effects. In moderation, typically defined as three to five cups a day or roughly 400 milligrams of caffeine, coffee can be considered a healthful part of the diet for most adults.

The composition of coffee varies considerably depending on the type of bean, roasting process, grind size, and brewing method. Arabica beans, prized for their smooth, mild flavor, dominate global coffee production, while Robusta beans offer a stronger, more bitter taste and greater resilience to environmental stress. Beyond the beans themselves, the degree of roasting—from light to dark—affects acidity, bitterness, and aroma. Despite popular myths, darker roasts contain slightly less caffeine than lighter ones. Whether enjoyed as a morning ritual or an afternoon pick-me-up, coffee offers a source of caffeine, magnesium, vitamin B2, and a wealth of plant chemicals such as chlorogenic acid, quinic acid, cafestol, and kahweol—all of which may play roles in health outcomes.

Research exploring coffee's impact on chronic disease has yielded consistently encouraging results. Epidemiological studies indicate that moderate coffee consumption is associated with reduced risks of type 2 diabetes, cardiovascular disease, depression, and several neurodegenerative disorders such as Parkinson's and Alzheimer's disease. Coffee may improve insulin sensitivity and glucose metabolism through its polyphenolic compounds and minerals, while its antioxidant and anti-inflammatory effects may protect against cellular damage. In terms of cardiovascular health, while caffeine can temporarily increase heart rate and blood pressure, long-term studies show no elevated risk of heart disease or stroke among moderate drinkers. In fact, large cohort studies have found that consuming two to five cups daily correlates with a lower risk of cardiovascular mortality.

Coffee's relationship with cancer has evolved with advancing scientific understanding. While early concerns about acrylamide—a compound formed during roasting—prompted California to issue warning labels in 2018, subsequent regulatory reviews concluded that coffee does not pose a significant cancer risk. Indeed, compounds in coffee may inhibit cancer cell growth, modulate hormones such as estrogen, and reduce inflammation. The American Institute for Cancer Research now recognizes coffee as potentially protective against liver and endometrial cancers. Similarly, coffee has been linked with lower risks of gallstone formation, possibly due to its stimulation of bile flow and gallbladder contraction.

For mental health and neuroprotection, coffee's bioactive compounds and caffeine content appear to offer benefits. Caffeine stimulates the central nervous system, increasing alertness, concentration, and energy. Studies have shown associations between higher coffee intake and reduced risks of depression and suicide, with caffeine believed to play a significant role in these effects. Furthermore, habitual coffee drinking has been linked to lower rates of Parkinson's disease, likely due to caffeine's capacity to protect dopamine-producing neurons. The potential cognitive benefits extend to Alzheimer's disease as well, with midlife coffee consumption associated with reduced risk in later years.

Caffeine itself—the bitter white compound chemically known as 1,3,7-trimethylxanthine—is rapidly absorbed after consumption, reaching peak blood levels within 15 minutes to two hours. Its half-life in the body ranges from 1.5 to 9.5 hours, influenced by genetics, smoking, pregnancy, and use of oral contraceptives. As a mild stimulant, caffeine enhances wakefulness and mood, but excessive intake may cause anxiety, insomnia, or heart palpitations in sensitive individuals. The U.S. Food and Drug Administration considers up to 400 milligrams of caffeine per day safe for most adults, while pregnant women are advised to limit intake to 200 milligrams due to the compound's ability to cross the placenta.

Caffeine's physiological effects are diverse. It acts primarily by blocking adenosine receptors in the brain, which delays fatigue and promotes alertness. However, this mechanism also reduces deep sleep quality, particularly when caffeine is consumed late in the day. Caffeine may also stimulate thermogenesis and fat metabolism, though its role in long-term weight management is modest at best. Interestingly, caffeine's bronchodilatory properties mirror those of theophylline, a medication used to treat asthma, suggesting a beneficial effect on respiratory function. In the liver, caffeine appears protective against fibrosis and cirrhosis, likely by inhibiting adenosine-mediated collagen production.

Despite these benefits, moderation remains key. Individuals vary widely in caffeine sensitivity due to genetic differences in metabolism. For those who experience jitteriness, anxiety, or insomnia, switching to decaffeinated coffee—which retains most of coffee's beneficial compounds but contains only trace amounts of caffeine—may be a preferable option. It is also worth noting that the healthfulness of coffee depends not only on its bioactive compounds but also on preparation and additions: sugary syrups, whipped cream, and high-fat milk can quickly turn a beneficial beverage into a calorie-laden indulgence.

In conclusion, the evidence overwhelmingly supports that moderate coffee and caffeine consumption can be part of a healthy lifestyle. Coffee contributes valuable antioxidants and bioactive compounds that may protect against numerous chronic diseases, while caffeine provides short-term improvements in alertness and cognitive performance. However, personal tolerance and health status should guide consumption, especially for individuals sensitive to caffeine's effects or during pregnancy. Enjoyed thoughtfully and in moderation, coffee remains not only one of the world's most popular beverages but also one with substantial potential for promoting long-term health.

Tea

Tea is the world's most popular beverage after water, prepared simply by pouring hot water over the cured leaves of the Camellia sinensis plant. Its earliest recorded use in third-century China emphasized medicinal qualities, and merchants soon carried it across continents. By the early nineteenth century, Britain had popularized the ritual of afternoon tea, pairing the drink with light fare. Flavor depends on where the leaves are grown and how they are processed; black tea remains the most widely consumed globally, followed by green, oolong, and white teas. Herbal infusions, often called "herbal teas", do not come from Camellia sinensis, but from other plants' leaves, flowers, seeds, roots, spices, or fruits, and are typically naturally caffeine-free.

Traditional teas contribute caffeine and a rich array of polyphenols, including flavanols such as myricetin, quercetin, and kaempferol; theaflavins formed during oxidation in black tea; and catechins in green tea, most notably epigallocatechin-3-gallate (EGCG). Although these beverages provide few vitamins or minerals in meaningful amounts, their polyphenols shape aroma and taste and may support health. The precise composition varies with cultivar, geography, harvest conditions, and processing, and it can be further altered by additions like milk, honey, or lemon.

Evidence from human studies, while more mixed than animal research, suggests that regular tea consumption—about two to three cups daily—is associated with lower risks of premature mortality, cardiovascular disease, stroke, and type 2 diabetes. Polyphenols likely contribute via antioxidant and anti-inflammatory effects, modulation of endothelial function, and influences on lipid oxidation. Heterogeneity in study results often reflects wide variation in tea types, blends, brewing strengths, serving temperatures, and co-consumed foods. One consistent caution is temperature: frequent intake of very hot beverages, typically above 65–70°C (131–140°F), has been associated with an elevated risk of esophageal cancer, likely through thermal injury, rather than any specific compound in tea.

The "antioxidant story" of tea is nuanced. Green tea is richest in EGCG, whereas black tea is richer in theaflavins, and both classes of compounds have demonstrated biological activity in experimental models. Decaffeinated teas generally retain polyphenols, although certain solvent-based decaffeination methods may reduce their concentrations to a greater extent than carbon dioxide "effervescence" processing. The addition of milk may decrease measurable antioxidant capacity in vitro by binding flavonoids to proteins, with lower-fat milks sometimes exerting a greater effect than higher-fat milks; nevertheless, tea with a splash of milk can still fit within an overall healthful pattern.

Cardiometabolic outcomes illustrate both promise and limits of current evidence. Observational cohorts from East Asia link higher intakes of green and oolong tea with reduced risks of stroke and cardiovascular mortality, and several studies suggest that regular tea intake supports healthier blood pressure profiles over time. Meta-analyses of randomized trials point to modest reductions in blood pressure with green tea extracts in specific populations and small decreases in LDL cholesterol with both black and green tea, though overall trial quality and duration temper firm conclusions. Larger, longer, well-controlled studies are still needed to clarify causality and dose-response relationships.

Cancer findings remain inconsistent in humans. Laboratory work shows that EGCG can inhibit cancer cell growth and promote apoptosis, and animal studies with green and black tea extracts often suggest risk reduction or delayed progression. Population studies, however, have not demonstrated uniform protection across cancer sites, and some meta-analyses find no association for black tea with common cancers when consumed at typical intakes. As noted, temperature is a key confounder: drinking very hot tea appears to raise esophageal cancer risk irrespective of tea type, while moderate temperatures mitigate that concern.

For those sensitive to caffeine—given its stimulant effects on the nervous system and potential to increase heart rate or jitteriness—decaffeinated tea offers a practical alternative. Traditional teas already provide roughly half the caffeine of coffee per typical serving, and lowering brew time further reduces caffeine. Decaffeination methods include organic solvents such as ethyl acetate or methylene chloride, which can remove more polyphenols, and carbon dioxide–based processes that tend to preserve them. Residual solvent in finished products is minimal to none, and current evidence does not indicate adverse health effects at those levels. Herbal teas, being naturally caffeine-free, require no decaffeination and can provide diverse flavor profiles depending on their plant origins.

Purchasing and storing tea benefits from a few simple practices that preserve freshness and flavor. Choose among black, white, green, yellow, and oolong according to preference; matcha is a special green tea made by grinding the dried leaves to a fine powder. Teas are sold as loose leaf, bags, or sachets; loose leaf offers the greatest control over strength, while bags and sachets provide convenience and standardized dosing. Keep tea away from light, heat, moisture, odors, and air by storing it in airtight containers in a cool, dark cupboard. Most teas remain at their best for about a year once opened, though sturdier styles like some black and oolong teas can keep quality longer, and delicate teas may fade sooner; your palate is the best judge.

Preparation at home maximizes benefits and minimizes added sugars common in bottled or shop-made beverages. Black and oolong teas are typically steeped near boiling, around 210°F, for four to five minutes, while green tea is best at about 180°F for roughly four to fifteen minutes, depending on desired strength and bitterness. Serving tea plain preserves its polyphenol content; if sweetness is desired, consider subtle flavor enhancers such as vanilla or cinnamon, or select naturally sweet-leaning herbal infusions. Iced preparations—sparkling or still—offer a refreshing, sugar-free alternative to sweetened soft drinks when brewed and cooled properly before serving.

