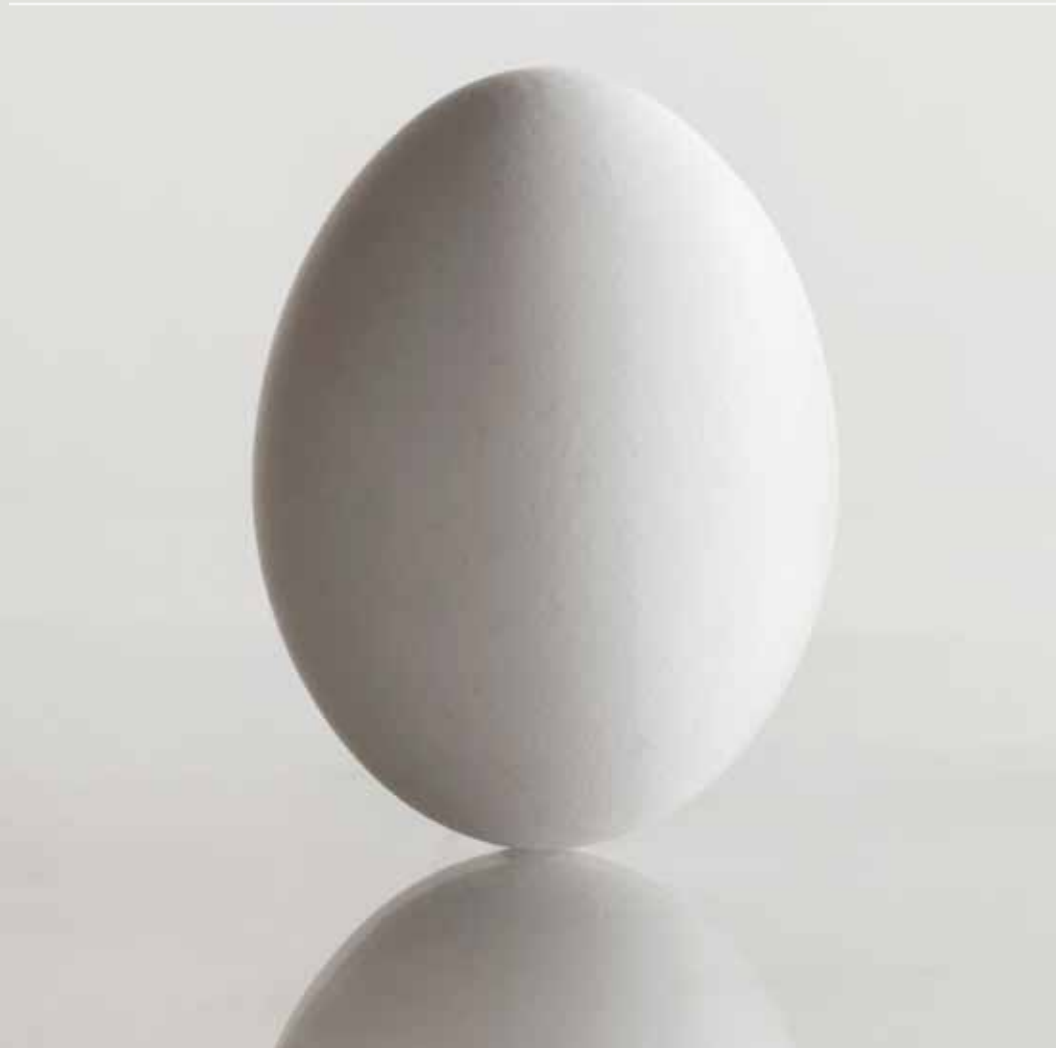
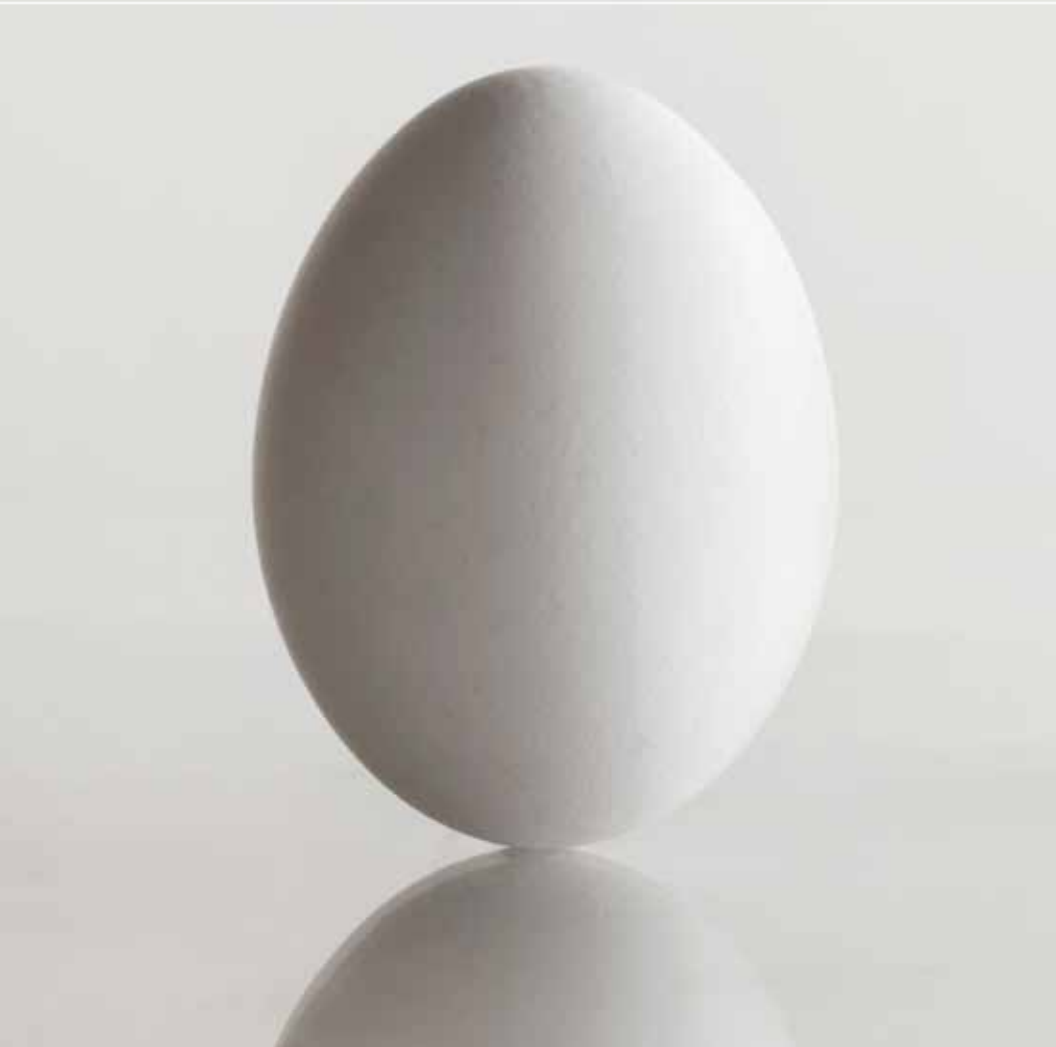
American Egg Board
FIFTH EDITION

the incredible edible egg™

EGGCYCLOPEDIA



We are proud to present the newly revised, fifth edition of *The Incredible Edible Egg™ Eggcyclopedia*. This comprehensive, in-depth resource is designed to provide food and health professionals, as well as consumers with the latest egg information from A-Z. *The Eggcyclopedia* was developed by the American Egg Board (AEB) on behalf of America's egg farmers who are committed to caring for their hens and producing a high-quality product. This commitment starts on the farms and continues through the egg's journey to your table.



A

Aioli

Garlic mayonnaise popular in the Provence region of southern France.

- See Mayonnaise

Air Cell

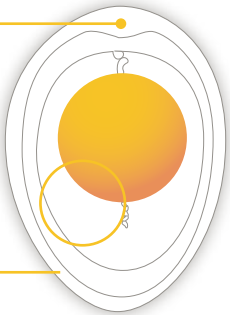
The air-filled pocket between the white and shell at the large end of the egg.

When an egg is newly laid, it is about 105°F (41°C) and has either no air cell or a very small one. As the egg cools, the liquid contents contract more than the shell and the inner shell membrane separates from the outer shell membrane to form the air cell. As the egg ages, moisture and carbon dioxide leave through the pores of the shell, air enters to replace them and the air cell becomes larger. The flattened end of a peeled, hard-boiled egg shows you where the air cell once was.

The formation of the air cell and the separation of the shell membranes are the reasons that a slightly older egg is easier to peel after hard-boiling. Storing eggs upright in their cartons in the refrigerator helps to keep their air cells in place and maintain egg quality.

Although the air cell usually forms in the large end of the egg, it occasionally moves freely toward the uppermost point of the egg as the egg is rotated. It is then called a free or floating air cell. If the main air cell ruptures, resulting in one or more small separate air bubbles floating beneath the main air cell, it is known as a bubbly air cell.

Candlers use the size of the air cell as one basis for determining grade.



Albumen

Also known as egg white. Depending on the size of the egg, albumen accounts for most of an egg's liquid weight, about 66%. The white contains more than half the egg's total protein, a majority of the egg's niacin, riboflavin, magnesium, potassium, sodium, and none of the fat. The white of a large egg contains about 17 calories.

Albumen color is opalescent and doesn't appear white until an egg is beaten or cooked. The cloudy

appearance comes from carbon dioxide. As eggs age, carbon dioxide escapes, so the albumen of older eggs is more transparent than that of fresher eggs.

The albumen consists of four alternating layers of thick and thin consistencies. From the yolk outward, they are designated as the inner thick or chalaziferous white, the inner thin white, the outer thick white and the outer thin white. As an egg ages, the egg white tends to thin out because its protein changes in character. That's why fresh eggs sit up tall and firm in the pan while older ones tend to spread out.

When you beat egg white vigorously, it foams and increases in volume six to eight times. Egg foams are essential for making meringues, puffy omelets, soufflés, angel food and sponge cakes.

– *See Breakout; Chalazae; Color, White; Composition; Cooking Functions; Cooking Terms; Foam; Formation; Grading; Nutrient*

American Egg Board

American Egg Board (AEB) is the promotion (advertising, marketing communications), education and research organization for the U.S. egg industry. The Board is composed of 18 members and 18 alternates. All members are egg producers who have been appointed by the Secretary of Agriculture to administer the program on behalf of all egg producers in the 48 contiguous states.

The Board was authorized by the Egg Research and Consumer Information Act passed by the 93rd Congress. The purpose of the law is "to enable egg producers to establish, finance and carry out a coordinated program of research, producer and consumer education and promotion to improve, maintain and develop markets for eggs, and egg products." The activities of the AEB are conducted under the oversight of the U.S. Department of Agriculture (USDA).

The staff of the AEB implements the programs and policies of the Board. Major programs consist of a national advertising and public relations campaign, as well as egg product, foodservice and retail marketing outreach and nutrition education activities, which are conducted through the AEB-funded Egg Nutrition Center.

Angel Food Cake

A cake, tall and light in texture, leavened only by beaten egg whites. Visit www.IncredibleEgg.org for an Angel Food Cake recipe.

