Food is one of the basic necessities of life. Food contains nutrients—substances essential for the growth, repair, and maintenance of body tissues and for the regulation of vital processes. Nutrients provide the energy our bodies need to function.

The energy in food is measured in units called calories. Age, sex, weight, height, and level of activity determine the number of calories a person needs each day. Depending on age, sex, and activity level, the recommended daily caloric intake for a child aged 11 to 14 can range anywhere from 1,600 to 2,600 calories per day, with sedentary girls needing the fewest calories and active boys needing the most. For adults, this can range from 1,800 to about 3,000.

Kinds of Nutrients

Scientists divide nutrients into six major groups: carbohydrates, fats, proteins, minerals, vitamins, and water. Most foods contain all or most nutrient groups, in different amounts.

Carbohydrates provide energy for the body. Nearly all the carbohydrates we eat come from plants. They include starches found in cereal grains and plants like potatoes and yams. Sugars, found in fruits, vegetables, and milk, are also carbohydrates. Sugarcane and sugar beets are grown specifically for their high sugar content.

Many of the starches and sugars we eat have been processed into products, such as flour and corn syrup. These processed carbohydrates are used in cookies, cakes, breads, pastas, and pies.

Fats provide more than twice as much energy as carbohydrates. They also help protect and insulate the body and its internal organs. Common fats include vegetable oils, such as soybean, cottonseed, and corn oil. They are used in cooking and in the processing of many foods. Fats that come from animal products include butter and lard. Eggs, milk, cheese, meats, poultry, and fish also contain high levels of fats.

Proteins are the body’s chief tissue-builders. They help keep skin, bones, muscles, and blood healthy. Proteins also help regulate bodily processes, including transporting oxygen and nutrients into and out of cells; the clotting of blood; and the formation of antibodies, which help fight disease. Animal products, such as beef, fish, poultry, eggs, and dairy products, are high in protein. Grains, nuts, and some beans are also protein-rich foods.

Minerals and vitamins are called micronutrients because they are needed in very small quantities compared with carbohydrates, fats, and proteins (known as macronutrients). Minerals provide building materials for the body and help regulate its activities, much as proteins do. Calcium and phosphorus build strong bones and teeth, iron contributes to healthy blood, and iodine helps keep the thyroid gland working.

Vitamins help the body make full use of other nutrients by assisting the chemical reactions that make those nutrients work. For example, vitamin B1, or thiamine, helps regulate the release of energy from carbohydrates, promotes a healthy appetite, and aids the functioning of the nervous system. Vitamin D helps in the growth and maintenance of healthy bones.

Other essentials for the body’s health include water, oxygen, and fiber. Some scientists include water in the list of basic nutrients. Water makes up more than half of a human body’s weight. It is involved in most body processes, such as the regulation of temperature, the transporting of nutrients into cells, and the elimination of waste products from cells.

Oxygen is not a nutrient, since it is breathed in and not eaten, but it is essential to life. It permits the release of energy from food inside the body.

Fiber is indigestible material found in most plant foods. It adds bulk to the diet, helping to keep the intestines healthy. Fiber-rich foods include whole grains, dried beans, and fresh fruits and vegetables.

A healthy diet contains a balanced mix of different foods that together provide all essential nutrients. Malnutrition is the lack of a balanced diet. Too few nutrients, too many nutrients, or an imbalance of nutrients (too many carbohydrates, for instance, and not enough fruits and vegetables) can lead to malnutrition.

Undernutrition is a form of malnutrition. It is usually linked to hunger. Undernutrition happens when the body does not get enough food to meet its needs. Many diseases and even death are caused by lack of food. Death due to lack of food is called starvation.

To get the right amounts of nutrients, people need to select from a range of food types: cereal grains; fruits and vegetables; legumes, meat, poultry, fish, and eggs; and milk and dairy products. A food pyramid outlines the suggested amount of these different types of foods people should eat each day.