Cultural and specialty teas add context and considerations. What many cafés label “chai” refers more precisely to masala chai—spiced black tea with cinnamon, cardamom, cloves, ginger, and peppercorns, often taken with milk and a sweetener. Japan’s tea culture, centered on green tea, includes elaborate ceremonial practices emphasizing attentiveness and aesthetics. Marketing claims around “fat-burning” teas routinely overpromise; research on green tea and weight reduction shows little meaningful effect, and so-called “detox” or “slimming” teas may contain laxatives or other undesirable substances best avoided. Yerba mate, an herbal infusion from Ilex paraguariensis, shares caffeine levels and chlorogenic acid with coffee. Concerns with mate arise from very high-temperature consumption and certain smoke-drying methods that can introduce polycyclic aromatic hydrocarbons; choosing air-dried products and moderate temperatures is a prudent approach.

Taken together, tea is a versatile, enjoyable beverage that can complement a healthful diet. Its polyphenols likely contribute to cardiometabolic benefits, though definitive causal evidence from long-term randomized trials remains limited. The primary practical cautions are to avoid very hot serving temperatures, be mindful of caffeine sensitivity, and minimize added sugars. With thoughtful selection, storage, and preparation, a daily cup—or a few—of tea can be both a satisfying ritual and a supportive element of overall well-being.

Desserts

Desserts are often rich in added sugars, refined grains, and unhealthy fats, and it can be challenging to resist when others at the table are eager to indulge. It's easy to justify the choice but healthful eating doesn't have to mean missing out on dessert altogether. Customers shouldn't have to compromise their well-being to enjoy a sweet finish to a meal. While traditional desserts like cakes, pies, and cookies are the norm, they don't need to be the only options.

A more balanced approach is to create your own nutritious dessert using what can be called the "Three Pleasures": fruit, nuts, and dark chocolate.

Fruit provides natural sweetness, vibrant color, and a boost of vitamins, minerals, and fiber. Fresh options like raspberries, blueberries, or sliced pears work beautifully, and small portions of dried fruit can also satisfy a sweet craving.

Nuts, such as almonds, pecans, or walnuts, add crunch and richness while offering heart-healthy fats, protein, and micronutrients.

Finally, dark chocolate—especially varieties with 70% cocoa or higher—introduces a complex, satisfying flavor with less sugar than milk chocolate. Together, these three elements create a dessert that feels indulgent yet supports better nutrition, offering pleasure without guilt and nourishment without deprivation.

Dark Chocolate

Dark chocolate is one of the world's most cherished foods, with a rich history that stretches back more than 4,000 years. Originating in Central America, the ancient Maya were among the first to enjoy cacao, drinking it as a bitter, spiced beverage rather than the sweet confection we know today. Modern chocolate production begins with the cacao pod, which is larger than the human hand. The seeds, or beans, are extracted, fermented, dried, and roasted to produce cocoa beans. These beans are then processed to separate the shells from the nibs—the edible part of the bean—which are ground into a thick liquid called chocolate liquor. This liquor is further refined and separated into cocoa solids and cocoa butter, the foundational components of chocolate. The resulting products—ranging from cocoa powder to the familiar chocolate bars—reflect varying proportions of these ingredients, with dark chocolate containing more cocoa solids and less sugar than milk chocolate.

Dark chocolate typically contains between 50 and 90 percent cocoa solids, cocoa butter, and sugar, whereas milk chocolate includes as little as 10 percent cocoa solids along with milk and more sugar. Despite its name, dark chocolate may still contain trace amounts of milk due to cross-contamination during production. In contrast, white chocolate is made only from cocoa butter, sugar, and milk, with no cocoa solids, meaning it lacks the beneficial plant compounds found in dark varieties. High-quality dark chocolate avoids added fats or artificial flavors, preserving its natural bitterness and nutrient integrity.

Nutritionally, dark chocolate provides small but meaningful amounts of minerals such as iron, magnesium, zinc, copper, and phosphorus. Its most notable compounds, however, are flavanols—naturally occurring plant chemicals found in cacao that have been studied for their cardiovascular and metabolic benefits. Dark chocolate contains two to three times more flavanols than milk chocolate, making it a potent source of these bioactive compounds. Flavanols promote the production of nitric oxide in the endothelium, the inner lining of blood vessels, which helps relax blood vessels, improve circulation, and lower blood pressure. Some research also indicates that these compounds can enhance insulin sensitivity, which may help reduce the long-term risk of developing type 2 diabetes.

The heart-protective properties of cocoa have been documented in several observational studies. A famous example comes from research on the Kuna people of Panama, whose traditional diets are rich in cocoa beverages made from flavanol-rich powder. Despite consuming more dietary salt than most Western populations, hypertension among the island-dwelling Kuna was almost nonexistent, and rates of heart disease and diabetes were significantly lower compared to Kuna who migrated to urban areas and adopted Western eating habits. Other studies have shown that consuming small amounts of dark chocolate—roughly one to two squares or about six grams daily—may correlate with reduced risk of cardiovascular disease and mortality. The evidence suggests that moderate consumption of high-quality dark chocolate, when part of an overall healthy diet, may contribute to better vascular function and lower inflammation.

While dark chocolate offers potential health benefits, it is also calorie-dense, providing around 150 to 170 calories per ounce. Overconsumption can contribute to weight gain, so portion control is key. It also contains moderate levels of saturated fat, which can raise cholesterol levels if consumed excessively. However, the beneficial effects of flavanols and monounsaturated fats

may counterbalance these risks when dark chocolate is eaten in modest quantities. Choosing chocolate that contains at least 70 percent cocoa solids provides the most flavanols and the least added sugar, offering the best balance between health and enjoyment.

Concerns have been raised about heavy metal contamination in some cocoa and chocolate products. Trace amounts of cadmium and lead can be present in cocoa due to natural soil content or contamination during manufacturing. Cocoa from Latin America has been found to contain higher cadmium levels than cocoa from Africa, which supplies most of the world's beans. Lead exposure poses risks to children and pregnant women, as it can affect neurological development and organ health. Nonetheless, food safety agencies such as the World Health Organization and the U.S. Food and Drug Administration have concluded that chocolate and cocoa are not major sources of lead or cadmium in the average diet. To minimize risk, international standards have been established to regulate permissible metal levels in chocolate products and to guide agricultural and manufacturing practices that reduce contamination. Consumers can further reduce exposure by choosing reputable brands that test for heavy metals and by consuming dark chocolate in moderation.

Proper storage and preparation enhance both the flavor and longevity of dark chocolate. It should be kept in a cool, dry place—around 65 to 70°F—in an airtight container. Refrigeration is not recommended, as moisture can cause a whitish "bloom" on the surface. Although bloom does not affect taste or safety, it alters appearance. Stored correctly, dark chocolate can last up to two years. When melting dark chocolate for cooking or desserts, heat it slowly and evenly to prevent scorching. A small drizzle over oatmeal, yogurt, or fresh fruit provides a nutrient-rich indulgence that satisfies sweet cravings while delivering antioxidants.

Dark chocolate pairs beautifully with fresh fruit, nuts, and seeds to create a simple, elegant dessert. It can be used to make smoothies, sauces, or even a dairy-free frozen treat when blended with frozen bananas. The higher the cocoa content, the more intense and bitter the flavor—so allowing a piece to melt slowly in the mouth can reveal its full complexity. Natural cocoa powder, as opposed to Dutch-processed cocoa, retains the most flavanols and therefore offers greater health benefits. However, it is worth noting that darker chocolate also contains more caffeine; two ounces of 70 percent dark chocolate contain approximately 50 to 60 milligrams, about half the amount found in a standard cup of coffee.

Beyond personal health, chocolate production raises ethical considerations. Cocoa farming and processing have historically relied on low-wage labor, and in some regions, child labor remains a concern. Choosing products labeled as "Fair Trade" helps ensure that cocoa farmers receive fair compensation and that labor practices adhere to ethical standards. By selecting responsibly sourced dark chocolate and enjoying it mindfully in small portions, individuals can appreciate this ancient food as both a pleasure and a contributor to well-being.

Sugar and Sugar Substitutes

The health effects of low-calorie sweeteners (LCS) remain inconclusive, with research showing mixed findings across various study designs and types of LCS. Evidence continues to evolve as studies differentiate between sweeteners such as aspartame, sucralose, stevia, and others. Large observational studies have suggested that both sugar-sweetened beverages (SSBs) and LCS beverages may be associated with an increased risk of type 2 diabetes. One major French cohort

found similar risk trends for both beverage types, with the authors noting that while SSBs may promote weight gain by increasing blood sugar and insulin resistance, LCS beverages might also stimulate appetite and sweet preference in some individuals. However, reverse causation is a plausible confounder—individuals already at risk for obesity or diabetes may switch to LCS beverages to manage their health, thereby falsely linking LCS consumption to later disease development. This was supported by a meta-analysis of 17 cohort studies showing an 18% higher incidence of diabetes with SSBs and 25% higher with LCS beverages, though the relationship weakened after adjusting for body weight and metabolic status.

In data from the Health Professionals Follow-up Study, the observed positive association between LCS beverage intake and diabetes risk largely disappeared after accounting for baseline BMI and related conditions, suggesting that pre-existing health behaviors may drive the relationship. Additionally, three large U.S. cohort studies found that substituting LCS beverages or water for SSBs was associated with less weight gain over time—about one pound less per four years. This suggests that for adults seeking to reduce sugar intake, diet beverages can serve as a short-term transitional substitute, though water remains the preferred long-term option. For children, the long-term effects of LCS are unknown, and it is advisable to limit their use.

Weight control research on LCS is also mixed. Long-term observational studies show that regular LCS beverage consumption can reduce calorie intake and help with weight maintenance, while others find no effect—or even slight weight gain. Randomized controlled trials generally show modest weight reduction, but most are short in duration and limited in sample size, making definitive conclusions difficult. Moreover, differences in study design (comparing LCS beverages to SSBs, juice, or water) can influence outcomes. Mechanistically, LCS may alter appetite regulation: because they provide sweetness without calories, they might encourage cravings for sweet foods or interfere with hormonal signals of satiety. Some hypothesize that LCS could trigger insulin release or disrupt gut microbiota, potentially influencing weight and metabolism. Animal studies have demonstrated that certain LCS compounds alter gut microbial balance, leading to glucose intolerance and weight gain, though similar effects in humans remain unproven. Functional MRI research from the University of California, San Diego, found that while sugar activates brain reward regions, sucralose does not, suggesting that LCS may fail to fully satisfy sweet cravings, potentially prompting compensatory eating.