Angel Pie

- See Hard or Swiss Meringue

Antibiotic-Free Eggs

Antibiotics are not used on a continuous basis in the egg industry. If hens become ill and antibiotics are needed, they're used on a therapeutic level under the supervision of a veterinarian. If hens are given an antibiotic at this level, their egg production is likely severely depressed. Any eggs produced would be diverted from human consumption according to FDA regulations.

Avian Influenza

Avian influenza (AI), also referred to as bird flu, is a virus that infects all types of avian species, including wild birds and domestic poultry. AI is an animal health issue that causes mild to severe symptoms in birds and, in its most extreme form, can be fatal to infected birds.

Pathogenicity refers to an organism's ability to cause disease. There are two types of AI associated with domestic poultry, high pathogenicity (HPAI) and low pathogenicity (LPAI). LPAI is common in many areas of the world, may cause mild symptoms in birds and poultry, and is of no risk to human health. HPAI is more serious and causes severe illness in birds and poultry. In egg-laying hens, symptoms include respiratory problems, decreased food intake and slowed or stopped egg production.

In addition to pathogenicity (HP and LP), AI is also classified by the proteins on the surface of the virus. These proteins are hemagglutinin (H proteins) and neuraminidase (N proteins). There are 16 H proteins and 9 N proteins, so 144 different virus combinations are possible. Only two H proteins, H5 and H7, have been found to cause HPAI. All other H proteins are only found in LPAI and cause mild bird illness. The virus strain that is most talked about worldwide is H5N1. This strain is commonly found in Asia and has caused illness in millions of birds and in hundreds of people who have been in very close contact with the secretions or execretion of sick birds. The spread of AI viruses from one person to another is extremely rare.

The U.S. egg industry, local animal health officials, and many federal government agencies, including U.S. Department

of Agriculture (USDA) have had years of experience in dealing with and preventing AI in commercial poultry flocks as well as protecting the health of consumers. USDA and the egg industry are well equipped to identify AI outbreaks quickly and to eradicate them immediately. There are many levels of protection built into commercial egg production. Most importantly, veterinarians monitor flock health daily and quickly identify any problems. The combination of daily monitoring with a nationwide, routine AI testing program is very effective at detecting illness. During regular testing of domestic flocks, it's not unusual to occasionally find LPAI. Outbreaks of HPAI, however, are rare. As of March 2012, there have been only three outbreaks of HPAI in the U.S. in the last 100 years. All three outbreaks were quickly eradicated and no human illnesses occurred.

If an HPAI outbreak were to occur, USDA and the egg industry have plans in place to quarantine and monitor the affected flock and surrounding area, eradicate the disease, as well as disinfect the premises and test to make sure the farm/s are free from AI virus. Under current regulations, eggs from an HPAI-positive flock will be destroyed immediately.

Another level of protection is that proper cooking destroys all AI virus particles. The USDA, the Food and Drug Administration and the World Health Organization all agree that thoroughly cooked eggs are safe to eat. Cook basic egg recipes until whites are firm and yolks thicken. Cook or bake any dishes containing eggs until they reach an internal temperature of 160°F (71°C).

– *See Cooking Methods, Doneness Guidelines, Egg Safety, Partnership for Food Safety Education, Raw Eggs*

Avidin

A protein found in small amounts (about 0.05%, five one-hundredths of 1%) in egg white. Avidin is inactivated by heat.

– *See Biotin*

B

Bain Marie

– *See Water Bath*

Baked Eggs

– *See Cooking Methods, Baked*

Beak Trimming

The old phrase "pecking order" comes from the fact that chickens do peck at one another, sometimes inflicting considerable injury and even death. To prevent this, the majority of commercial egg farms trim beaks when chicks are 10 days old or younger, when there is little stress, a practice supported by the scientific community. The process is similar to clipping a dog's nails or trimming a horse's hooves. Of course, chicks and hens with trimmed beaks can still eat and drink. Research has

shown that mortality in flocks that are not beak-trimmed is considerably higher than in flocks that are beak-trimmed.

Bearnaise

– *See Hollandaise Sauce*

Beverages

You can make many beverages with eggs. When recipes call for raw eggs, to eliminate risk and ensure food safety, eggs need to be heated to 160°F (71°C) or use pasteurized shell eggs or egg products. Eggnog, for example, is a well-known beverage made from eggs and milk. Visit www.IncredibleEgg.org for an eggnog recipe.

– *See Doneness Guidelines, Eggnog, Egg Safety, Raw Eggs*

Biological Value

A measurement of protein quality expressing the rate of efficiency with which protein is used for growth.

The egg is a complete protein food because egg protein has all nine of the essential amino acids (as well as all nine of the non-essential amino acids). Scientists often use egg protein as the standard against which they judge all other proteins. Based on the essential amino acids it provides, egg protein is second only to mother's milk for human nutrition. A large egg contains 6.29 grams of high-quality protein, about 12.6% of the Daily Reference Value (DRV) for protein.

– *See Nutrient, Protein*

Biological Values of Protein

On a scale, with 100 representing top efficiency, these are the biological values of proteins in several foods.

Whole egg	93.7
Milk	84.5
Fish	76.0
Beef	74.3
Soybeans	72.8
Rice, polished	64.0
Wheat, whole	64.0
Corn	60.0
Beans, dry	58.0

Source: Food and Agriculture Organization of the United Nations. The Amino Acid Content of Foods and Biological Data on Proteins, Nutritional Study #24. Rome (1970).

Biotin

One of the B vitamins which plays an important role in cell metabolism and the utilization of fats, proteins and carbohydrates. Biotin is present in many foods, including egg yolk, and is synthesized by the body.

Avidin, one of the egg proteins, can combine with biotin and make biotin unavailable. However, a human would have to eat 24 raw egg whites a day for biotin to be inhibited by avidin. Heat inactivates the avidin, so biotin is not inhibited in cooked eggs.

– *See Avidin*

Bird Flu

– *See Avian Influenza*

Blood Spots

Occasionally found on an egg yolk. These tiny spots do not indicate a fertilized egg. Instead, they are caused by the rupture of a blood vessel on the yolk surface during formation of the egg or by a similar accident in the wall of the oviduct.

Mass candling methods reveal most eggs with blood spots and those eggs are removed. However, even with mass scanners, it's impossible to catch them all.

Both chemically and nutritionally, eggs with blood spots are safe to eat. You can remove the spot with the tip of a knife, if you wish.

– See Formation, Grading

Bloom

Also known as the cuticle, bloom is the natural coating or covering on the eggshell that seals the eggshell pores. The bloom helps to prevent bacteria from getting inside the shell and reduces moisture loss from the egg. In nature, the bloom dries and flakes off. Before they are sent to market, eggs are washed and sanitized, removing the bloom. About 10% of egg packers give eggs a light coating of edible mineral oil to restore the bloom.

– See Cuticle, Oiling, Production

"Blown Out" Eggshells

Shells from which the edible part of the egg has been emptied. With nothing inside to spoil, you can decorate empty eggshells and keep them indefinitely.

– See Empty Eggshells

Boiled Frosting

– See Italian Meringue

Bread Pudding

A simple, sweetened custard that is poured over pieces of bread, fruit, nuts or other flavorings and then baked. This classic dessert can be served hot or cold, sometimes with heavy cream or a dessert sauce. A savory version is called a strata.

Breakers

Processors who convert shell eggs into egg products. Breaking plants are under strict U.S. Department of Agriculture inspection by USDA's Food Safety and Inspection Service. Breaking plants use a fascinating array of modern equipment to break eggs and separate the shell, white and yolk.

– See Egg Products

Breakout

A quality-control measure to supplement the grading process. The following criteria have been set by the U.S. Department of Agriculture (USDA) to judge egg quality. Sample eggs are selected at random and broken out onto a level surface.

The height of the thick albumen (white) is measured with a tripod micrometer and this measurement is correlated with the weight of the egg to give a Haugh unit measurement. A high Haugh value means high egg quality. At the same time, the condition of the yolk is observed.

The foodservice industry also uses a breakout test to evaluate the quality of eggs purchased. Simple observations of the condition of albumen (white) and yolk are considered adequate; generally the Haugh unit system is not used.

– See Grading, Haugh Unit

Grade AA	Grade A	Grade B
		
Egg content covers a small area. White is firm, has much thick white surrounding the yolk and a small amount of thin white. The yolk is round and upstanding.	Egg content covers a moderate area. White is reasonably firm and has a considerable amount of thick white and a medium amount of thin white. The yolk is round and upstanding.	Egg content covers a very wide area. White is weak and watery, has no thick white and the large amount of thin white is thinly spread. The yolk is enlarged and flattened.

Brown Eggs

– See Color Shell

Buying

Look for shells that are clean and whole. Cracked eggs are always removed from production, but some may be broken in handling. Don't use an egg if it's cracked or leaking.

Proper handling and refrigeration are important factors in maintaining egg quality. Eggs lose quality very rapidly at room temperature, so buy eggs only from refrigerated cases, get them home quickly and refrigerate

immediately. At temperatures of 35° to 45°F (2° to 7°C), you can store eggs with insignificant quality loss for three to five weeks after you bring them home.

Eggs are marketed according to grade and size standards established by the U.S. Department of Agriculture (USDA) or by state departments of agriculture. The USDA shield on the egg carton means that the eggs have been graded by U.S. or state department of agriculture representatives for consistency with USDA's standards for the voluntary grading of shell eggs.

Some egg packers may follow state standards, which must meet or exceed USDA standards. Some states have state seal programs which indicate that the eggs are produced within that state and are subject to continuing state quality checks. All eggs sold at the retail level must meet the standards for Grade B or better.

Size and grade are two entirely different factors and bear no relationship to one another. Grade is determined by the interior and exterior quality of the egg at the time the egg is packed. Size is determined by the average weight per dozen.

Grades *(Buying)*

Egg grades are labeled AA, A and B. There is no difference in nutritive value between the different grades.

All eggs sold at the retail level must meet the standards for Grade B or better. Most eggs sold in supermarkets today are Grade AA or A. Although Grade B eggs are just as wholesome to eat, they rate lower in appearance when broken out. Few Grade B eggs find their way to the retail supermarket. Most go to institutional egg users such as bakeries or foodservice operations.

– See Breakout, Grading

Sizes *(Buying)*

Eggs are classified as jumbo, extra large, large, medium, small and peewee. The most common sizes available are medium, large and extra large, because hens most often lay eggs of these sizes. Sizes are classified according to minimum net weight expressed in ounces per dozen.

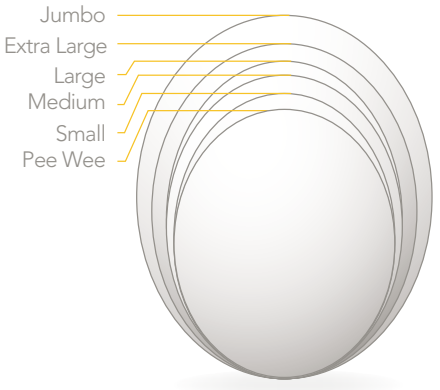
Which Size to Buy *(Buying)*

You can use any size egg for most basic egg recipes, including scrambled or fried eggs. However, most recipes for baked goods are formulas in which it's important to maintain the proper proportion

of liquid to dry ingredients and to have enough whole egg, white or yolk to perform the needed functions. Most baking recipes are based on large-sized eggs. (To substitute one size egg for another in recipes, see Size Equivalents.)