Cereal Grains

Cereal grains are the edible seeds of certain grasses. People have grown them since the beginning of agriculture. Today, the most commonly grown grains are wheat, rice, and corn (maize). Other important grains are sorghum, millet, barley, oats, and rye.

Worldwide, cereal grains are the most important food staples. They are eaten almost daily by large populations. They supply a significant percentage of the calories consumed by the world’s population. Cereal grains and the products made from them provide food not only for people, but also for livestock, such as cattle, chickens, and hogs.

Throughout the world, more wheat is planted than any other grain. Wheat is the chief ingredient in most breads, cookies, cakes, crackers, pastas, and some breakfast cereals. China, the United States, Russia, Ukraine, India, France, and Canada are major wheat-producing countries. Wheat, often eaten as bread, serves as the principal food grain for people living in regions with temperate climates.

Rice, an Asian tropical grass, is a food staple for more than half the world’s population. More than 90 percent of the world’s total rice crop is produced and eaten in South and East Asia. Rice is also a food staple for people in parts of Africa and Latin America. This cereal grain thrives in a warm, humid climate with heavy rainfall or wet ground. It is often grown in flooded fields called rice paddies.

Hominy grits, corn bread, popcorn, and tortillas are all made with corn. Outside the United States, this grain is called maize. Although native to the Americas, maize is now cultivated throughout most of the world and is a staple food in many areas. It grows in various soils and climates and at different elevations. American farmers produce over 30 percent of the world’s corn; of that 40 percent, most of it is used to feed livestock. Corn is also used to produce sweeteners, such as corn syrup and cornstarch.

Sorghum and millet are other grains commonly used as livestock feeds. These grains are also staple foods for people in parts of Africa and Asia, where they are used in breads, porridges, and cakes.

Three other grains—barley, oats, and rye—are important in many regions. Barley thrives in a wide range of climates. One type of barley is the source of malt for making beer. Barley is also used in making vinegar, malt extract, and beverages similar to milk. Pearl barley, the most popular form of this grain, is often used in soups and other foods.

Oats and rye were domesticated much later than other grains. Oats are used mainly as livestock feed, but also go into oatmeal and other breakfast cereals. After wheat, rye is the second most common grain used as a bread flour; the two are often mixed together in breads. Bread made with rye alone, called black bread, is popular in many European countries.

Fruits and Vegetables

The term “fruit” has several meanings. To a botanist, it means the part of a plant that contains seeds. According to this definition, fruits include most nuts, as well as vegetables, such as cucumbers and tomatoes.

To most of us, though, “fruit” is defined as the soft, edible, seed-bearing part of a perennial plant. A perennial is a plant that lives for more than one growing season. Fresh fruits are rich in carbohydrates, vitamins, minerals, and fiber. They can be preserved by freezing, canning, or drying.

Different fruits grow in different climates, and may not grow well in climates that are too cold, hot, dry, or wet. Based on the kind of climate in which they grow, fruits can be classified in different groups: temperate fruits, subtropical fruits, and tropical fruits.

Temperate fruits grow best where there is a well-defined cold season, as in the U.S. states of Washington and Oregon. Temperate fruits include apples, berries, grapes, pears, plums, and peaches.

Subtropical fruits thrive where temperatures are mostly warm year-round. The area around the Mediterranean Sea has a subtropical climate. Citrus fruits, such as lemons, oranges, grapefruits, dates, pomegranates, and some types of avocadoes, are subtropical fruits.

Tropical fruits require a hot climate to grow. Tropical fruits, such as bananas, mangoes, and papayas, grow in hot, humid areas like the Philippines.

Vegetables are the edible parts of herbaceous plants. Herbaceous plants, sometimes just called herbs, have stems that are softer and less woody than those of trees and shrubs. Vegetables are good sources of fiber, minerals, and vitamins. Most vegetables are annuals, living for only one growing season.