Concerns have also been raised about potential associations between LCS and cancer, though the current evidence does not support a causal relationship. A 2011 joint statement from the American Heart Association (AHA) and the American Diabetes Association (ADA) concluded that non-nutritive sweeteners, when used judiciously, may assist with weight management and improve metabolic health—but noted that benefits depend on avoiding compensatory calorie intake from other sources. Their 2018 scientific advisory reaffirmed these conclusions, emphasizing that long-term safety remains uncertain and that LCS beverages should not be used regularly by children. For adults who consume large amounts of SSBs, LCS beverages may serve as a temporary replacement strategy to reduce sugar intake, particularly for those accustomed to sweet-tasting drinks. However, the advisory stressed that unsweetened alternatives—such as plain, sparkling, or naturally flavored water—should be encouraged as the ultimate goal.

In summary, current evidence suggests that low-calorie sweeteners can play a limited, transitional role in reducing sugar consumption among habitual SSB consumers but are not a long-term solution for weight management or metabolic health. Their overall benefit depends heavily on the broader dietary pattern and individual health context. Health professionals should guide patients toward sustainable hydration strategies emphasizing water and minimally sweetened beverages, while monitoring evolving evidence on the metabolic, behavioral, and microbiome effects of LCS use.

Low-Calorie Sweetener	Brand Names†	Sweetness as compared with sugar	Acceptable Daily Intake* (maximum number of tabletop sweetener packets per day)
Aspartame	Equal®, NutraSweet®, Sugar Twin®	200 times sweeter than sugar	75**
Acesulfame-K	Sunett®, Sweet One®	200 times sweeter than sugar	23
Saccharin	Sweet'N Low®, Sweet Twin®, Necta Sweet®	200-700 times sweeter than sugar	45
Sucralose	Splenda®	600 times sweeter than sugar	23
Neotame	Newtame®	7,000-13,000 times sweeter than sugar	23
Advantame	No brand names	20,000 times sweeter than sugar	4,920

**An acceptable daily intake is the maximum amount of a substance that can be consumed daily over the course of a person's lifetime with no appreciable health risk and is based on the highest intake that does not lead to observable adverse effects. Calculations are based on a 132-pound individual.*

***People with a rare hereditary disease known as phenylketonuria (PKU) have difficulty breaking down phenylalanine, a component of aspartame, and should limit their intake of phenylalanine from all sources, including aspartame.*

†The inclusion of brand names on this list is for reference only and does not constitute an endorsement. The Nutrition Source does not endorse specific brands.

GLP-1 Medications and the Role of Food

With the growing use of GLP-1 receptor agonists (like semaglutide and tirzepatide) for treating type 2 diabetes and managing weight, it's more important than ever to consider the role of diet and food literacy in supporting long-term outcomes.

GLP-1 medications work by enhancing insulin secretion, slowing gastric emptying, and promoting satiety—all of which reduce appetite and food intake. While these physiological effects can lead to significant weight loss, the medication does not replace the need for nourishing food, culinary skill-building, and supportive eating behaviors.

People taking GLP-1s often report a loss of interest in food or even aversions to textures and smells. This can pose a challenge to nutrient adequacy, particularly if protein, fiber, or micronutrient intake drops as a result. Culinary interventions—like smaller portion sizes, protein-forward recipes, and flavor-enhancing herbs and acids—can help make meals more appealing and digestible for those on GLP-1s.

Importantly, studies show that weight loss from GLP-1s is significantly more sustainable when paired with behavioral and dietary changes. Without a shift in eating habits or the acquisition of food preparation skills, patients may regain lost weight after discontinuing medication. Therefore, culinary medicine plays a key role in long-term metabolic health.

Food professionals—whether clinicians, chefs, or educators—can support patients by helping them:

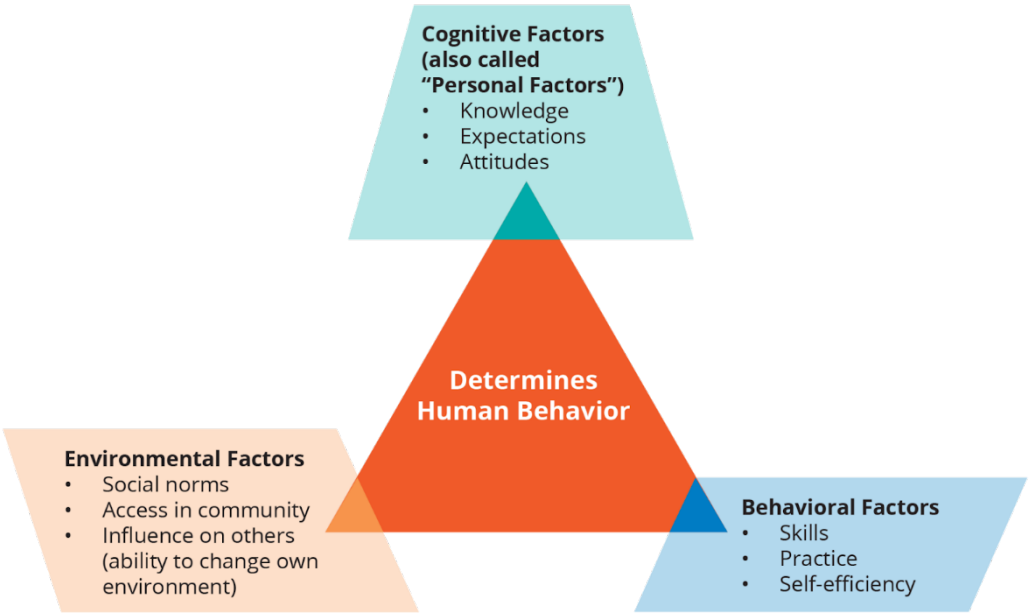
- Prioritize nutrient-dense foods in smaller, satisfying portions.
- Maintain adequate protein to preserve lean body mass.
- Build food confidence and literacy to support independence from medication.
- Understand hunger and satiety cues that may shift with medication use.
- Explore simple, flexible meal frameworks like grain bowls, soups, and smoothies.

GLP-1s may change the conversation about appetite and food, but they do not replace the need for a positive relationship with food, or the foundational skills required to cook and eat with purpose and joy.

Driving Behavior Change

Improving dietary intake often requires more than just nutrition knowledge; it involves behavior change strategies that help individuals translate intentions into consistent, sustainable habits. Effective approaches combine psychological, environmental, and practical tools that address motivation, self-regulation, and social context.

Albert Bandura's Social-Cognitive Theory of Behavior Change



One foundational strategy is goal setting, where individuals establish specific, measurable, achievable, relevant, and time-bound (SMART) goals. Rather than vague intentions like "eat healthier," a SMART goal might be "include at least one serving of vegetables at lunch each day." Self-monitoring through food logs, apps, or photos can help increase awareness of eating patterns and identify triggers for unhealthy choices. Regular feedback from health professionals or digital tools reinforces accountability and progress.

Motivational interviewing is another evidence-based technique that supports lasting dietary change by helping individuals explore their own reasons for change, resolve ambivalence, and strengthen intrinsic motivation. Motivational interviewing emphasizes empathy, autonomy, and collaboration rather than prescriptive advice, making it especially effective for clients resistant to change.

Environmental restructuring, modifying one's surroundings to support healthy decisions, is also key. This can include keeping fruits and vegetables visible, prepping healthy snacks in advance, using smaller plates, or limiting access to high-calorie foods at home and work. Similarly, implementation intentions—specific "if-then" plans (e.g., "If I get hungry mid-afternoon, I'll have a handful of nuts instead of chips") help bridge the gap between intention and action by preparing for decision points in advance.

Social support and modeling play important roles as well. Eating with family or peers who share healthy habits, joining group programs, or participating in community-based interventions can increase motivation and accountability. Similarly, if social networks do not provide a supportive environment this can hold a person back and become a barrier for making changes. Mindful eating strategies encourage attention to hunger and fullness cues, eating pace, and emotional triggers, fostering a more positive and conscious relationship with food.

Finally, sustaining change requires self-compassion and flexibility. Relapses or lapses are normal; focusing on progress over perfection supports resilience and long-term adherence. For health professionals, integrating these behavior change techniques into counseling tailored to the individual's readiness, cultural context, and resources can greatly enhance success in improving dietary quality and promoting lasting health outcomes.

Barriers to healthy eating behavior change are influenced by a combination of environmental, psychological, social, and biological factors. Limited access to affordable, nutritious foods, time constraints, and the convenience of ultra-processed options make healthy choices difficult for many. Emotional eating, stress, and ingrained habits can further undermine motivation, while misinformation and confusion about nutrition often create uncertainty about what "healthy eating" means. Social pressures, cultural norms, and family traditions may reinforce less healthful patterns, and biological factors such as taste preferences or metabolic differences can also play a role. Overcoming these challenges requires practical, individualized strategies that consider personal circumstances, cultural context, and the broader food environment to support sustainable dietary change.

Perspectives on Plant Forward Dining

Excerpts from the Culinary Institute of America, Food for Climate League, and the Menus of Change University Research Collaborative in collaboration with Dattasential.

Plant Forward vs. Plant Based

The framing of "plant-forward" is an outgrowth of the CIA-Harvard T.H. Chan School of Public Health—Department of Nutrition joint initiative, Menus of Change, exploring consumers' eating habits and beliefs to uncover opportunities to reduce reliance on meat, dairy, and other foods from animal sources in ways that are approachable and appealing.

Plant-Forward is s style of cooking and eating that emphasizes and celebrates, but is not limited to plant-based foods – including fruits and vegetables (produce); whole grains; beans, other legumes (pulses), and soy foods; nuts and seeds; plant oils; and herbs and spices and that reflects evidence-based principles of health and sustainability. This dietary pattern is also often referred to as plant-rich or flexitarian and may include various foods from animal sources but in reduced quantities and/or less frequently.

Plant-Based is used to refer to ingredients and foods themselves, i.e., fruits and vegetables (produce); whole grains; beans, other legumes (pulses), and soy foods; nuts and seeds; plant oils; and herbs and spices. Can also be used to refer to dietary patterns made up only of these foods.