Egg Weight	
Egg Sizes	**Ounces Per Dozen**
Jumbo	30
Extra large	27
Large	24
Medium	21
Small	18
Peewee	15

Source: U. S. Department of Agriculture (USDA) http://www.fsis.usda.gov/Factsheets/Focus_On_Shell_Eggs/index.asp#17



Most of the eggs sold in supermarkets are large-sized, but there are occasionally specials on other sizes. Use the following chart to find which size is the best buy.

To compare the price of large eggs to the price of medium eggs, for example, run your fingers down the columns to the figures closest to the prices per dozen for large and medium eggs. Then, go across to the price per pound for each size. The one selling for the lower price per pound is the better buy. Always compare the same grade of eggs for an accurate price comparison.

– See Grading, Size Equivalents

Inexpensive Egg Protein *(Buying)*

Protein is an essential part of a nutritious diet but, for many people, foods that supply protein are some of the most expensive items on the grocery list.

Fortunately, the protein supplied by eggs is both high in quality and low in cost. It's easy to compare the price of eggs to the price of other protein foods. A dozen large eggs weigh 1 1/2 pounds, so the price per pound of large eggs is two-thirds of the price per dozen. For example, if large eggs cost $1.45 per dozen, they cost 97¢ per pound. At $1.75 per dozen, large eggs are only $1.17 per pound.

Another helpful formula is that one egg equals one ounce of lean meat, poultry or fish. This means that you can use two eggs as your main dish at a meal or you can use eggs to "stretch" more expensive protein foods. For instance, you might use one chopped hard-boiled egg per serving along with half the usual amount per serving of expensive seafood in a dish.

– *See Meat Replacement, Protein*

Price Comparison
Which size is the best buy?

Small (18 oz)	Medium (21 oz)	Large (24 oz)	Extra-Large (27 oz)	Jumbo (30 oz)	PRICE/POUND (16 oz)
.68	.79	.90	1.01	1.13	.60
.75	.88	1.00	1.13	1.25	.665
.83	.96	1.10	1.24	1.38	.73
.90	1.05	1.20	1.35	1.50	.80
.98	1.14	1.30	1.46	1.63	.865
1.05	1.23	1.40	1.58	1.75	.93
1.13	1.31	1.50	1.68	1.88	1.00
1.20	1.40	1.60	1.80	2.00	1.065
1.28	1.49	1.70	1.91	2.13	1.13
1.35	1.58	1.80	2.03	2.25	1.20
1.43	1.66	1.90	2.14	2.38	1.265
1.50	1.75	2.00	2.25	2.50	1.335
1.58	1.84	2.10	2.36	2.63	1.40
1.65	1.93	2.20	2.48	2.75	1.465
1.73	2.01	2.30	2.59	2.88	1.53
1.80	2.10	2.40	2.70	3.00	1.60
1.88	2.19	2.50	2.81	3.13	1.665
1.95	2.28	2.60	2.93	3.25	1.73
2.03	2.36	2.70	3.04	3.38	1.80
2.10	2.45	2.80	3.15	3.50	1.865
2.18	2.54	2.90	3.26	3.63	1.93
2.25	2.63	3.00	3.38	3.75	2.00
2.33	2.71	3.10	3.49	3.88	2.065
2.40	2.80	3.20	3.60	4.00	2.13
2.48	2.89	3.30	3.71	4.13	2.20
2.55	2.98	3.40	3.83	4.25	2.265
2.63	3.06	3.50	3.94	4.38	2.33
2.70	3.15	3.60	4.05	4.50	2.40
2.78	3.24	3.70	4.16	4.63	2.465
2.85	3.33	3.80	4.28	4.75	2.53

Source: American Egg Board

C

Calcium

The major role of the mineral calcium is in building and maintaining bones and teeth. Calcium is also essential for many other body functions related to the blood, nerves and muscles. One large egg provides 28 milligrams (mg) of calcium, 2.6% of the Daily Reference Value (DRV) for calcium, most of which is in the yolk. An eggshell is composed largely of calcium carbonate (about 94%) along with small percentages of magnesium carbonate and calcium phosphate and, in total, contains about 2 grams of calcium.

– See Daily Value, Daily Reference Values (DRVs), Nutrient, Shell

Calories

The calorie count for eggs varies with size.

– See Nutrient, Reference Daily Intakes (RDIs)

Egg Calories

Egg Sizes	Calories Per Egg
Small	54
Medium	63
Large	72
Extra large	80
Jumbo	90

Source: U.S. Department of Agriculture, Agricultural Research Service. 2004. USDA National Nutrient Database for Standard Reference, Release 17.

Nutrient Data Laboratory Home Page, http://www.ars.usda.gov/nutrientdata

Candling

The step in grading during which the egg grader looks inside the egg (without breaking it) to judge quality. Long ago, this quality check was done by holding a candle behind an egg. Some hand-candling, using electric equipment, is still used for spot-checking or for training egg graders, but today most eggs pass on rollers over high-intensity lights, which make the interior of the egg visible. The eggs are rotated so all parts are visible. The candler checks the size of the air cell and the distinctness of the yolk outline. Imperfections such as blood spots show up in candling. Very large packing plants may also use electronic blood and/or check detectors to sort and remove eggs exhibiting these defects.

– See Air Cell, Blood Spots, Grading

Carotenoids

Antioxidants

– See Xanthophylls, Lutein and Zeaxanthin

Carton Dates

Egg cartons from plants producing USDA-graded eggs must display a Julian date – the date the eggs were packed. Although not required, egg cartons may also carry an expiration (sell-by) date and/or a best-by (use-by) date. On USDA grade-shielded egg cartons, if an expiration date appears, it can be no more than 30 days after the pack date. It may be

less through the choice of the packer or quantity purchaser, such as your local supermarket chain. On USDA grade-shielded egg cartons, if a best-by (use-by) date appears, it can be no more than 45 days after the pack date. Eggs that are not packed under USDA's grading program must be labeled and coded in accordance with egg laws in the state where they are packed and/or sold. Most states require the use of a Julian date.

– See Julian Dates, Expiration Date

Cephalin

A phospholipid found in nerve tissues, including the white matter of the brain and spinal cord. One large egg contains 0.23 gram of cephalin.

– See Nutrient

Chalazae (kuh-LAY-zah)

Ropey strands of egg white which anchor the yolk in place in the center of the thick white. Chalazae are neither imperfections nor beginning embryos. The more prominent the chalazae, the fresher the egg. Chalazae don't interfere with the cooking or beating of the white and you don't need to remove them, although some cooks like to strain them from stirred custard.

– See Composition

Chantilly Meringue

– See Italian Meringue

Chinese Eggs

– See Preservation

Cholesterol

A fat-like substance found in every living cell in your body. Cholesterol is made in necessary amounts by your body and is stored in your body. Cholesterol is especially concentrated in your liver, kidney, adrenal glands and brain. Cholesterol insulates nerve fibers and must be available for your body to produce vitamin D. Cholesterol is also required for the structure of cell walls, is essential to the production of digestive juices and is the basic building block for many hormones. Cholesterol is essential for life.

While your body produces cholesterol, dietary sources also can contribute to blood cholesterol levels. Research shows that a diet high in saturated fat, trans-fatty acids and excess calories contributes to increased levels of cholesterol in your blood.

Dietary cholesterol, found in all foods from animals, does not automatically raise your blood cholesterol levels. Your body usually compensates for dietary cholesterol by synthesizing smaller amounts in the liver, by excreting more or by absorbing less.

Elevated blood cholesterol levels do increase the risk of heart disease. You should know your blood cholesterol

levels and, if they are elevated, follow your doctor's advice. In a blood cholesterol-lowering diet, research shows that the most important change you can make is to limit saturated fats and trans-fatty acids. Including fats – such as monounsaturated and polyunsaturated fats and omega-3 fatty acids – also may help improve blood cholesterol levels. A wealth of research has shown that eggs do not have a significant impact on blood cholesterol levels, so it's not necessary to avoid egg yolks, as part of an overall healthful diet. You can use egg whites freely.

One large egg contains 186 milligrams (mg) of cholesterol. Regardless of the color of the eggs, the hen's housing system, or whether the eggs are fertilized, the cholesterol content is the same unless the feed was altered, in which case a claim will appear on the carton. Cooking does not affect the cholesterol content of eggs.

– See Fat

Choline

Choline is essential for the normal functioning of all cells in your body and assures the structural development and signaling functions of cell membranes. Choline is made by your body but needed in larger amounts during pregnancy and lactation. When consumed during pregnancy, choline may be a key factor in the development of infants' memory functions and, later in life, choline may improve memory capacity. Animal studies have shown that a mother's insufficient choline production and intake during pregnancy can cause either defective memory or lower memory capabilities that last throughout life. Research shows that choline supplementation during fetal development enhances memory function. Egg yolks are an important source of choline (126 mg per large egg yolk) and provide 28% of a pregnant woman's daily needs (450 mg).

Choux Pastry

– See Cream Puff

Cleaning

Washing eggs to remove any dirt or stains. In modern laying houses, eggs are gathered shortly after they're laid and moved to automated washing equipment. Strict federal regulations specify the procedures and cleaning compounds that may be used. Today most eggs are cleaned in mechanical egg washers employing sprayers, brushes, detergent-sanitizers, rinses and driers. Only clean eggs go to the market.

In washing, the bloom is removed. About 10% of egg packers apply an edible mineral oil to replace it.

– See Bloom, Oiling, Production

Coddled Egg

1. An egg cooked in a coddler.

– *See Cooking Equipment, Coddler*

2. A less frequently used term for eggs cooked-in-the-shell for a very brief time.

Cold Storage

The practice of holding eggs in refrigerated warehouses. Commercial cold storage of eggs began in the U.S. in 1890. Because egg production was seasonal then, spring and summer eggs could be held in cold storage for release during periods of relative scarcity in autumn and winter. This practice helped avoid drastic price fluctuations.

Modern breeding and flock management have virtually eliminated seasonal differences in egg production so that cold storage is neither necessary nor practical. Thanks to rapid handling methods and efficient transportation, most eggs reach the supermarket warehouse within a few days of being laid.

– *See Preservation, Storing*

Color

Egg shell and yolk color may vary. Color has no relationship to egg quality, flavor, nutritive value, cooking characteristics or shell thickness.

Shell *(Color)*

Shell color comes from pigments in the outer layer of the shell and, in eggs from various commercial breeds, may range from white to deep brown. The breed of hen determines the color of the shell. Among commercial breeds, hens with white feathers and ear lobes lay white-shelled eggs; hens with red feathers and ear lobes lay brown eggs.

White eggs are most in demand among American buyers. In some parts of the country, however, particularly in New England, brown shells are preferred. Commercial brown-egg layers are hens derived from the Rhode Island Red, New Hampshire and Plymouth Rock breeds. Since brown-egg layers are slightly larger birds and require more food, brown eggs are usually more expensive than white.

White (Albumen)

Egg albumen in raw eggs is opalescent and doesn't appear white until you beat or cook it.

Yolk

Yolk color depends on the hen's diet. If a hen consumes plenty of yellow-orange plant pigments called xanthophylls, the xanthophylls will be deposited in the egg yolk. Hens fed mashes containing yellow corn or alfalfa meal lay eggs with medium-yellow yolks, while those eating wheat or barley yield lighter-colored yolks. A colorless diet, such as white cornmeal, produces almost colorless yolks. Natural yellow-orange substances, such as marigold petals, may be added to light-colored feeds to enhance yolk color. Artificial color additives are not permitted. Gold or lemon-colored yolks are the most common. Yolk pigments are relatively stable and are not lost or changed in cooking.