Vegetables can be roots, leaves, stems, seeds, or bulbs. For example, carrots, radishes, and beets are roots. Cabbage, celery, lettuce, and spinach are leaves or leafstalks. Heads of broccoli are flower stalks topped by thick clusters of flower buds. Asparagus is a stem. Cucumbers, eggplants, and tomatoes contain the seeds of the plant. Garlic, leeks, and onions are bulbs.

Some plants, called tubers, have a special type of underground stem that can be eaten fresh as a vegetable or used as an ingredient in other dishes. In temperate regions, the most important tuber is the potato. The potato was first a food staple to indigenous cultures of the Andes of South America. Today, major potato-growing countries include Russia, China, and Poland.

Important tropical tubers include yams, cassavas, and taros. These tubers are staple foods in many cultures. For instance, taro is a major food crop of the islands of Polynesia, as well as West Africa. Cassava is a staple food for more than 500 million people in Africa and Latin America.

Legumes, Meat, Poultry, Fish, and Eggs

Legumes are plants that are raised for their edible seeds or seed pods. Peas, lima beans, soybeans, peanuts, and lentils are all legumes. Legumes that are harvested for their dry seeds, such as beans or lentils, are called pulses. Pulses are food staples in India and Pakistan.

Legumes and pulses contain high amounts of protein. In addition, they supply iron, other minerals, and vitamins.

The term “meat” usually refers to the edible flesh of mammals, such as cattle, pigs, and sheep. Meat is a high-protein food and is rich in other nutrients, as well.

The United States, Australia, Russia, and Argentina raise much of the world’s beef cattle. Beef can come from cows, bulls, or steers. Cows are adult female cattle. Bulls are adult male cattle capable of reproduction. Steers are adult male cattle that have been castrated, or been made incapable of reproduction. Meat from very young cattle, or calves, is called veal.

The world’s major hog producers include China, the European Union, the United States, Brazil, and Russia. Meat from hogs is called pork.

Lamb is meat from sheep less than a year old. It is especially popular in the Middle East, Australia, and the United Kingdom. Mutton, meat from mature sheep, has a stronger flavor and a rougher texture than lamb. New Zealand and Australia are the world’s largest exporters of lamb and mutton.

Bison, water buffalo, camels, goats, and yaks are all sources of meat. Wild animals, such as rabbits and deer, are also eaten as meat. Meat from wild animals is called game.

“Poultry” refers to domesticated birds that are raised for meat and eggs. Chickens are an important food source for most of the world’s population. Raising chickens is a major industry in many countries, including China, the United States, Russia, and across the European Union. Ducks, turkeys, geese, and guinea fowl are also raised for food in many parts of the world.

Fish and shellfish are probably the most popular meats worldwide. Fish provide about 15 percent of all animal proteins consumed by the world’s population. Fish and shellfish are excellent sources of vitamins and minerals. People eat fish raw or cooked, and preserve it by canning, freezing, drying, salting, smoking, or pickling.

Most of the fish and shellfish people eat come from the ocean. Tuna is one of the most popular ocean fish. Other fish come from inland bodies of fresh water, such as lakes and rivers. Bass, perch, and carp are popular freshwater fish worldwide.

An increasing amount of fish comes from fish farms, where fish and shellfish are raised commercially. The cultivation of fish and shellfish is called aquaculture.

Clams, oysters, crabs, and shrimp are popular types of shellfish. Abalone, a kind of mollusk, is another type of seafood. Conch, a large type of sea snail, is eaten in the Florida Keys and in the West Indies. Eels, octopuses, squids, and mussels are other popular seafoods.

Eggs are a source of proteins, fats, minerals, and vitamins. Boiled, fried, scrambled, or deviled, chicken eggs are popular around the world. They are also used in a variety of baked goods. People also eat the eggs of other birds, such as ducks and quail, and those of reptiles, such as turtles and crocodiles. The eggs of certain fish, mainly sturgeon, are prepared as a delicacy known as caviar.