Plant-Based Meat Alternatives: Foods designed to mimic the taste, texture, and appearance of traditional meat while being made entirely from plant ingredients like soy, pea protein, or mycoprotein. Unlike whole plant-based protein sources (e.g., legumes, grains, nuts), these products are typically more processed and engineered to replicate specific meat products using binders, oils, and natural flavors. Examples include brands like *Beyond* or *Impossible Meat*.

Meat refers to red meat (e.g., beef, pork, lamb, etc.) and poultry (e.g., chicken, turkey, etc.) but not fish or seafood.

Animal Protein refers to all animal proteins, including red meat, poultry, fish, seafood, dairy, eggs, etc.

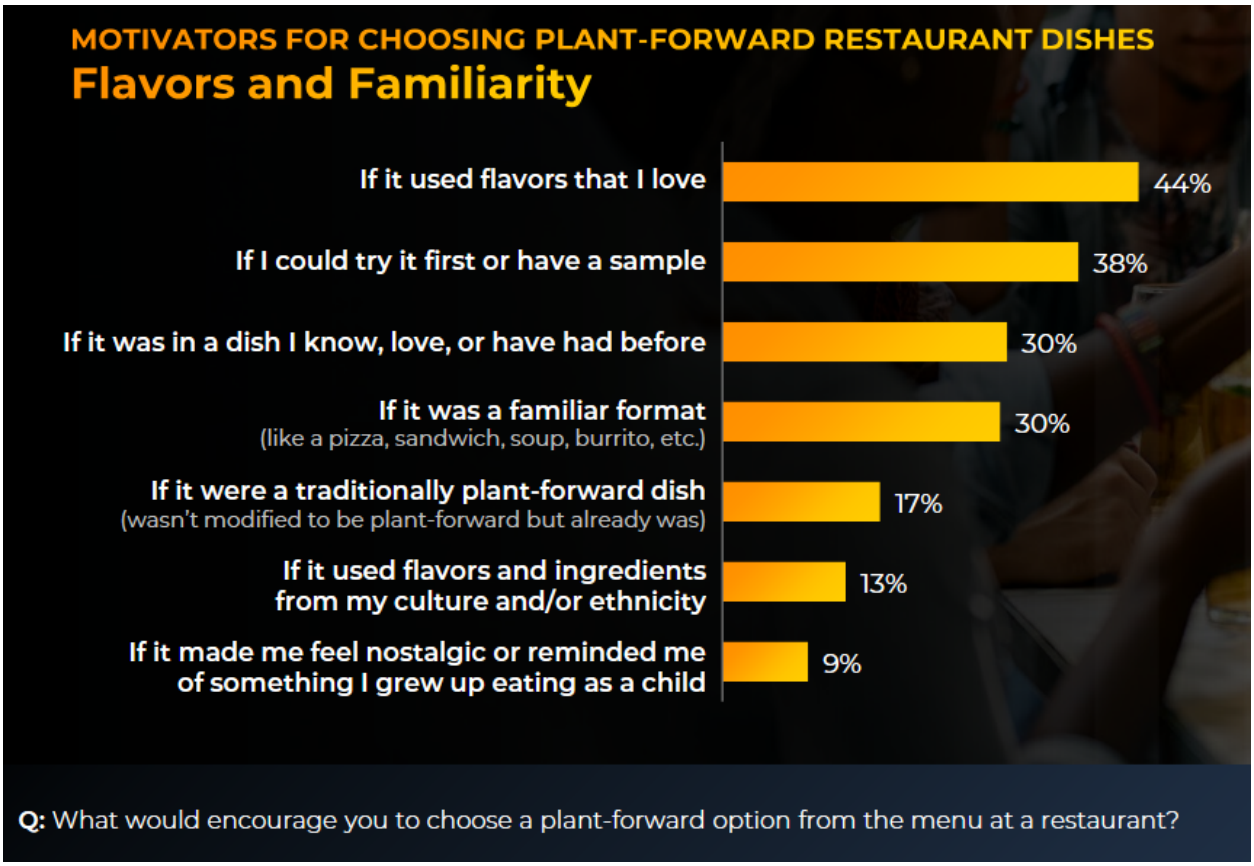
Meat Limiters are consumers who limit meat in some way (vegan, vegetarian, pescatarian, and flexitarian)

2025 Plant-Forward Opportunity Report

1. In 2025, nearly a quarter of the general population is actively limiting meat in their diet. Women, Boomers, and lower- to medium-income consumers are still leading the charge.
2. Foodies are significantly open to plant-forward dining but are

   reluctant to limit meat entirely. Rather than framing plant-based dishes as restrictions, foodservice operators should position them as culinary adventures. Highlighting creativity, flavor, and quality will help capture Foodies' enthusiasm and inspire greater plant-forward exploration.
3. Poultry, fish, eggs, and dairy are consumed widely and regularly, while red meat is losing ground among meat limiters. That said, all animal protein sources – including red meat – are rated by most consumers as the highest-quality sources of protein.
4. Consumers overwhelmingly trust whole foods – nuts, legumes, and grains – over processed plant-based meat alternatives. While Millennials and Gen X consumers are most likely to rate plant-based proteins – whether whole foods or process options – as good or excellent sources, male consumers express a particularly strong affinity for protein supplements (powders, shakes, etc.) and seitan.
5. Taste, satiety, and protein concerns are some of the biggest barriers to plant-forward dining at restaurants. Gen Z and Millennials are especially concerned that plant-based dishes lack flavor or can’t provide enough energy for daily pursuits. To drive trial and loyalty, operators should lead with bold flavors and thoughtfully optimize presentation and portion sizes.
6. Cost sensitivity remains a major hurdle for plant-based dining, as many consumers still worry about overpaying for what they perceive as “just vegetables.” While providing value is about more than just numbers, you simply can’t ignore the power of price in today’s economic climate. Offering competitive prices, combos, and value deals can make plant-forward dishes feel both exciting and accessible to value-conscious diners.
7. Familiarity and nostalgia are powerful tools to encourage plant-forward exploration. Consumers are far more willing to try plant-based dishes that echo familiar flavors, formats, or cherished memories. Operators should lean into classic favorites – pizzas, sandwiches, bowls, etc. – while also tapping into cultural traditions and comfort foods.
8. Though Gen Z and Millennials express the most reservations about ordering plant-based foods at restaurants, they are also the most open to being convinced. Clear communication about flavor, nutrition, sourcing, and value can easily turn hesitation into enthusiasm.

Interestingly, when asked "what would encourage you to choose a plant-forward option from the menu in a restaurant, 44% of consumers asked said "if it used flavors that [they} loved" 38% said "if it was in a dish they [they] know, love or have had before" and 30% said "if it was in a familiar format".



Demographics:

- Gen Z (1997-2012)
- Millennial (1981-1996)
- Gen X (1965-1980)
- Boomer+ (1921-1964)

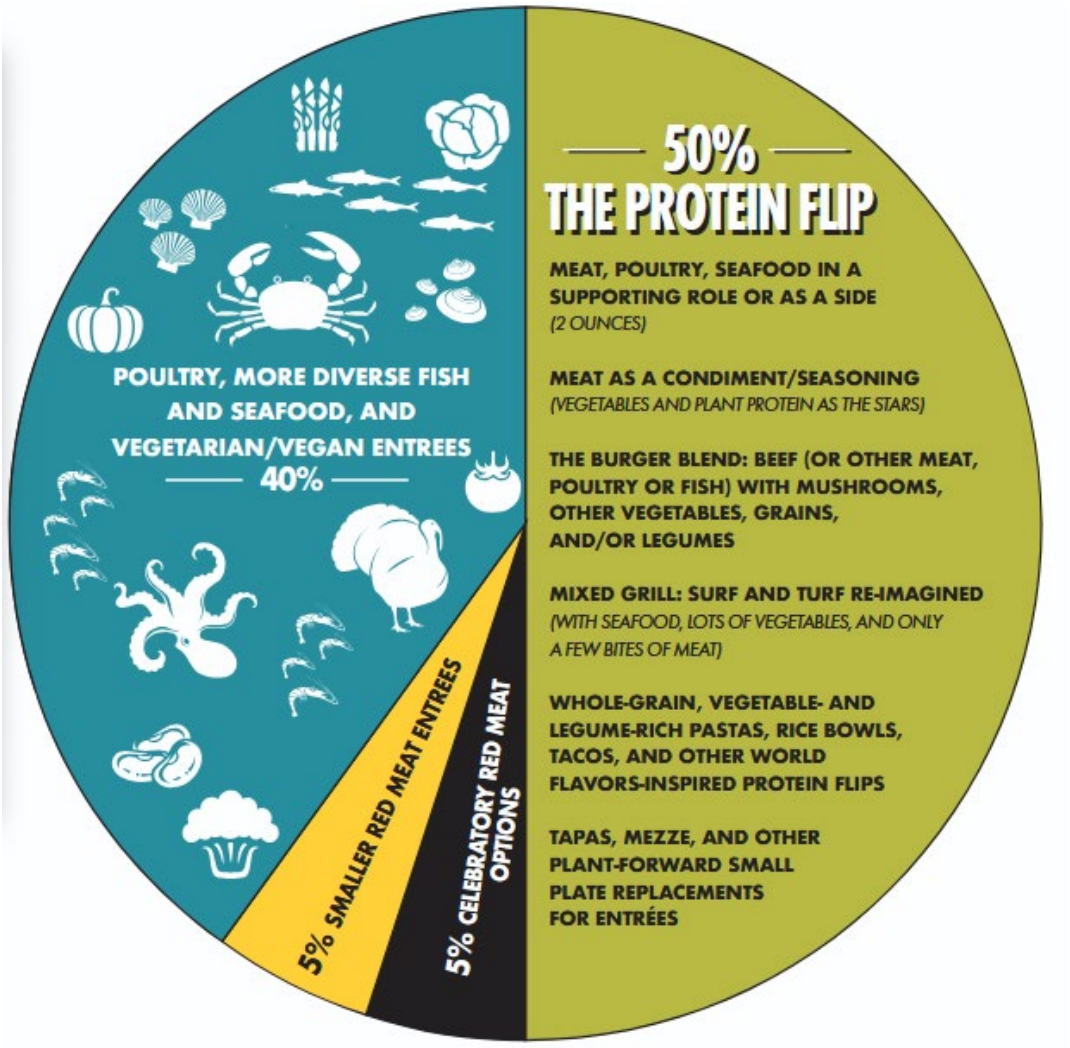
Source: https://www.ciaprochef.com/wp-content/uploads/2025/05/2025-Plant-Forward-Opportunity-Report.pdf