A **green** ring around hard-boiled egg yolks is the result of sulfur and iron compounds in the egg reacting at the surface of the yolk. The greenish color may occur when you cook eggs for too long or at too high a temperature or when there is a high amount of iron in the cooking water. Although the color may be unappealing, eggs with green rings are still wholesome and nutritious and have a normal flavor. The best ways to avoid greenish yolks are to use the proper cooking time and temperature and to rapidly cool the cooked eggs.

– See Cooking Methods, Hard-Boiled

Sometimes a large batch of scrambled eggs turns green. Although not pretty, the color change is harmless. Just as in hard-boiled eggs, the green color is the result of heat causing a chemical reaction between the eggs' iron and sulfur. The green color occurs when you cook eggs at too high a temperature, hold them for too long, or both. To prevent the coloring, use stainless steel equipment and a low cooking temperature, cook the eggs in small batches and serve them as soon as possible after cooking. If it's necessary to hold scrambled eggs for a short time before serving, it helps to avoid direct heat. Place a pan of hot water between the pan of eggs and the heat source.

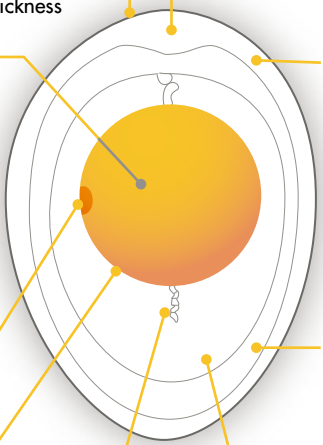
Occasionally several concentric green rings appear in hard-boiled egg yolks. A yolk develops within the hen in rings. As the rings are formed, iron in the hen's feed or water may cause the green coloring.

Complete Protein

- See Protein

Composition

Composition



Shell
- Outer covering of egg, composed largely of calcium carbonate
- May be white, brown or even blue-green depending on breed of chicken
- Color does not affect egg quality, flavor, cooking characteristics, nutritive value or shell thickness

Air Cell
- Pocket of air formed at large end of egg
- Caused by contraction of the contents during cooling after laying
- Increases in size as egg ages

Yolk
- Yellow portion of egg
- Color varies with feed of the hen, but doesn't indicate nutritive content
- Major source of egg vitamins, minerals and fat and about half of the protein

Shell Membranes
- Two membranes - inner and outer shell membranes - surround the albumen
- Provide protective barrier against bacterial penetration
- Air cell forms between these two membranes

Germinal Disc

Thin Albumen (White)
- Nearest to the shell
- Spreads around thick white of high-quality egg

Vitelline (Yolk) Membrane
- Clear seal which holds yolk

Thick Albumen (White)
- Major source of egg riboflavin and protein
- Stands higher and spreads less than thin white in higher-grade eggs
- Thins and becomes indistinguishable from thin white in lower-grade eggs

Chalazae
- Twisted, cord-like strands of egg white
- Anchor yolk in center of egg
- Prominent chalazae indicate freshness

Cooking Equipment

It's easy to cook eggs with no special kitchen equipment. For example, you don't need to have a double boiler to cook egg sauces and custards. Simply use a heavy-gauge saucepan over low heat. However, there are some pieces of kitchen equipment designed especially for preparing eggs. Some of these items – such as an electric egg cooker – are limited to egg use only, while others – such as custard cups – come in handy for a variety of foods.

As a rule, on top of the range, cooking is more even in heavy-gauge pots and pans. Baking dishes and pans of the proper size are particularly important for items that rise, such as breads, cakes and soufflés.

Beaters

Cooks once had to rely on muscle power to whip eggs. They used an assortment of large and small, flat and balloon-shaped whisks, many of which are still available. Today, most cooks use an electric stand or hand mixer. Blenders and some food processors can whip up a whole egg, an egg yolk or a mixture but do not produce stiffly beaten egg whites.

Bowls

There has long been a great controversy about the merits, if any, of using a copper bowl to produce volume in beaten egg whites. The copper in the bowl reacts with the conalbumin of egg whites much like cream of tartar to stabilize egg-white foam. With the addition of cream of tartar, a stainless steel or glass bowl works just as well, is much less expensive and avoids the possibility of copper leaching into food.

Because they tend to absorb fat, plastic and wooden bowls aren't suitable for beating egg whites. Any film or residue of fat will keep the whites from forming a stable foam.

The size and shape of a bowl is important. When you use an electric stand mixer, use the bowl that comes with the mixer. A deep bowl with enough room for expansion is best for an electric hand mixer. For hand-whipping with a balloon whisk, use a bowl that's rounded at the bottom, at least 10 inches across the top and 5 to 6 inches deep.

Cooking Equipment Especially For Eggs

Coddler

A small cup made of porcelain, heatproof glass or pottery with a screw-on top. To use a coddler, break an egg or two into the cup, screw on the top and submerge the cup in simmering water until the egg is cooked. Eat the eggs directly from the coddler. You can also coddle eggs in a small jelly-size canning jar.

Cooker

An electric appliance which steam-cooks eggs in the shell. Most egg cookers also have inserts or cups for steam-poached eggs and some have a flat insert for cooking fried or scrambled eggs and omelets.

Crepe Pan

A shallow, slope-sided skillet, 6 to 8 inches in diameter. Crepe pans range from inexpensive, lightweight pans to sophisticated electric models, some of which cook the crepes on what appears to be the outside of the pan. You can make crepes in almost any small shallow pan with sloping sides, such as a small omelet pan.

Custard Cups

Small, deep, individual bowl-shaped dishes, with a capacity of 6 or 10 ounces, designed for oven use and perfect for baking eggs, individual custards or quiches.

Omelet Pan

A shallow, slope-sided nonstick skillet, usually 7 to 10 inches in diameter. A double omelet pan consists of 2 shallow rectangular or semicircular pans attached by hinges. Each pan has a handle.

Piercer

A sharp-pointed tool for gently pricking a very small hole in the large end of an eggshell before hard-boiling. Piercing may allow some air to escape and some water to seep into the egg during cooking, which may make peeling easier. However, piercing often produces hairline cracks in the shell, making the egg more vulnerable to bacteria. For this reason, piercing is not recommended. To make peeling hard-boiled eggs easier, use eggs that are 7 to 10 days old.

Poacher

A rack that holds cups, sized to fit one egg each, over simmering water, or a small colander-like form that holds an egg as it poaches in simmering water.

Quiche dish

A round, shallow, straight-sided ceramic dish, usually with scalloped edges, for oven use. Sometimes

also called a flan or tart dish, a quiche dish is available in several sizes. You can also use a pie plate of the same size to bake a quiche.

Ring

A round band, with or without a handle, to hold a fried egg during cooking.

Separator

A small cup centered in a round frame made of plastic, metal or ceramic. The cup catches the yolk while slots around the frame let the white slip through to a container beneath the separator. You can also use a kitchen funnel to separate eggs.

Slicer

A device which cuts a hard-boiled egg into neat slices with one swift stroke. An egg slicer has an indented tray in which the egg rests and a cutting mechanism of parallel wires. To chop an egg, carefully rotate the sliced egg 90 degrees

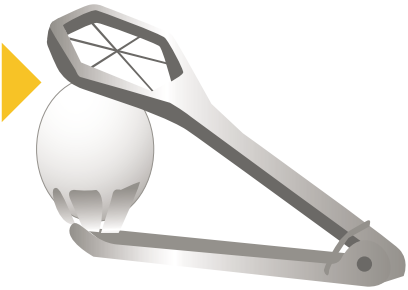
in the tray and cut through again. You can also chop eggs using a pastry blender in a bowl or with a sharp knife on a cutting board.

Soufflé dish

A deep, straight-sided dish designed for oven use. Soufflé dishes are available in various sizes and can serve as casserole dishes, too. You can also bake a soufflé in a straight-sided casserole or baking dish or an uncoated saucepan of the same size.

Wedger

A device which cuts a hard-boiled egg into 6 equal wedge-shaped parts. The wedger holds the egg upright as you pull wires over it to cut the wedges. When you draw down the wires only partway, you can open the egg to hold a stuffing or to resemble a flower.



Cooking Functions

Although eggs are widely known as breakfast entrees, they also serve in many other ways. In fact, the cooking properties of eggs are so varied that eggs have been called "the cement that holds together the castle of cuisine".

Eggs **bind** ingredients in dishes such as meatloaves or crab cakes, **leaven** such baked high-rises as soufflés and sponge cakes and **thicken** custards and sauces.

Eggs **emulsify** mayonnaise, salad dressings and Hollandaise sauce and are frequently used to **coat or glaze** breads and cookies.

Eggs **clarify** soups and coffee and **retard crystallization** in boiled candies and frostings.

Eggs **add color, flavor, moisture and nutrients** to baked goods such as cakes. As a finishing touch, hard-boiled eggs often serve as a **garnish.** For more in-depth information visit www.IncredibleEgg.org

Cooking Methods

The basic principle of egg cooking is to use a medium to low temperature and time carefully. When you cook eggs at too high a temperature or for too long at a low temperature, the whites shrink and become tough and rubbery and the yolks become tough and their surface may turn gray-green.

To kill bacteria and other microorganisms, the recommended guidance is to cook eggs until the whites are firm and the yolks thickened. Cook egg dishes to an internal temperature of 160°F (71°C). Pasteurized shell eggs are available on the market for those who prefer eggs not cooked to this level of doneness. There are five basic methods for cooking eggs.

Baked

Eggs baked in a dish in the oven, also known as shirred. Break and slip 2 eggs into a greased 10-ounce custard cup, shallow baking dish

or ramekin. Spoon 1 tablespoon milk or half and half over the eggs. Bake in a preheated 325°F (163°C) oven until the whites are completely set and the yolks begin to thicken but are not hard, about 10 to 12 minutes, depending on the number of servings you're baking.

Hard-boiled/Hard-cooked

Place eggs in a saucepan large enough to hold them in a single layer. Add enough cold water to come at least 1 inch above the eggs. Heat over high heat to boiling. Turn off heat. If necessary, remove the pan from the burner to prevent further boiling. Cover pan. Let the eggs stand in the hot water about

12 minutes for large eggs (about 9 minutes for medium, about 15 for extra-large). Immediately run cold water over the eggs or place them in ice water until they're completely cooled. Never microwave eggs in the shell and unfortunately, it's almost impossible to hard-boil eggs at altitudes above 10,000 feet.
– See Peeling

Fried

For Sunny-Side-Up Eggs: Heat a small amount of butter in nonstick skillet over medium-high heat until hot. Break eggs and slip into pan, one at a time. Immediately reduce heat to low. Cover pan and cook slowly until whites are completely set and yolks begin to thicken but are not hard, 5 to 6 minutes. Sprinkle with salt and pepper.

For Over-Easy or Over-Hard Eggs: Cook as for Sunny-Side-Up, but do not cover pan. When whites are completely set and yolks begin to thicken but are not hard, 5 to 6 minutes. Slide turner under each egg and carefully flip it over in pan. Cook second side to desired doneness, 30 seconds to 1 minute.

For Basted Eggs: Cook as for Sunny-Side-Up, but use 2 tablespoons butter and do not cover pan. Cook until edges turn white, about 1 minute. Begin basting eggs with butter from pan. Cover pan between bastings and continue cooking until whites are completely set and yolks begin to thicken but are not hard, 4 to 5 minutes.

For Steam-Basted Eggs: cook as for Sunny-Side-Up, but use 1 teaspoon butter or a light coating of cooking spray. Cook until edges turn white, about 1 minute. Add 1 teaspoon water to pan. Cover pan tightly. Continue cooking until whites are completely set and yolks begin to thicken but are not hard, 4 to 5 minutes.

Poached

Heat 2 to 3 inches of water, milk, broth, tomato juice, wine or other liquid in a large saucepan or deep

skillet to boiling. Adjust heat to keep liquid simmering gently. Break cold eggs, one at a time, into a custard cup or saucer. Holding the dish close to the liquid's surface, slip the eggs, one by one, into the water. Cook until the whites are completely set and the yolks begin to thicken but are not hard, about 3 to 5 minutes. Do not stir. With a slotted spoon, lift out the eggs. Drain the eggs in the slotted spoon or on paper towels. Trim any rough edges, if you like. Adding vinegar or salt to the water to enhance coagulation is not necessary and can flavor the eggs. Use very fresh eggs for poaching. They hold their shape better and form fewer wispy threads or "angel wings" in the water.

Scrambled

Beat together 2 eggs, 2 tablespoons milk or water, salt and pepper, if you like, until blended. Heat a small amount of butter or cooking spray in a 7 to 8 inch nonstick omelet pan or skillet over medium heat until hot. Pour in the egg mixture. As the eggs begin to set, gently pull the eggs across the pan with an inverted turner, forming large soft curds. Continue cooking – pulling, lifting and folding eggs until thickened and no visible liquid egg remains. Do not stir constantly.

Cooking Terms

The following terms or phrases regularly occur in egg recipes.

Cook until knife inserted near center comes out clean. Baked custard mixtures are done when a metal knife inserted off center comes out clean. The very center still may not be quite done, but the heat retained in the mixture will continue to cook it after you remove it from the oven. Cooking longer may result in a curdled and/or weeping custard. Cooking less time may result in a thickened but not set custard.

Cook until just coats a metal spoon. For stirred custard mixtures, the eggs are cooked to the proper doneness when a thin film adheres to a metal spoon dipped into the custard. The point of coating a metal spoon is 20° to 30°F below boiling. Stirred custards should not boil. The finished product should be soft and thickened but not set. Stirred custards will thicken slightly after refrigeration.

Slightly beaten. Beat eggs with a fork or whisk just until the yolks and whites are blended.

Well beaten. Beat eggs with a mixer, blender, beater or whisk until they are light, frothy and evenly colored.

Thick and lemon-colored. Beat yolks with an electric mixer at high speed until they become a pastel yellow and form ribbons when you lift the beater or drop the yolks from a spoon, about 3 to 5 minutes. Although yolks can't incorporate as much air as whites, this beating does create a foam and is important to airy concoctions such as sponge cakes.

Add a small amount of hot mixture to eggs/egg yolks. When you add eggs or egg yolks to a hot mixture all at once, they may begin to coagulate too rapidly and form lumps. So, stir a small amount of the hot mixture into the eggs to warm them and then stir the warmed eggs into the remaining hot mixture. This is called ***tempering***.

Room temperature. Some recipes call for eggs to be at room temperature before you combine the eggs with a fat and sugar. Cold eggs could harden the fat in this type of recipe and the batter might become curdled. This could affect the texture of the finished product. To prevent the curdling, remove eggs from the refrigerator about 30 minutes before you use them or put them in a bowl of warm water for 10 to 15 minutes while you assemble other ingredients. For all other recipes, use eggs straight from the refrigerator.

The following cooking terms apply specifically to egg whites.

Separated. Fat inhibits the foaming of egg whites. Since egg yolks contain fat, recipes sometimes call for the yolks to be separated from the whites. Beating the whites separately allows them to reach their fullest possible volume. It's easiest to separate the yolks and whites when the eggs are cold, but whites reach their fullest volume if you allow them to stand at room temperature for about 30 minutes before beating.

Many inexpensive egg separators are available. To separate eggs, tap the midpoint of the egg sharply with a table knife. Hold the egg over the bowl in which you want the whites and gently pull apart the shell halves. Let the yolk nestle into the cuplike center of the separator and

the white will drop through the slots into the bowl beneath. You can use the same process with a funnel.

Drop one egg white at a time into a cup or small bowl and then transfer it to the mixing bowl before separating another egg. This avoids the possibility of yolk from the last egg you separated getting into several whites. Drop the yolk into another mixing bowl if you need it in the recipe, otherwise into a storage container.
– *See Storing*

Add cream of tartar. Egg whites beat to greater volume than most other foods, including whipping cream, but the air beaten into them can be lost quite easily. To make the foam more stable, add a stabilizing agent such as cream of tartar to the whites. Lemon juice works much the same way.
– *See Cream of Tartar*

Add sugar, 1 to 2 tablespoons at a time. When you make meringues and some cakes, you add sugar to beaten egg whites. Sugar serves to increase the stability of the foam. However, sugar can also retard the foaming of the whites and you must add it slowly so you don't decrease the volume. Beat the whites until they just begin to get foamy, then slowly beat in the sugar.
– *See Meringue*

Stiff but not dry. Beat whites with a mixer, beater or whisk just until they no longer slip when the bowl is tilted. (A blender or food processor will not aerate them properly.) If you underbeat egg whites, the finished product may be heavier and less puffy than desired. If you overbeat egg whites, they may form clumps which are difficult to blend into other foods in the mixture and the finished product may lack volume.

Stiff peaks form. Stiff but not dry.

Soft peaks or piles softly. Whites that have been beaten until high in volume but have not reached the stiff peak stage. When you lift the beater, peaks will form and curl over slightly.

Gently folded. When you combine beaten egg whites with other heavier mixtures, handle carefully so you don't

Stiff peaks

Soft peaks

lose the air you've beaten into the whites. It's best to pour the beaten egg whites onto the heavier mixture. Then, using a spoon or rubber spatula, gradually combine the ingredients with a downward stroke into the bowl, followed by an across-up-and-over-the-mixture motion. Come up through the center of the mixture about every three strokes and rotate the bowl as you are folding. Fold just until there are no streaks remaining in the mixture. Don't stir because this will force air out of the egg whites.

Copper Bowl

– See Cooking Equipment, Bowls

Cream of Tartar

An acid ingredient which stabilizes beaten egg whites. As a rule of thumb, use 1/8 teaspoon cream of tartar per egg white or 1 teaspoon per cup of egg whites. For meringues, use 1/8 teaspoon cream of tartar for each 2 egg whites.

– See Cooking Terms, Add Cream of Tartar

Cream Puff

A light, but rich, hollow pastry puff which you can fill with a sweet filling for dessert or with a savory one, such as egg or chicken salad, for a main dish. Called choux pastry (Pâte or choux) after the French word for cabbage, cream puffs come out of the oven looking like little cabbages. A high proportion of egg is necessary to form the cream puff

structure. Egg yolk helps to emulsify the fat and egg whites are drying agents for crisp, dry puffs. Visit www.IncredibleEgg.org for a cream puff recipe.

Crème Anglaise

– See Custard, Stirred

Crème Caramel

– See Custard, Baked

Crepe

A light, thin, egg-rich pancake. The word is French, but the crepe is so versatile that it exists in many other languages, too. It's a Russian blini, a Jewish blintz, a Chinese egg roll, a Greek krep or a Hungarian palacsinta. Depending on the filling, a crepe can be an appetizer, main dish or dessert.

Crepe batter should be the consistency of heavy cream. Letting the batter rest

for an hour or so after mixing allows the flour to absorb moisture and gives the air bubbles time to dissipate so that the crepes you make don't have tiny holes.

You can make crepes in advance. Stack, wrap and refrigerate them for a few days and reheat to serve. For longer storage, double wrap and freeze. Visit www.IncredibleEgg.org for a crepe recipe.

Curdling

Also known as syneresis or weeping. When you cook an egg mixture such as a custard sauce too rapidly or for too long, the protein becomes over-coagulated and separates from the liquid, leaving a mixture resembling fine curds and whey. If the curdling in a custard sauce hasn't progressed too far, you may be able to reverse it if you remove the mixture from the heat and stir or beat vigorously.

To prevent syneresis or curdling in a custard sauce, use a low temperature, stir (if appropriate for the recipe), cook just until the custard tests done, and cool quickly by setting the pan in a bowl of ice or cold water and stirring for a few minutes.

The term curdling is usually used in connection with a stirred mixture such as custard sauce, while weeping or syneresis are more often used with reference to pie meringues or baked custards.

– See Meringue, Soft Meringue

Custard

A cooked mixture of eggs and milk with sugar and flavoring sometimes added. There are two basic kinds of custard – stirred and baked.

Stirred custard is also known as soft custard, custard sauce or erroneously, boiled custard. This custard is cooked on top of the range to a creamy, but pourable, consistency. You can cook the mixture in a double boiler over hot water or in a heavy saucepan over low heat. Serve stirred custard as a pudding or over cake or fruit. Visit www.IncredibleEgg.org for a vanilla custard sauce recipe.

Baked custard is cooked in a water bath in the oven and has a firm, but delicate, gel-like consistency. Serve a sweetened baked custard as a dessert in itself or as a base for toppings and sauces. A quiche or timbale is an unsweetened baked custard.

The usual proportions for a sweet custard are one egg and two tablespoons of sugar for each cup of milk. This is the minimum ratio of eggs to milk which will produce properly thickened custard. You may, though, use as many as four eggs and increase the sugar to four tablespoons. Increasing the sugar will make the custard less firm and lengthen the cooking time. Increasing the egg will make the custard firmer and shorten the cooking time.

You can also substitute two egg yolks for one whole egg. Two egg whites will also thicken the custard as much as one whole egg, but the characteristic custard color and flavor will be missing. Visit www.IncredibleEgg.org for baked custard and quiche recipes.

Cuticle

– See Bloom

D

Daily Reference Values (DRVs)

There are two sets of reference values for reporting nutrients in nutrition labeling: 1) Daily Reference Values (DRVs) and 2) Reference Daily Intakes (RDIs). These values assist consumers in interpreting information about the amount of a nutrient that is present in a food and in comparing nutritional values of food products. DRVs are established for adults and children four or more years of age, as are RDIs, with the exception of protein. DRVs are provided for total fat, saturated fat, cholesterol, total carbohydrate, dietary fiber, sodium, potassium, and protein. RDIs are provided for vitamins and minerals and for protein for children less than four years of age and for pregnant and lactating women. In order to limit consumer confusion, however, the label includes a single term (i.e., Daily Value (DV)), to designate both the DRVs and RDIs. Specifically, the label includes the % DV, except that the % DV for protein is not required unless a protein claim is made for the product or if the product is to be used by infants or children under four years of age.

– See Daily Values (DVs), Reference Daily Intakes (RDIs), Recommended Dietary Allowances (RDAs), U.S. Recommended Daily Allowances (U.S. RDAs)

Daily Values (DVs)

A term on food labels that represents the amount of protein, fat, cholesterol, carbohydrate (including dietary fiber and sugars), vitamins and minerals, expressed in percentage of a specific nutrient that a person should consume per day. To avoid consumer confusion, the term DV represents both Daily Reference Values (DRVs) and Reference Daily Intakes (RDIs). DVs serve as a yardstick for food comparisons and not as a strict dietary prescription.