Reimagining Recipes

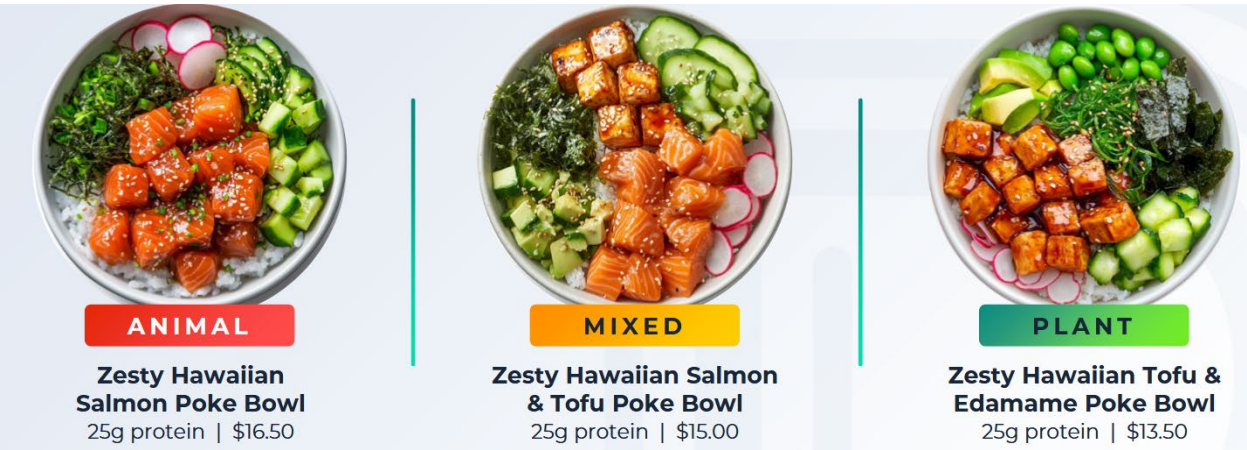
There are many ways to decrease caloric and fat intake in our diets and one of the best ways to do so is to start with our favorite foods. We can create ingredient swaps that have more nutrient density, fiber and probiotics, as well as lower the glycemic index of the final dish. These ingredient swaps can be heart healthy, full of protein, and clean label, meaning they are made from whole foods. Some examples include using protein rich Greek yogurt instead of sour cream, mashed avocado instead or butter, fig or date paste instead of sugar, and cauliflower or celery root instead of potatoes.

The Protein Flip

Of the easiest ways to reimagine favorite foods and start transforming diets is to swap out some or all animal based proteins with plant-rich options. Animal protein can be used a flavoring and a garnish, or as a component to a blend rather than the main and most substantial part of any meal. This is effectively coined as "The Protein Flip", and the idea of which can be used in almost any meal period, from breakfast and lunch, to snacks, dinner and dessert.



Source: https://ciaprochef.com/wp-content/uploads/2024/06/ProteinFlip_NewLogo.pdf



Cultural and Socio-Economic Challenges with Protein

How do consumers across different income brackets perceive and consume protein?

Across the board, higher-income consumers report greater consumption of both animal and plant-based proteins compared to their lower-income counterparts, likely because of increased access to a wider variety of high-quality ingredients. High-income consumers are also more likely to view both animal proteins and whole plant-based sources – like legumes, grains, and nuts – as high quality.

Interestingly, the one exception is fruits and vegetables, which are rated more highly as protein sources by low- and middle-income consumers, possibly due to greater reliance on these ingredients in everyday meals or a broader, albeit scientifically less accurate, understanding of protein quality.

Resources

The Culinary Institute Of America
www.ciachef.edu |
www.ciaindustryleadership.com

Menus Of Change University Research Collaborative
www.moccollaborative.org

Food For Climate League
www.foodforclimateleague.com

Datassential
https://datassential.com

MINDFULNESS: COOKING MINDFULLY

Mindfulness is when one uses all their senses to appreciate the world around them. It is a form of present-moment attentiveness that enhances self-regulation and control and supports stress management.

Cooking has often been referred to as being very therapeutic. Not just for nourishing the body, but also the soul. The act of preparing food can help us explore and reflect on ways to be more present in our everyday lives.

We also benefit from eating home-cooked foods, which can be healthier and less processed than many of the options that are available in restaurants or ready-to-eat packages.
The act of mindfulness can also be applied to eating food and paying attention to your hunger cues. Mindful eating also enhances the awareness of your body's satiety cues which may assist with weight management.

The act of eating should be considered as equally important in our health. How quickly do we eat? Are we distracted by TV or phones? Are we eating while driving? Do we even take the time to chew our food properly? Eating mindlessly happens when one is not paying attention to how hungry they are, how much they're eating, or why they're eating. This can lead to overeating or eating foods that are less healthy than foods one might choose to eat if they were paying a little more attention.

It is interesting to note that the act of digesting food does not start only when the food enters the stomach. Think about the aroma of certain foods when they cook. What happens when you see a photo of your favorite food? Maybe your mouth waters? This is your digestive enzymes starting to work even before food has entered your body. Our digestion begins the moment that any of our senses come in contact with the food we are about to consume.

Things to consider while cooking mindfully:

- Keeping a cooking journal
  - Write down thoughts and memories about food.
  - Save your favorite recipes
  - When a health challenge arises, select recipes that may help address the issue through food.

- Don't forget about *mis en place*. Organization can:
  - Add a feeling of things being within your control.
  - Help create a sense of calm environment.
  - Create confidence for a well thought out and executed idea.

- Focus on what is in front of you.
  - Pay attention to the textures and smells

    - Think of the act of knife cuts and measuring ingredients correctly as moments of practicing meditation.
    - Assess your mood and any thoughts that come up.

- Try cooking and eating with others.
    - Creating a sense of community can be very healing

- Think about and be grateful for everything that went into preparing your meal
    - The farmers who grew your food
    - The sun, earth, and water
    - The purveyors you purchased your food from
    - Your skill in preparing the food
    - Anything and anyone else that comes to mind

- Reflect.

Eating Mindfully

Try the following mindful eating exercise that engages all your senses:

Sight: Look at your food. What are the colors and textures you see? Imagine you are from another planet, and this is the first time ever laying eyes on the food.

Touch: Hold a piece of food in your hand. Run your fingers all over it, squeeze it. Is it heavy? Light? Bumpy? Smooth?

Smell: Close your eyes and hold the food under your nose and take a deep breath through your nose. What do you notice? Does your mouth water?

Consciousness: whole foods were once a living thing, and it is important to honor that life. Offering thanks to the plant and animal kingdoms for sacrificing their lives to sustain our own is a way to show this respect. People all over the world say a blessing over the food they are about to eat. Indigenous people pray for the farmers who grew it, the sun for providing the light, the clouds for providing the water, the insects for pollinating the flowers, the mushrooms for providing fertilizer, and the hands that prepare it. Before you put the food in your mouth, look at it and say "I choose to consume this food and have its molecules become one with my molecules".

Taste: Put the food in your mouth. Run your tongue over it. Move it around your mouth. Chew it. Note the flavors that are released. Is it Salty? Sweet? Sour? Bitter? Does it have notes of Umami or pungency?

Sound: Listen to the sound the food makes as you chew. Is it crunchy? Chewy? How does the food change as you chew it?

Pay attention to what happens when you swallow the food. How does it make you feel to fully consume this food mindfully?

Source: Rebecca Peizer

Recipe Modifications/Substitutions

INSTEAD OF	CHANGE TO	BENEFIT
1 egg	2 egg whites	Less fat/cholesterol/calories
Sauté in butter	"Sauté" in broth	Less fat/calories
1 cup mayonnaise	½ cup mayonnaise + ½ cup non-fat yogurt	Less fat/calories
Mayonnaise in dressing	Yogurt in dressing or buttermilk in dressing	Less fat/calories
1 cup sour cream	1 cup non-fat plain yogurt + 1 - 2 Tbsp. buttermilk or lemon juice (if used in cooking blend in 1 Tbsp. flour per 8 oz. yogurt)	Less fat/calories
Cream	Plain non-fat yogurt (if used in cooking, blend in 1 Tbsp. flour per 8 oz. yogurt)	Less fat/calories
1 cup heavy cream	1 cup evaporated skim milk	Less fat/calories
1 oz. baking chocolate	3 Tbsp. cocoa powder + 1 Tbsp. polyunsaturated oil	Less saturated fat
1 cup shortening or lard	¾ cup vegetable oil	Less saturated fat
1 cup fat	½ cup fruit purée and ½ cup fat	Less fat/calories
1 cup oil	½ cup fruit purée	Less fat/calories
Sugar recipe calls for	Reduce sugar by ⅓ - ½	Less calories
Fat recipe calls for	Reduce fat by ⅓	Less fat/calories

Percent fat:

- Oil 100%
- Shortening 100%
- Lard 100%
- Butter 80%
- Margarine 81%

Do not substitute oil for margarine or butter if your goal is to reduce fat or calories.

Appendix One: Healthy Cooking Concepts and Techniques

In healthy cooking, the choice of cooking method is as important a consideration as the ingredients used in the dish. Fortunately, with the exception of deep frying and pan frying, most familiar cooking techniques are well suited to a menu built around healthy cooking goals. Some of these techniques need a few minor adaptations, while others work as is.

The following cooking methods can be used with great success in healthy cooking. Each technique increases the quality and flavor of the finished dish in several ways. When ingredients and preparations are handled properly, great-tasting, healthy foods are sure to follow.

- Sautéing
- Grilling
- Roasting
- Steaming
- Simmering
- Stewing
- Deep Poaching
- Stir Frying
- Broiling
- Baking
- Shallow Poaching
- Boiling
- Braising

Sauté

Sautéing is a method of quickly cooking foods in a small amount of fat at a high temperature. The term sauté comes from the French verb *sauter*, or "to jump," and refers to the way foods sizzle and jump in a hot pan. This technique does not have the tenderizing effects of moist-heat cooking methods; therefore, foods must be naturally tender. The sauce is typically made by deglazing the juices that were released during the cooking process.

Select and Prepare the Ingredients and Equipment

1. Cuts from the rib, loin or leg of beef, veal, lamb, pork, or large game animals.
    a. Breasts from poultry and game birds
    b. Firm to moderately textured fish
    c. Shellfish
2. Choose the cooking fat according to the flavor that you want to create.
    a. Oils (olive, corn, canola) and clarified butter are the most commonly used.
3. Equipment needs include a sauteuse and a pair of tongs or a spatula.

How to Sauté

1. Season food. Dredge or dust with flour if necessary.
2. Preheat the pan and add the cooking fat.
3. Immediately add the food to the pan. Sauté on the presentation side until golden brown.
4. Turn the food and continue sautéing to the proper doneness.
5. Remove items from the pan and reserve, keeping warm.
6. Degrease the pan.
7. Deglaze with liquid (if you plan to make a sauce).
8. Form a sauce by thickening the liquid.
9. Plate or place into serving containers. Serve sauce with the main item.

Evaluating the Quality of the Finished Sautéed Food

The object of sautéing is to produce a flavorful exterior, resulting from proper browning, which serves to intensify the food's flavor. Weak flavor and color indicate that the food was sautéed at too low a temperature or that the pan was too crowded. Good color depends on the food. When well sautéed, red meats and game will have a deep brown exterior. White meats (veal, pork, and poultry) will have a golden or amber exterior. Lean white fish will be pale gold when sautéed as skinless fillets, while firm fish steaks, like tuna, will take on a darker color. In any case, food should not be extremely pale or gray. Improper color is an indication that incorrect pan size or improper heat levels were used. Only naturally tender foods should be sautéed, and after sautéing they should remain tender and moist. Excessive dryness is a sign that the food was overcooked, that it was cooked too far in advance and held too long, or that it was sautéed at a temperature higher than necessary.

Stir-Fry

Stir-frying is a cooking method similar to sautéing, in that items are cooked over very high heat, using little fat. The food items are cut into small pieces and are constantly kept moving throughout the rapid cooking period. Woks are traditionally selected for this style of cooking, though a large sauté pan may also be used. The sauce for a stir fry, like that of a sauté, is made or finished in the pan to capture the dish's flavors.

Select and Prepare the Ingredients and Equipment

1. Prepare the food to be stir-fried into uniform, bite-sized pieces.
2. Choose a cooking fat, such as peanut oil, that has a high smoke point.
3. Equipment needs include a wok.

How to Stir-Fry

1. Heat the oil in a wok or large sauté pan.
2. Add the aromatics and allow them to infuse into the oil.
3. Add the main item.
4. Stir-fry, keeping the food in constant motion.

5. Add additional ingredients in the proper sequence (longest cooking in first, shortest cooking in last).
6. Add the liquid for the sauce, then the thickener.
7. Serve the food immediately.

Evaluating the Quality of the Finished Stir-Fried Food

The characteristics of properly prepared stir-fried foods are basically the same as those of sautéed foods. One defining characteristic of a well-prepared stir-fry is that an appropriate amount of sauce exists for the total volume of product. The items should not be dry, nor should they be swimming in sauce. Rather, there should be just enough sauce to coat the items that were stir-fried, leaving a limited amount of sauce remaining on the serving dish.

Because the fabrication technique used for stir-fried items differs from sauté, the proteins used need not be naturally tender. Marinades often include components that help tenderize the main item. In addition, items are often cut across the grain, making the pieces more palatable.

Uniformity of size is also very critical when preparing stir-fried items. Due to the short cooking periods and high temperatures, if the size is not consistent, some items will be overcooked while others remain undercooked.

Sautéing and Stir-Frying: Pros, Cons, and Tips

Pros:

- With proper cookware, minimal fat used to cook foods.
- Many variations to finished product (jus, pan sauces, garnishes)
- Foods receive flavor, texture, and attractive color from high-heat caramelization.

Cons:

- Tender, more expensive cuts of meat or fish are used.
- Foods do not hold well in heat (steam table)

Nutrition Tips:

- Use a well-seasoned or Teflon pan so that minimal fat is needed.
- Select polyunsaturated cooking oils such as olive, canola, corn, cottonseed, olive, peanut, safflower, and soybean oils.
- Use herbs and spices for seasoning.
- Deglaze pan with juice, stock, wine, or spirits to dissolve flavorful bits (*sucs*) on the bottom of the pan.
- Serve with light, flavorful sauces.
- Cook or finish vegetables as needed.
- Use vegetable or fruit coulis as sauces.
- Use arrowroot or cornstarch to thicken the sauce if necessary.

BRAISING

Although a great variety of items may be braised, this cooking technique is commonly utilized to tenderize tough cuts of meat. Braising is a combination cooking technique as it uses for dry and moist heat cooking techniques. The food item is first seared in fat (dry heat cookery), which helps develop a rich color and builds flavor. It is then slowly simmered in stock or another cooking liquid in a covered container (moist heat cookery). The moist heat penetrates the connective tissues and softens them while also further enhancing and concentrating the flavors. The flavor released into the cooking liquid becomes the accompanying sauce.

Select and Prepare the Ingredients and Equipment

1. More mature and less tender cuts.
2. The cooking liquid may be enhanced with aromatic vegetables, herbs, tomatoes, and a *sachet d'épices*.
3. Equipment needs include a brazier with a tight-fitting lid, kitchen fork, carving knife, and carving board.

How to Braise

1. Prepare the main item for braising and season it.
2. Heat the pan and oil and sear the seasoned main item on all sides.
3. Add the mirepoix to the pan and sweat.
4. Add flour to prepare a roux, if desired.
5. Add the appropriate amount of cooking liquid and bring to a rapid simmer over direct heat. The liquid should cover the item by a third to a half. The more tender the cut, the less liquid required.
6. Add additional ingredients to the braise such as a *sachet d'épices*.
7. Cover the pot and finish cooking in a moderate oven or over low direct heat. When fork tender, remove the main item from the braising liquid and keep warm.
8. Finish the sauce as necessary.
9. Carve or slice the main item and serve it with the sauce.

Evaluating the Quality of the Finished Braised Food

Well-made braises have an intense flavor because of the long, gentle cooking, and a soft, almost melting texture. The main item's natural juices, along with the cooking liquid, become concentrated, providing both a deep flavor and a full-bodied sauce. Braised foods have a deep color, depending on the type of food. They should retain their natural shape, although a significant amount of volume is lost during cooking. When done, braised foods are extremely tender, almost to the point at which they can be cut with a fork. They should not, however, be dry or fall into shreds. This indicates that the food has been over-cooked or cooked too rapidly at a high heat.

Stewing

Stews share many similarities with braises, from the cuts of meat selected to the texture of the finished dish. They differ from braises in that the food is cut into bite-sized pieces and is cooked in more liquid. Stews are thought of as one-dish meals, producing a tender and highly flavored dish including not only protein, but also a variety of vegetables. The sauce takes on a deep flavor and body during stewing. It is also possible to finish a stew with cream, herbs, or a liaison of eggs and cream.

Select and Prepare the Ingredients and Equipment

1. More mature and less tender cuts of meat, poultry, or fish cut into bite-sized cubes.
2. Select flavorful stocks, sauces, vegetable and fruit juices and/or water to use as the cooking liquid.
3. Choose a heavy-gauge braising pan or rondeau with a lid. Have a ladle or skimmer on hand.

How to Stew

1. Cut the food into bite-sized pieces and season.
2. Heat the pan and oil and sear the pieces on all sides. Remove from the pan and keep warm.
3. Brown or sweat the mirepoix.
4. Return the seared items to the bed of mirepoix in the pot. Add the liquid.
5. Bring the liquid to a simmer over low heat.
6. Cover the pot and finish the stew in a moderate oven or over low direct heat.
7. Add the *sachet d'épices* or *bouquet garni* and garnishes at the appropriate times.
8. Reduce the sauce, if necessary. (Remove the main item first.)
9. Garnish the item as appropriate and serve.

Evaluating the Quality of the Finished Stewed Food

A well-made stew has a rich flavor and a soft, almost melting texture. The natural juices of the ingredients, along with the cooking liquid, become concentrated, and provide both good flavor and a full-bodied sauce. The major components in a stew retain their natural shape, although a certain amount of volume may be lost during cooking. When done, a stew is extremely tender, almost to the point where it can be cut with a fork but not where it falls into shreds. This would indicate that the food has been overcooked.

Broiling and Grilling

Broiling and grilling are quick techniques that are used for naturally tender, portion-size or smaller pieces of meat, poultry or fish. Grilling cooks foods with radiant heat from a source located below it. Grilled foods have a smoky, slightly charred flavor resulting from the flaring of the juices and fats that are rendered as the food cooks, as well as from direct contact with the rods of the grill rack. Broiling uses a heat source located above the food rather than below.

Select and Prepare the Ingredients and Equipment

1. Tender portion-size cuts of poultry.
    a. Cuts of meat from the loin, rib, or top round areas
    b. Fillets of fatty fish such as tuna or salmon
2. Clean the grill or broiler before use.
3. Equipment needs include a grill or broiler, tongs, spatulas, and brushes.

How to Grill or Broil

1. Thoroughly clean and preheat the grill.
2. Season the item.
3. Place the seasoned food on the preheated grill or broiler rods to start cooking and mark the item. The best-looking, or presentation-side, always goes face down on the rods first.
4. To mark foods with a crosshatch on a grill or broiler, gently work the spatula or tongs under the food and give it a quarter turn. Turn the food over and continue cooking to the desired doneness.

Evaluating the Quality of the Finished Grilled or Broiled Food

Properly prepared grilled and broiled foods have a distinctly smoky flavor, which is enhanced by a certain amount of charring and by the addition to the grill of hardwood or sprigs or stalks of some herbs. This smoky flavor and aroma should not overpower the food's natural flavor, and the charring should not be so extensive that it gives the food a bitter or carbonized taste. Any marinades or glazes should support and not mask the food's natural flavor.

ROASTING

Roasting is a way of cooking by indirect heat in an oven, resulting in a crusty exterior and tender interior. Roasted foods are cooked through contact with dry, heated air held in a closed environment, such as an oven. As the outer layers become heated, the food's natural juices turn to steam and penetrate the food more deeply. The rendered juices are the foundation for sauces which are prepared while the roast rests.

Select and Prepare the Ingredients and Equipment

1. Select tender meats from the rib, loin, or leg (top round)
    a. Young, tender birds
    b. Whole fish
2. Equipment needs include a flat-bottomed pan with low sides, roasting rack, butcher's twine or skewers, thermometer, kitchen fork, carving board, and carving knife.