– See Daily Reference Values, Reference Daily Intakes (RDIs), Recommended Dietary Allowances (RDAs), U.S. Recommended Daily Allowances (U.S. RDAs)

Daily Values (DVs)	
DVs based on a caloric intake of 2,000 calories, for adults and children four or more years of age.	
Food Component	**DV**
Total Fat	65 grams (g)
Saturated Fat	20 g
Cholesterol	300 milligrams (mg)
Sodium	2,400 mg
Potassium	3,500 mg
Total Carbohydrate	300 g
Dietary Fiber	25 g
Protein	50 g
Vitamin A	5,000 International Units (IU)
Vitamin C	60 mg
Calcium	1,000 mg
Iron	18 mg
Vitamin D	400 IU
Vitamin E	30 IU
Vitamin K	80 micrograms mcg
Thiamin	1.5 mg
Riboflavin	1.7 mg
Niacin	20 mg
Vitamin B_6	2 mg
Folate	400 mcg
Vitamin B_{12}	6 mcg
Biotin	300 mcg
Pantothenic acid	10 mg
Phosphorus	1,000 mg
Iodine	150 mcg
Magnesium	400 mg
Zinc	15 mg
Selenium	70 mcg
Copper	2 mg
Manganese	2 mg
Chromium	120 mcg
Molybdenum	75 mcg
Chloride	3,400 mg

The nutrients in the table are listed in the order in which they are required to appear on a label in accordance with 21 CFR 101.9(c). This list includes only those nutrients for which a DRV has been established in 21 CFR 101.9(c)(9) ora RDI in 21 CFR 101.9(c)(8)(iv).

Source: Dietary Reference Intakes: The Essential Guide to Nutrient Requirements, Jennifer J. Otten, Jennifer Pitzi Hellwig, Linda D. Meyers, Editors, The National Academies Press, 2006

Decorating Eggs

The egg shape has often inspired artists and the egg has been the palette for some of the most intriguing of folk arts in many cultures.

There is literally no end to the creative possibilities for individual expression on an eggshell. You can paint eggs or color them with crayons or felt-tipped pens, turn them into funny faces, top them with fantastic hats, trim them with feathers or sequins or simply dye them in an endless variety of hues. However you decide to do it, decorating eggs is fun for grown-ups as well as kids.

You can decorate either hard-boiled eggs or empty eggshells. The hard-boiled variety is a bit sturdier for children to use, while empty shells are best if you're making an egg tree or want to keep the eggs on display for a considerable time.

Commercial egg dyes are sold especially at the Easter season and food coloring is available year round. Any time of year, you might prefer to craft your eggs by experimenting with colors from nature.

To make naturally-dyed eggs: Toss your choice of a handful – or two or three – of one of the materials below into a saucepan. (Use your own judgment about quantity. This is an art – not a science!) Add about a cup of water for each handful, so the water comes at least an inch above the dyestuff. Bring

to boiling, reduce the heat and simmer from 15 minutes up to an hour, until the color is the shade you want. Keep in mind that the eggs will dye a lighter shade. Remove the pan from the heat.

Through cheesecloth or a fine sieve, strain the dye mixture into a small bowl that's deep enough to completely cover the eggs you want to dye. Add 2 to 3 teaspoons of white vinegar for each cup of dye liquid. With a spoon or wire egg holder from a dyeing kit, lower the eggs into the hot liquid. Let the eggs stand until they reach the desired color. For emptied eggshells, stir or rotate for even coloring. With a slotted spoon or wire egg holder, remove the eggs to a rack or drainer. Allow the eggs to dry thoroughly. Within two hours (or within one hour if the weather is warm), refrigerate hard-boiled eggs that you intend to eat.

Naturally-Dyed Eggs
Pinkish Red
Fresh beets, cranberries, radishes 3 or frozen raspberries
Orange/Yellow
Yellow onion skins, ground turmeric, orange or lemon peels, carrot tops, celery seed or ground cumin
Pale Green
Spinach leaves
Green-gold
Yellow Delicious apple peels
Blue
Canned blueberries or red cabbage leaves
Beige to brown
Strong brewed coffee, dill seeds, chili powder
Gray
Purple or red grape juice or beet juice

Source: American Egg Board

However you decide to color your hard-boiled eggs, follow these tips if you'd like to eat them later: Wash your hands thoroughly before handling the eggs at every step, including cooking, cooling, dyeing and hiding. If you won't be coloring your eggs right after cooking them, store them in their cartons in the refrigerator. Don't color cracked eggs.

When coloring the eggs, use water warmer than the eggs. Refrigerate the eggs in their cartons right after coloring and refrigerate them again after they've been hidden and found. Don't eat

cracked eggs or eggs that have been out of refrigeration for more than two hours. If you plan to use hard-boiled eggs for an Easter egg hunt or as a centerpiece or other decoration and they will be out of refrigeration for many hours or several days, cook extra eggs to refrigerate for eating. Discard the eggs that have been left out for more then two hours. For more decorating ideas, visit www.IncredibleEgg.org

– See Cooking Methods, Hard-Boiled; Empty Eggshells; Easter Eggs

Deviled Eggs

Also known as stuffed eggs, hard-boiled eggs, peeled, cut in half and stuffed with a seasoned, mashed yolk mixture. The yolks are removed from the whites, mixed with a moistener, such as mayonnaise, flavoring foods and/or seasonings and then piled back into the whites. The word "devil" originally referred to the combination of spices, including dry mustard, with which the eggs were highly seasoned.

Doneness Guidelines

To prevent food-born illness, U.S. Department of Agriculture (USDA) recommends cooking eggs until the whites are firm and yolks are thickened. Cook egg-containing dishes to an internal temperature for 160°F (71°C). For egg preparations not cooked to these guidelines, pasteurized shell eggs are available on the market. Eggs should be served promptly after cooking.

- Cook **scrambled eggs, omelets and frittatas** until the eggs are thickened and no visible liquid egg remains.
- To cook both sides of **fried eggs** and increase the temperature the eggs reach, cook slowly and baste the eggs, turn the eggs or cover the pan with a lid. Cook until the whites are completely set and the yolks begin to thicken but are not hard.
- For classic **poached eggs** cooked gently in simmering water, cook until the whites are completely set and the yolks begin to thicken but are not hard, about 3 to 5 minutes. For steamed eggs cooked in "poaching" inserts set above simmering water, cook until the whites are completely set and the yolks begin to thicken but are not hard, about 6 to 9 minutes. Avoid precooking and reheating poached eggs.

- Cook or bake **French toast, Monte Cristo sandwiches, crab or other fish cakes, quiches, baked custards and most casseroles** until a thermometer inserted at the center shows 160°F (71°C) or a knife inserted near the center comes out clean. You may find it difficult to tell if a knife shows uncooked egg or melted cheese in some casseroles and other combination dishes that are thick or heavy and contain cheese – lasagna, for example. To be sure these dishes are done, make sure that a thermometer at the center of the dish shows 160°F (71°C).

- Cook a **soft (stirred) custard – including cream pie, eggnog and ice cream bases** – until it's thick enough to coat a metal spoon with a thin film and a thermometer shows 160°F (71°C) or higher but no higher than 180°F (83°C). A custard sauce thickens at 160°F (71°C) and curdles at 180°F (83°C). An exception to the rule is when cream pie fillings and puddings that contain a starch, the addition of starch prevents curdling even when the mixture is brought to a boil. After cooking, cool the custard quickly by setting the pan in ice or cold water and stirring for a few minutes. Cover and refrigerate the cooled custard to chill thoroughly, at least 1 hour.

- Bake a 3-egg-white **soft (pie) meringue** spread on a hot, fully cooked pie filling in a preheated 350°F (177°C) oven until the meringue reaches 160°F (71°C), about 15 minutes. For meringues using more whites, bake at 325°F (163°C) or a lower temperature until a thermometer registers 160°F (71°C), about 25 to 30 minutes (or more). The more egg whites, the lower the temperature and longer the time you need to cook the meringue through without excessive browning. Refrigerate meringue-topped pies until serving. Return leftovers to the refrigerator.

- **Baked goods and hard-boiled eggs** will easily reach internal temperatures of more than 160°F (71°C) when they are done. Note, though, that while Salmonella are destroyed when hard-boiled eggs are properly prepared, hard-boiled eggs can spoil more quickly than raw eggs. After cooking, cool hard-boiled eggs quickly under running cold water or in ice water. Avoid allowing eggs to stand in stagnant water. Refrigerate hard-boiled eggs in their shells promptly after cooling and use them within one week.

- For **microwaved egg dishes**, encourage more even cooking by covering the dish, stirring the ingredients, if possible, and if your microwave does not have a turntable, rotate the dish once or twice during the cooking time.

Recipes calling for raw or lightly cooked eggs. Although the overall risk of egg contamination is very small, the risk of foodborne illness from eggs is highest in raw and lightly cooked dishes. To eliminate risk and ensure food safety, replace all your recipes calling for raw or lightly cooked eggs with cooked egg recipes or use pasteurized shell eggs or egg products when you prepare them. To cook eggs for these recipes, use the following methods to adapt your recipes:

Cooking whole eggs for use in recipes. Fully cook whole eggs for assured safety in recipes that call for raw or lightly cooked eggs. You can use the following method for a variety of recipes, with any number of eggs.

In a heavy saucepan, stir together the eggs and either sugar, water or another liquid from the recipe (at least 1/4 cup sugar, liquid or a combination per egg). Cook over low heat, stirring constantly, until the egg mixture coats a metal spoon with a thin film or reaches 160°F (71°C). Immediately place the saucepan in ice water and stir until the egg mixture is cool. Proceed with the recipe.

Cooking egg yolks for use in recipes. Cook egg yolks for use in mayonnaise, Hollandaise sauce, Caesar salad dressing, cold soufflés, chiffons and mousses and other recipes calling for raw egg yolks. You can use the following method with any number of yolks.

In a heavy saucepan, stir together the egg yolks and the liquid from the recipe (at least 2 tablespoons liquid per yolk). Cook over very low heat, stirring constantly, until the yolk mixture coats a metal spoon with a thin film, bubbles at the edges or reaches 160°F (71°C). Immediately place the saucepan in ice water and stir until the yolk mixture is cool. Proceed with the recipe.

Cooking egg whites for use in recipes. For full safety in all recipes, cook egg whites before you use them. You can use the following method with any number of whites, including chilled desserts and Seven-Minute Frosting, Royal Icing and other frosting recipes calling for raw egg whites.

In a heavy saucepan, the top of a double boiler or a metal bowl

placed over water in a saucepan, stir together the egg whites and the sugar from the recipe (at least 2 tablespoons sugar per white), water (1 teaspoon per white) and cream of tartar (1/8 teaspoon per each 2 whites). Cook over low heat or simmering water, beating constantly with a portable mixer at low speed, until the whites reach 160°F (71°C). Pour into a large bowl. Beat on high speed until the whites stand in soft peaks. Proceed with the recipe.

Note that you must use sugar to keep the whites from coagulating too rapidly. Test with a thermometer as there is no visual clue to doneness. If you use an unlined aluminum saucepan, eliminate the cream of tartar or the two will react and create an unattractive gray meringue.