How to Roast

1. Season, the main item. Sear over direct heat or in a hot oven.
2. Elevate the item in a roasting pan so that hot air can reach all sides.

3. Roast the item, uncovered, until the desired internal temperature is reached. Be sure to allow for carryover cooking.
4. Add the mirepoix to the roasting pan for pan gravy during the final hour of roasting time, if desired.
5. Let the roasted item rest before carving.
6. Prepare the pan gravy in the roasting pan.
7. Carve the main item and serve with the accompanying gravy or sauce.

Evaluating the Quality of the Finished Roasted Food

The factors used in evaluating quality are flavor, appearance, and texture. The flavor and aroma of a roasted food should contribute to an overall sensation of fullness, richness, and depth. This is due in part to the nature of the food and in part to the browning process.

Roasted foods should have a golden-brown exterior. The color has a direct bearing on the flavor. Items that are too pale lack eye appeal and the depth of flavor associated with properly roasted foods.

A roasted food's texture depends upon the nature of the main item. In general, however, roasted foods should be tender and moist. If left on the food, the skin should be crisp, creating a contrast with the meat's texture.

Roasting and Broiling: Pros, Cons, and Tips

Pros:

- Food is cooked on a rack, allowing rendering fats to drip from the food.
- Food receives flavor from caramelization.
- Individual portions can be cooked quickly to order.
- Good method for large cuts of meat.

Cons:

- Tender, more expensive cuts of meat, fish, or poultry are used.
- Meat must have sufficient marbling, or it will be dry when roasted.
- Foods do not hold well in heat (service, steam table)

Nutrition Tips:

- Flavor foods with low-fat marinades.
- Use herbs and spices for seasoning.
- Serve with jus or jus lié.
- Trim surplus fat before cooking
- Roast on a rack
- Serve with vegetable coulis, chutneys, and compotes.
- Use fortified stocks for flavoring.
- Vary woods for charcoal grilling.

Shallow Poaching

Shallow poaching, like sautéing and grilling, is an *à la minute* technique. Foods are cooked in a combination of steam and simmering liquid. Items are partially submerged in a liquid containing an acidic ingredient (wine, lemon juice, etc.) and can also contain seasonings (e.g. herbs and spices). The poaching liquid temperature ranges between 180°F and 185°F. A lid should be used to trap the steam next to the items. The cooking liquid is used as a base for the sauce that might accompany the items that are being shallow poached.

Select and Prepare the Ingredients and Equipment

1. Select naturally tender foods of a size and shape that allow for quick cooking.
    a. Fish
    b. Shellfish
    c. Chicken breasts
2. For the poaching liquid, select rich broths or stocks and add wine, vinegar, or citrus juice.
3. Shallow poaching is best done in a sauté pan or other shallow cooking vessel, such as a sautoir or rondeau. Use a strainer for the sauce and a slotted spatula to remove the main item.

How to Shallow Poach

1. Butter the cooking vessel and add the aromatics.
2. Add the main item and the poaching liquid.
3. Bring the liquid to a bare simmer over direct heat.
4. Cover the cooking vessel with parchment paper.
5. Finish the food over direct heat or in a moderate oven.
6. Remove the main item, moisten it, and keep it warm.
7. Prepare a sauce from the cooking liquid.
8. Serve the main item with the sauce and the appropriate garnish.

Evaluating the Quality of the Finished Shallow-Poached Food

When well prepared, shallow-poached dishes reflect the flavor of both the food and the cooking liquid. Because acidic and aromatic ingredients are included, the flavor is bright. The sauce adds a rich, complementary flavor. In general, foods appear moist, opaque, and relatively light in color. Fish should not have deposits of white albumin, which indicates that it has been overcooked or cooked too quickly. Properly cooked shallow-poached foods are very tender and exceptionally moist. And because this technique is most often used with delicate foods, they have an almost fragile texture. If they are falling apart or dry, however, they have been overcooked.

Deep Poaching

Deep-poached items are completely submerged in a cooking liquid that is kept at a constant, moderate temperature. The aim of deep poaching is to produce foods that are moist and extremely tender. Deep poaching is best suited to naturally tender cuts of meat, poultry, or fish.

Select and Prepare the Ingredients and Equipment

1. Select naturally tender cuts of meat, poultry, or fish.
2. For meat and poultry, choose a well-developed stock as the poaching liquid. For fish and shellfish, use fish stock, fumet, wine, or a court bouillon.
3. Choose a pot that is deep enough to hold the food, liquid, and aromatics comfortably with enough room to allow the liquid to expand as it heats.
    a. A lid may be helpful to bring the liquid up to temperature, but it is not essential during the deep poaching process.
    b. Also have on hand ladles or skimmers, a thermometer, carving boards, and slicers.

How to Deep-Poach

1. Bring the cooking liquid to 160°F to 185°F. The surface of the liquid may show some motion, sometimes called shivering, but no air bubbles should break the surface.
2. Add the main item, using a rack if necessary. Be sure the item is fully submerged.
3. Return to a simmer over low heat.
4. Add aromatics at the appropriate time.
5. Remove the main item; moisten it and keep it warm while preparing a sauce or cool it in liquid, as appropriate.
6. Cut or slice the main item and serve it with the appropriate sauce and garnish.

Evaluating the Quality of the Finished Deep-Poached Food

When properly cooked, deep-poached items are fork-tender, and any juices from poultry are nearly colorless. Poultry flesh takes on an evenly opaque appearance and offers little resistance when pressed with a fingertip. When whole birds are fully cooked, the legs move easily in the sockets. When properly cooked, the flesh of fish and shellfish becomes slightly firm and loses its translucency, taking on a nearly opaque appearance. Shellfish open and the edges of the flesh curl. Shrimp, crab, and lobster have a bright pink or red color. Flavor, appearance, and texture are all important. In an ideal balance the aromatics, seasonings, and flavorings either bolster or complement the flavor of the food.

Poaching: Pros, Cons, and Tips

Pros:

- No additional fat is required during cooking.
- Variety is achieved through sauces and garnish.
- Good for tender, delicate fish.

Cons:

- No flavor from caramelization.
- Product dries when removed from cooking liquid.

Nutrition Tips:

- Season cooking liquid.
- Trim surplus fat before cooking.
- Serve with light, flavorful sauces.
- Utilize cooking liquid for sauces when possible.
- Cook only as long as necessary.

Thickening Agents

Roux: Combination of fat and flour that is cooked. The cooking time is determined by the amount of roux and desired color. Three types of roux are white, blond, and brown. Today's trends utilize sauces that are lighter, which limit the use of roux in the kitchen and replace it with pure starches such as arrowroot and cornstarch.

Cornstarch: Pure starch derived from corn. It is translucent and thickens when heated, but gels upon cooling. It loses its thickening power with excessive heating. It is used much more often than arrowroot because it is inexpensive.

Arrowroot: Pure starch derived from West Indian arrowroot plant. It is more translucent than cornstarch when heated and it does not gelatinize when cooled. Its high cost prevents it from being the thickener of choice.

Liaison: Mixture of egg yolks (1 part) and heavy cream (3 parts). It is used as a thickener and adds richness to a sauce or soup. The sauce or soup must be tempered by incorporating a small amount into the liaison, then adding the mixture back to the sauce or soup.

Beurre Manié: French for "kneaded butter." A mixture of equal parts by weight of whole butter and flour used to thicken gravies and sauces.

Slurry: Starch dispersed in cold liquid to prevent it from forming lumps when added to hot liquid as a thickener. One example would be a whitewash, where water is the liquid and flour is the starch.

Reduction: The results when a liquid is reduced or simmered until much of the liquid has evaporated. It is more viscous or thicker and intensified in flavor.

Roasted flour: For those occasions when no additional fat is desired, but a thickening is required, a roasted flour and water mixture may be prepared. To use, roast one pound of bread flour in a 350°F oven in a pan until a light pale color. Let cool and mix with water to a medium liquid paste. It thickens like a roux.

Weights and Measures

Weights and Measures Equivalencies

1 dash or 1 pinch	=	⅛ tsp.
3 tsp.	=	1 Tablespoon (½ fl. oz.)
2 Tbsp.	=	⅛ cup (1 fl. oz.)
4 Tbsp.	=	¼ cup (2 fl. oz.)
8 Tbsp.	=	½ cup (4 fl. oz.)
16 Tbsp.	=	1 cup (8 fl. oz.)
2 cups	=	1 pint
2 pints	=	1 quart (approximately 1 liter)
4 quarts	=	1 gal.

Metric Weights and Measures Equivalencies

1 gram (g)	=	1/28 oz. (or 0.035 oz.)
½ ounce (oz.)	=	14 g
1 ounce	=	28.35 g (approx. 30 g)
2 ounces	=	56 g (approx. 60 g)
4 ounces	=	110 g
6 ounces	=	170 g
8 ounces	=	225 g
12 ounces	=	340 g
1 pound (16 oz.)	=	450 g
1 kilogram (kg)	=	2.21 lb.

1 liter (L)	=	33.92 fl. oz.

Temperature Equivalencies

250 °F (very cool)	=	130 °C
300 °F (low)	=	150 °C
350 °F (moderate)	=	180 °C
400 °F (hot)	=	200 °C
450 °F (very hot)	=	230 °C

Metric Conversion Table

To Change	To	Multiply by
Ounces (oz.)	Grams (g)	28.35
Pounds (lb.)	Kilograms (kg)	.45
Teaspoons (tsp.)	Milliliters (mL)	5
Tablespoons (Tbsp.)	Milliliters (mL)	15
Fluid Ounces (fl. oz.)	Milliliters (mL)	30
Cups	Liters (L)	.24
Pints (pt.)	Liters (L)	.47
Quarts (qt.)	Liters (L)	.95
Gallons (gal.)	Liters (L)	3.8
Celsius (Centigrade)	Fahrenheit	1. multiply by 9 2. divide by 5 3. add 32º
Fahrenheit	Celsius (Centigrade)	1. subtract 32º 2. multiply by 5 3. divide by 9

Appendix Two: Glossary of Common Nutrition Terms

Amino Acid: A compound composed of hydrogen, carbon, oxygen, and nitrogen, the amino acid is the building block of all proteins. Twenty to twenty-two amino acids are used to produce all the protein found in the human body; eight of these must be supplied in the diet (nine for infants and small children). See also *essential amino acids*.