The egg whites in an Italian meringue (made by adding hot sugar syrup to egg whites while beating them) do not reach much above 125°F (52°C), so this method is only safe in dishes that are further cooked. However, if you bring the sugar syrup all the way to the hard ball stage (250° to 266°F/121° to 130°C), the whites will reach a high enough temperature. You can use a sugar syrup at hard ball stage for Divinity and similar recipes.

– *See Cooking Methods, Egg Safety, Fight BAC!, Partnership for Food Safety Education, Raw Eggs, Salmonella*

Double-yolked Eggs

– *See Yolk, Formation, Ovary*

Dried Eggs

– *See Egg Products*

E

Easter Eggs

Eggs were colored, blessed, exchanged and eaten as part of the rites of spring long before Christian times. Even the earliest civilizations held springtime festivals to welcome the sun's rising from its long winter sleep. Ancient peoples thought of the sun's return from darkness as an annual miracle and they regarded the egg as a natural wonder and a proof of the renewal of life. As Christianity spread, the egg was adopted as a symbol of Christ's Resurrection from the tomb.

For centuries, eggs were among the foods forbidden by the church during Lent, so it was a special treat to have them again at Easter. In Slavic countries, baskets of food including eggs are traditionally taken to church to be blessed on Holy Saturday or before the Easter midnight Mass, then taken home for a part of Easter breakfast.

People in Eastern European countries have a long tradition of elaborately decorating Easter eggs. Polish, Slavic and Ukrainian people create amazingly intricate designs on the eggs. They draw lines with a wax pencil or stylus, dip the egg in color and repeat the

process many times to make true works of art. Every dot and line in the pattern has a meaning. Yugoslavian Easter eggs bear the initials "XV" for "Christ is Risen", a traditional Easter greeting.

The Russians, during the reign of the Tsars, celebrated Easter much more elaborately than Christmas, with Easter breads and other special foods and quantities of decorated eggs given as gifts. The Russian royal family carried the custom to great lengths, giving exquisitely detailed jeweled eggs made by goldsmith Peter Carl Fabergé from the 1880s until 1917.

In Germany and other countries of central Europe, eggs that go into Easter foods are not broken, but emptied out. The empty shells are painted and decorated with bits of lace, cloth or ribbon, then hung with ribbons on an evergreen or small leafless tree. On the third Sunday before Easter, Moravian village girls used to carry a tree decorated with eggshells and flowers from house to house for good luck. The eggshell tree is one of several Easter traditions carried to America by German (Deutsch) settlers, especially those who became known as Pennsylvania Dutch. German immigrants also brought the fable that the Easter bunny delivers colored eggs for good children.

Easter is an especially happy time for children and many Easter customs are for their enjoyment. Hunting Easter eggs hidden around the house or yard is a widespread activity and so are egg-rolling contests.

– *See Decorating Eggs, Empty Eggshells, Games*

Eclairs

– *See Cream Puffs*

Eggnog

A beverage of eggs, milk, sugar and sometimes flavoring. Rich cream may take the place of part or all of the milk and spirits are often added at holiday time. Eggnog may be served hot or cold, but it should be prepared as a cooked stirred custard. The name may come from the noggin or small cup in which it was served in earlier days.

Visit www.IncredibleEgg.org for an Eggnog recipe.

– *See Custard, Doneness Guidelines, Cooking Whole Egg for Use in Recipes, Egg Safety, Raw Eggs*

Egg Nutrition Center

The nutrition organization for the egg industry. American Egg Board began to fund ENC in 1984 to provide scientifically correct information on egg nutrition and accompanying health issues. Located in Park Ridge, IL, the Egg Nutrition Center communicates regularly with industry, the media, and health and nutrition communities.

A panel of independent scientists advises the Egg Nutrition Center on the interpretation of research studies. The Center is dedicated to providing scientifically accurate, up-to-date information on egg nutrition and health issues. The Egg Nutrition Center's website can be accessed at: www.eggnutritioncenter.org

– See American Egg Board

Egg Products

Processed and convenience forms of eggs for commercial, foodservice and home use, including refrigerated-liquid, frozen, dried and specialty products. Egg products are comparable to shell eggs in flavor, nutritional value and most functional properties. Convenience foods – such as cake and pudding mixes, pasta, ice cream, mayonnaise, candies and bakery goods – utilize egg products. Egg products are frequently preferred to shell eggs by commercial bakers, food manufacturers and the foodservice industry because they have many advantages, including convenience, labor savings, minimal storage requirements, ease of portion control, and product quality, safety, stability and uniformity.

Surplus shell eggs, as well as those produced particularly for the purpose, are used in making egg products. About 30% of total U.S. egg production goes into egg products. About three billion pounds of all types of egg products are produced each year in the U.S.

Since passage of the Egg Product Inspection Act (EPIA) in 1970, all plants that make egg products operate under continuous USDA inspection. The Act mandates specific inspection requirements for shell eggs and egg products to ensure wholesomeness, including pasteurization of all egg products.

Processing egg products. Immediately on delivery to the breaking plant, shell eggs are held in refrigerated holding rooms. Before breaking, the eggs are washed in water that is at least 90°F (32°C). The wash water must also be at least 20°F (-7°C) warmer than the internal temperature of the eggs. The eggs must be spray-rinsed with a sanitizing agent.

Refrigerated liquid products. Machines break eggs and, if necessary, separate the whites and yolks. After the liquid egg is pasteurized and put into covered containers, it may be shipped

to bakeries or other outlets for immediate use or to other plants for further processing. When shipped by truckload, sanitary tank trucks maintain temperatures low enough to assure that the liquid egg arrives at its destination at 40°F (4°C) or less.

In addition to tanker truckloads, wholesale and foodservice refrigerated-product containers range in size from bags containing a few ounces to 20-, 30- and 45-pound bags, 4- to 10-pound cartons, 30-pound cans and bulk totes holding up to 3,000 pounds. Retail refrigerated products for home use are generally available in one-or two-pack cartons containing 8 to 16 ounces each.

Keep liquid egg products under refrigeration and use immediately after opening. Shelf life can vary, so check the product label.

Frozen egg products. These products include separated whites and yolks, whole eggs, blends of whole eggs and yolks or whole eggs and milk and these same blends with salt, sugar or corn syrup added. Salt or carbohydrates are sometimes added to yolks and whole eggs to prevent yolk gelation during freezing. Frozen egg products are generally packed in 30- and 40-pound plastic pails, 30-pound cans, and in 4-, 5-, 8- and 10- pound pouches (some of which are cook-in-bag pouches) or waxed or plastic cartons. Some retail consumer products are available frozen in one-or two-pack cartons containing 8 to 16 ounces each.

Keep frozen egg products frozen or refrigerated until use. Thaw frozen egg products under refrigeration or under cold running water in unopened containers. After defrosting, refrigerate thawed egg products and use within 3 days.

Dried or dehydrated egg products. Known also as egg solids, dried egg products have been produced in the United States since 1930. Demand was minimal until World War II when production reached peak levels to meet military and lend-lease requirements. Present-day technology – such as glucose removal and improved multi-stage dryers – has greatly improved the quality of dried eggs. Dried egg products are used in a wide number of convenience foods and in the foodservice industry.

Dried eggs for foodservice are sold in 6-ounce pouches, and 3- and 25-pound poly-packs. For commercial use, 5-, 25- and 50-pound boxes and 150-, 175- and 200-pound drums are available.

For home use, dried egg products include dried egg whites in 3- to 8-ounce fiberboard and metal canisters sold in supermarkets, meringue powders often available at gourmet outlets and freeze-dried egg products found in camping goods stores.

Unopened dried egg products may be stored at room temperature as long as they are kept cool and dry. Tightly seal and refrigerate opened containers. Reconstituted egg products should be used immediately or refrigerated and used that day.

Specialty egg products. Egg specialties processed for the foodservice industry include wet- and dry-pack, pre-peeled, hard-boiled eggs – either whole, wedged, sliced, chopped or pickled; long rolls of hard-boiled eggs; and freeze-dried scrambled eggs. Among other convenience menu items, also available are a host of frozen products, including pre-cooked fried and scrambled eggs and scrambled egg mix in boilable pouch, omelets, egg patties, French toast, quiche and quiche mix. Ultra-pasteurized liquid eggs with extended shelf-life are also available.

Many specialty egg items are also available at retail, including refrigerated peeled, hard-boiled eggs; shelf-stable pickled eggs; and frozen scrambled eggs, omelets and mixes, French toast and quiche.

– See Breakers, Egg Products Inspection Act, Restricted Eggs

Egg Products Inspection Act

The Egg Products Inspection Act assures that eggs and egg products distributed and consumed by the public are wholesome, not adulterated, and properly labeled and packaged. Passed by Congress in 1970, the Egg Products Inspection Act is administered by the U.S. Department of Agriculture (USDA) and imposes specific inspection requirements for two categories of eggs – shell eggs and egg products. Under the Egg Products Inspection Act, plants that break, dry and process shell eggs into liquid, frozen or dried egg products must operate under the continuous inspection program of the USDA. The law does not apply to food-manufacturing plants which prepare cooked eggs or other food products made with eggs or egg products, such as those which make mayonnaise, egg noodles and ice cream, for example. An official inspector must be present at all times when eggs are being processed.

– See Egg Products, Grading, Restricted Eggs

Egg Roll

1. An elongated, hard-boiled egg processed for the foodservice industry. When the roll is sliced, every piece is a center cut for attractive service.
   – See Egg Products
2. An Asian specialty consisting of a savory filling wrapped in an egg-rich dough, then deep-fat fried. In the U.S., egg rolls are usually served as appetizers.
3. An annual Easter event held in many venues, including the White House lawn.
   – See Egg Games

Egg Safety

Clean hands and equipment, sanitary food-handling practices, proper cooking and adequate refrigeration are essential in preparing all foods, including eggs, prior to eating. The contents of raw shell eggs may contain the bacteria Salmonella Enteritidis, but common food-safety practices can reduce the risk of illness. Use only refrigerated, clean, uncracked, fresh Grade AA or A eggs and follow these important food-handling practices:

Clean

Clean all cooking equipment and food-contact surfaces you use in food preparation. Always wash your hands before and after cracking open raw eggs and wash frequently during food preparation. Use soap and warm water and rub your hands together for 20 seconds, then dry thoroughly.

Separate

As the kitchen can also be a source of bacteria, to avoid cross-contamination, clean all cooking equipment and food-contact surfaces. Also avoid mixing egg yolks and whites with the shell.

Cook

Proper heating destroys the bacteria of concern in eggs. Cook eggs until the whites and yolks are firm and cook egg-containing dishes to an internal temperature of 160°F (71°C)

Chill

Always refrigerate eggs in their original carton in the main section of the refrigerator. Use a refrigerator thermometer to make sure the refrigerator temperature is between 33° to 40°F (1° to 4°C). If you accidentally leave eggs, egg mixtures or cooked egg dishes at room temperature, discard them after two hours or one hour (when the temperature outside is 90°F (32°C) or warmer. For summer outings, use ice or coolant in an insulated bag or cooler to keep cold foods cold (40°F/4°C or lower) and thermal containers to keep hot foods hot (140°F/60°C or higher). When you tote raw eggs on outings, leave them in their shells.

– See Cooking Methods, Doneness Guidelines, Fight BAC!, Partnership for Food Safety Education, Raw Eggs, Salmonella, Egg Safety Center

Egg Safety Center

Under the administration of United Egg Producers, the Egg Safety Center (ESC) provides scientifically accurate information on egg safety issues to both consumers and egg producers. ESC also answers any questions that consumers, producers, or media may have on eggs and egg safety as well as provides real-time updates on recalls that include eggs or egg products.