Antioxidants: Substances that retard the breakdown of tissues in the presence of oxygen. May be added to food during processing or may be naturally occurring. As an example, many fats, especially vegetable oils, contain vitamin E, which act to protect the oils from becoming rancid for a period of time.

Blood pressure: A measurement of the pressure exerted by blood flowing through the arteries. Expressed in both systolic and diastolic pressure, which represent the pressure as the heart pumps and as it relaxes.

Calorie (Kilocalorie, Kcal): The amount of heat necessary to raise the temperature of a kilogram (liter) of water 1 degree Celsius. It is a measure of the energy supplied in foods.

Carbohydrate: The term is derived from "carbo" (carbon) and "hydrate" (water), reflecting the components of all carbohydrates: carbon, oxygen, and hydrogen. It is the source of energy preferred by the body. Carbohydrates include simple carbohydrates (also known as simple sugars) and complex carbohydrates (referred to as starch or fiber). Simple carbohydrates are generally formed from one or two sugars (referred to as mono- or disaccharide), which may be naturally occurring (those found in fruits or milk) or refined (added sugars, including honey, table sugar, molasses, and corn syrup).

Cholesterol: A fatty acid belonging to a group known as the sterols, a category of lipid (the general term for fats of all types). Essential to hormone production and the creation of cell membranes, it acts as protection for nerve fibers and is responsible for production of vitamin D in the presence of sunlight.

Complementary Protein: A combination of odds, each of which supplies varying amounts of different amino acids so that the amino acids lacking or in sufficient supply in one food are complemented by those found in the second food.

Complete protein: A food source that provided all the essential amino acids in the correct ratio so that they can be used in the body for protein synthesis**.**

Complex Carbohydrates: Long chains composed of many sugars, referred to as polysaccharides. One of the forms of complex carbohydrates is starch, which is the plant's storage system that holds energy to support future growth. The other is fiber, the structural component of plants. These carbohydrates may be found in foods as they naturally occur (whole grains or whole-grain meals and flours) or they may be refined during the processes of polishing and bleaching.

Dietary Guidelines: Published jointly every 5 years since 1980 by the Department of Health and Human Services (HHS) and the Department of Agriculture (USDA). The *Guidelines* provide authoritative advice for people two years and older about how good dietary habits can promote health and reduce risk for major chronic diseases. They serve as the basis for Federal food and nutrition education programs.

Essential Amino Acids: An amino acid that the body requires but cannot produce itself. Eight amino acids are required by adults. Small children and infants require an additional amino acid. All the essential amino acids must be supplied, in the correct ratios, for the body to produce the proteins necessary for health.

Fat: One of the essential nutrients. Fat supplies the body with essential fatty acids as well as being the most concentrated source of energy. Fats are solid (or plastic) at room temperature; oils are liquid.

Fatty Acid: The basic chemical unit of fats; composed of carbon, hydrogen, and oxygen**.**

Fiber: The portion of plant food composed of complex carbohydrates. Soluble fiber is the pectin and the gums found in whole grains, fruits, and vegetables; insoluble fiber is the lignin and hemicelluloses found in whole grains, fruits, and vegetables. Humans cannot digest fiber.

Free-Range: Pertaining to both livestock and domestic poultry, permitted to graze or forage for grain, etc., rather than being confined to a feedlot or a small enclosure: For example, *a free-range pig*.

Glucose: A simple sugar molecule that serves as the primary source of energy for living organisms. It is a monosaccharide, meaning it consists of a single sugar unit. Glucose is found in various foods, such as fruits, vegetables, and grains. It is also produced in the body through the breakdown of carbohydrates.

Gluten: The protein found in flours-- especially wheat flour--that is capable of forming the elastic strands that enable yeast-leavened breads to rise by stretching enough to trap the gases released during fermentation.

Glycemic Index: A measure of how quickly a food containing carbohydrates raises blood sugar levels after consumption. It is a scale from 0 to 100.

GMO: Genetically modified organism.

Hydrogenation: The process of forcing hydrogen to bond at open sites in a mono- or polyunsaturated oil to produce a product that's more solid at room temperature. Shortenings and margarines are examples of hydrogenated fats. Once hydrogenated, a fat becomes more saturated than it was originally, though it may still be considered predominately unsaturated. Hydrogenation results in the formation of Trans fat.

Incomplete Protein: A protein found in plant foods that is either entirely lacking one or more of the essential amino acids or in an amount small enough that it cannot be used by the body to promote the growth, repair, or replacement of body tissue. The deficiency can be compensated

for by eating a variety of foods throughout the day that supply adequate amounts of all the essential amino acids.

Lipids: The family of substances that include triglycerides (known as fats and oils), phospholipids (lecithin is an example), and sterols (the most familiar is cholesterol). These compounds are essential to the body and are found throughout the food supply as well as being produced by the body. Those produced in the body are usually known as *blood or serum cholesterol or triglycerides*.

Mineral: An inorganic element that is an essential component of the diet. Provide no energy and is therefore referred to as a non-caloric nutrient.

Monounsaturated Fat: A fat or oil composed of fatty acids that have one point not bonded with hydrogen. Oils with a high proportion of monounsaturated fats tend to be flavorful; examples include oils found in or produced from avocados, olives, and most nuts.

Mutual Supplementation: The process of consuming various incomplete complementary protein sources to supply all essential amino acids.

Nutrients: Compounds required by the body to maintain life. The six classes of nutrients (known as the essential nutrients) are carbohydrates, fat, protein, vitamins, minerals, and water.

Nutrition: Study of the materials that nourish an organism and of the way the separate components are used for maintenance, repair, growth, and reproduction.

Omega-3 Fatty Acids: Polyunsaturated fatty acids that may reduce the risk of heart disease and tumor growth, stimulate the immune system, and lower blood pressure; they occur in fatty fish, dark green leafy vegetables, and certain nuts and oils.

Omega-6 Fatty Acids: Polyunsaturated fatty acids that may reduce the risk of heart disease and tumor growth, stimulate the immune system, and lower blood pressure; they occur in fatty fish, dark green leafy vegetables, and certain nuts and oils.

Organic: Produced or involving production without the use of chemical fertilizers, pesticides, or other artificial agents.

Phytochemicals: Naturally occurring compounds in plant foods that have antioxidant and disease-fighting properties.

Polyunsaturated Fat: A chain of fatty acids in which two or more points are not filled with hydrogen atoms. Oils composed predominantly of polyunsaturated fats are often of plant origin, liquid at room temperature, with a neutral flavor. They are found in or refined from corn, safflower, and cottonseed.

Protein: A compound formed by carbon, hydrogen, oxygen, and nitrogen when arranged into strands of amino acids. One of the six categories of essential nutrients. Found in a variety of food sources, including meats, milk, dairy products, eggs, grains, vegetables, and legumes**.**

RDA: Recommended daily allowance; a standard against which a population's intake of nutrients may be measured. The RDA for a nutrient is calculated to accommodate individuals whose

metabolic requirements are naturally high. For most nutrients this is achieved by increasing the RDA from the mean requirement to the mean plus two standard deviations. Some nutritionists feel that many RDAs are set excessively high by some expert committees.

Refined Sugars: Sugars made by concentrating and purifying simple carbohydrates found in other foods (honey, table sugar, molasses, corn syrup, etc.).

Saturated Fat: A chain of fatty acids in which all available sites for hydrogen bonds are full. Fats that are composed predominately of saturated fats tend to be solid at room temperature and/or animal origin. The tropical oils, including coconut, palm, and palm kernel oils, are exceptions to these rules. Saturated fats are associated with an increase in serum cholesterol levels.

Simple Carbohydrates: Also known as sugars, which may be single (monosaccharides) or double (disaccharides). These sugars are either naturally occurring (e.g. fructose found in fruit) or refined (e.g., sucrose found in table sugar).

Sustainable Agriculture: A method of agriculture that attempts to ensure the profitability of farms while preserving the environment.

Trans Fat: A type of fatty acid that is formed when unsaturated fats are hydrogenated (trans fat also occurs naturally in food). Trans fats may have an effect on serum cholesterol levels similar to that of saturated fats.

Vegetarian: An individual who has adopted a specific diet (or lifestyle) that reduces or eliminates all sources of animal products in their diet. Other people refer to themselves as vegetarians but occasionally eat fish or poultry, preferring to exclude only red meats.

Vitamin: An organic compound considered an essential nutrient. Vitamins provide no energy and are referred to as non-calorie nutrients.

Water: One of the six essential nutrients. Water provides no calories and is vital to the proper function of the body.

Whole foods: Foods that are unprocessed and unrefined, or processed and refined as little as possible before being consumed. Whole foods aren't necessarily organic, nor are organic foods necessarily whole, although they do share a number of traits, such as an avoidance of chemically-assisted agricultural techniques. Because of the lack of even basic, organically-acceptable processing, many whole foods have a very short shelf life and are not easily sold outside of farmers' markets. Examples of whole foods include unpolished grains; organically garden-grown fruits and vegetables; and non-homogenized milk.

Nutrition Newsletters

- FDA Consumer. Department of Health and Human Services, Rockville, MD.
- Nutrition Action. Jacobsen, Michael, Ph.D., Editor. Center for Science in Public Interest. Washington, DC
- Nutrition and Health. Winick, Myron MD., Editor. Institute of Human Nutrition.
- Tuft's University Diet and Nutrition Letter. White, William H., Publisher. New York.

Nutrition Organizations and Agencies

The American Dietetic Association
LaSalle Street
Suite 1100
Chicago, IL 60604
312/899-0040

American Health Foundation
320 East 43rd Street
New York, NY 10017
212/953-1900

American Heart Association
7320 Greenville Avenue
Dallas, TX 75231
214/750-5362

American Institute for Cancer Research
1759 R. Street, NW
Washington, DC
202/328-7744

National Dairy Council
6300 North River Road
Rosemont, IL 60018

National Livestock and Meat Board
444 Michigan Avenue
Chicago, IL 60611
312/467-5520

Food and Drug Administration
Office of Consumer Affairs
5600 Fishers Lane (HFE-88)
Rockville, MD 20857
301/443-3170

Human and Nutrition Information Services
6505 Belcrest Road
Hyattsville, MD 20782
301/436-7725

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Chef Rebecca Peizer CEC, CHE

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