– See Egg Safety

Egg Salad

A popular combination of chopped hard-boiled eggs, a dressing – such as mayonnaise – and seasonings. Egg salad is often served as a sandwich filling or in tomato or lettuce cups.

Eggs Benedict

Poached eggs with Canadian bacon served on English muffins with Hollandaise Sauce.

Egg Substitutes

Liquid egg products that typically contain only egg white with the yolk replaced by other ingredients, such as non-fat milk, tofu, vegetable oil, emulsifiers, stabilizers, antioxidants, gum, artificial color, minerals and vitamins. Egg substitutes contain the high-quality protein of egg white as well as the white's vitamins and minerals. However, each formula for replacing the yolk differs, so check labels for total nutrient content.

Due to varying formulas, each brand of egg substitute performs differently in cooking. You may have to experiment to learn how to cook an individual brand. For instance, those brands without fat will cook more quickly than those containing fat. Common to all brands is that the yolk's cooking properties, including emulsification, are lost. All brands which contain fat retard egg-white foaming which is needed to leaven certain dishes. Since both emulsification and leavening are important in many baked goods, egg substitutes may not yield the same results as shell eggs in home baking.

Egg White

– See Albumen

Empty Eggshells

Shells from which the edible part of the egg has been emptied. With nothing

inside to spoil, you can decorate empty eggshells and keep them indefinitely.

To empty an eggshell, first wash the egg, using water warmer than the egg, and dry it. With a sterilized long needle or small, sharp skewer, prick a small hole in the small end of the egg and a large hole in the large end. Carefully chip away bits of shell around the large hole until it's big enough to accommodate the tip of a baster. Stick the needle or skewer into the yolk to break it.

Either shake the egg large-end down over a cup or bowl until the contents come out or use a baster to push out the contents. Press the bulb of the baster to push air into the egg, letting the contents fall into the cup. If the contents don't come out easily, insert the needle again and move it around to be sure both the shell membranes and yolk are broken. Rinse the empty shell under cool running water and stand it on end to drain and dry. Be careful when decorating emptied shells – they're quite fragile.

Use the contents of emptied eggshells immediately in a recipe which includes mixed yolks and whites and calls for thorough cooking. Most baked dishes – such as casseroles, custards, quiches, cakes or breads – are good uses for eggs emptied from their shells.

Equinox

Either of the two times each year when the sun crosses the equator and day and night are of equal length everywhere. It is said that an egg will stand on its end during the spring (vernal) equinox (about March 21). Depending on the shape of the egg, you may be able to stand it on its end other days of the year as well.

Expiration Date

A date on an egg carton beyond which the eggs should not be sold.

– See Carton Dates, Julian Dates

Fat

A concentrated source of food energy containing 9 calories per gram. In addition to supplying energy, fat aids in the absorption of certain vitamins; enhances flavor, aroma and mouthfeel of food; and adds satiety to the diet. Fatty acids, the basic chemical units of fat, are either saturated, monounsaturated or polyunsaturated.

Saturated fatty acids are found primarily in fats of animal origin (meat, poultry, fish, seafood, milk and their products) and are usually solids at room temperature. Exceptions are some vegetable oils (palm, palm kernel and coconut) which contain large amounts of saturated fatty acids. Saturated fatty acids increase blood cholesterol levels.

Monounsaturated fatty acids are found in fats of both plant and animal origin and tend to improve blood cholesterol levels. Polyunsaturated fatty acids are found primarily in fats of plant origin and in fats of fatty fish and also tend to improve blood cholesterol levels. When monounsaturated or polyunsaturated fats are chemically hydrogenated, they become more solid trans-fatty acids. Trans-fatty acids tend to increase the levels of harmful LDL (low-density lipoprotein) cholesterol and decrease the levels of helpful HDL (high-density lipoprotein) cholesterol in the blood.

Most nutrition professionals recommend that we reduce our total dietary fat to 30% or less of total calories and that we limit our saturated fat intake to less than 10% of total calories. They emphasize that most of the fat in our diets should come from monounsaturated and polyunsaturated fats, including omega-3 fatty acids.

A large egg contains about 4.8 grams of fat – about 1.6 grams saturated and 2.8 grams unsaturated – and is considered a medium-fat food. You can keep added fats, especially saturated fats, to a minimum by using low-fat cooking methods and serving eggs with fruits, vegetables, whole-grain foods and low-fat milk products.

– *See Cholesterol, Cooking Methods, Omega-3 Fatty Acids*

Fertile Eggs

Eggs which have been fertilized, can be incubated and developed into chicks, as long as the eggs are not refrigerated. Nearly all commercially produced eggs are laid by hens which have not mated with a rooster, so are not fertilized.

Fertile eggs are no more nutritious than nonfertile eggs, do not keep as well as nonfertile eggs and are more expensive to produce. Although fertile eggs may contain a small amount of the rooster's male hormone, scientists believe it's more likely that the hormone dissipates. Some ethnic groups consider fertile eggs a delicacy.

– *See Germinal Disc*

Fight BAC!

A food safety program of the nonprofit Partnership for Food Safety Education.

– *See Partnership for Food Safety Education*

Flan

- *See Custard-Baked*

Floating Eggs

Eggs can float in water when the air cell has enlarged enough to keep it buoyant. This means the egg is old, but it may be perfectly safe to use. Crack the egg into a bowl and check for an off-odor or unusual appearance - a spoiled egg will have an unpleasant odor when you break open the shell, either when raw or cooked.

Floating Islands

– See Meringues- Poached Meringues

Foam

Air bubbles trapped in a mixture. A foam is created by incorporating air, usually by beating, and capturing the air in tiny bubbles. Eggs are excellent at foam formation. You can beat egg whites, egg yolks or whole eggs into a foam.

When you beat egg white, it becomes foamy, increases 6 to 8 times in volume and stands in peaks. When you heat the foam, the tiny air cells expand and the egg protein coagulates around them, giving permanence to the foam. Egg-white foam is responsible for the structure of angel food cake, meringues, puffy omelets and soufflés.

For egg whites that reach their greatest volume, allow the whites to stand at room temperature for about 30 minutes before beating.

Fat inhibits the foaming of egg whites, so be sure beaters and bowls are clean and that there's no trace of yolk in the whites. Use only metal or glass bowls because plastic bowls tend to absorb fat.

Adding an acid ingredient helps to stabilize egg-white foam. The most commonly used acid ingredient is cream of tartar (1/8 teaspoon for each 1 to 2 whites) although some recipes call for lemon juice or vinegar.

Opinion among food scientists is divided on salt. Since salt may decrease foam stability, it's best to add it to other recipe ingredients.

If you underbeat egg whites, the volume of the finished product will be less than desired. Overbeaten whites form clumps which are difficult to blend with other ingredients. Because overbeaten egg whites also lack elasticity, they can't expand properly when heated. The finished product may be dry or have poor volume, or may even collapse.

Combine an egg-white foam with other ingredients immediately after beating, before the foam has time to drain or shrink.

An egg-yolk foam may double or triple in volume but doesn't reach nearly the volume of egg-white foam. Beaten yolk foam is an important part of the leavening for puffy omelets and sponge cakes and is sometimes also used for soufflés.

Whole egg will also form a foam, but the volume is much less than the foam of beaten white and the foam is less thick than the foam of beaten yolk.

– See Angel Food Cake, Cooking Terms, Meringue

Formation

A hen requires about 24 to 26 hours to produce an egg. After the egg is laid, the hen starts all over again about 30 minutes later.

The hen's reproductive system consists of the ovary, the organ where the yolk develops, and the oviduct where

the egg is completed. The ovary is attached to the hen's back, about halfway between the neck and the tail. The oviduct, a tubelike organ about 26 inches long, is loosely attached to the backbone between the ovary and the tail. Most female animals have two functioning ovaries, but the hen uses only one, the left. The right ovary and oviduct remain dormant.

Ovary

A female chick is born with a fully formed ovary containing several thousand tiny ova, or future yolks. The ova begin to develop, one at a time, when the pullet (a hen less than 1 year old) reaches sexual maturity. Each yolk is enclosed in its own sac or follicle.

The follicle contains a highly developed system of blood vessels which carry nourishment to the developing yolk. Typically, about 30 minutes after the last egg was laid, ovulation occurs. At ovulation, the follicle ruptures to release the yolk into the oviduct. A double-yolked egg results when two yolks are released at the same time. Rupture occurs at the stigma line, an area of the follicle which has no blood vessels.

– See Blood Spots

Oviduct

The infundibulum, also known as the funnel, captures the ovulated yolk. The infundibulum is where fertilization, if it occurred, would take place. After about 15 minutes, the yolk passes along to the magnum where, in about 3 hours, the hen deposits the albumen (white) around the yolk. As the albumen (white) is formed, the yolk rotates, twisting the albumenous fibers to form the chalazae. Next, in about 1-1/4 hours, the two shell membranes are formed and some water and minerals are added in the isthmus.

The egg has now reached its full size and shape and passes along to the uterus (shell gland) where, after 19 to 21 hours, it acquires its shell, shell color and bloom. After a few minutes' pause in the vagina, the uterus inverts through the vagina, the cloaca (the junction of the digestive, urinary and reproductive systems) and the vent to release the egg outside the hen's body. Laying of the egg is known as oviposition.

During formation, the egg moves through the oviduct small end first. Just before laying, the egg rotates to be laid large end first. A young hen lays small eggs. The size increases as she gets older.

– See Bloom; Chalazae; Color, shell; Composition; Shell

Freezing Eggs

If you have more eggs than you can use within a few weeks of buying them, you can break them out of their shells and freeze them. Freeze only clean, fresh eggs.

Whites

Break and separate the eggs, one at a time, making sure that no yolk gets in the whites. Pour the whites into freezer containers, seal tightly, label with the number of egg whites and the date, and freeze. For faster thawing and easier measuring, first freeze each white in a standard ice cube tray. Then transfer to a freezer container.

Yolks

The gelation property of egg yolk causes it to thicken or gel when frozen, so you need to give yolks special treatment. If you freeze them as they are, egg yolks will eventually become so gelatinous that they will be almost impossible to use in a recipe. To help retard this gelation, beat in either 1/8 teaspoon salt or 1-1/2 teaspoons sugar or corn syrup per 1/4 cup of egg yolks (about 4 yolks). Label the container with the number of yolks, the date, and whether you've added salt (for main dishes) or sweetener (for baking or desserts). Freeze.

Whole eggs

Beat just until blended, pour into freezer containers, seal tightly, label with the number of eggs and the date, and freeze.

To use frozen eggs

In a home freezer, you can freeze eggs for up to one year. When you're ready to use frozen eggs, thaw them overnight in the refrigerator or under running cold water. Use egg yolks or whole eggs as soon as they're thawed. Thawed egg whites will beat to better volume if you allow them to sit at room temperature for about 30 minutes. Use thawed frozen eggs only in dishes that are thoroughly cooked.

Using Frozen Eggs
Substitute 2 tablespoons thawed egg white for 1 large fresh white.
Substitute 1 tablespoon thawed egg yolk for 1 large fresh yolk.
Substitute 3 tablespoons thawed whole egg for 1 large fresh egg.

Source: American Egg Board

Hard-boiled eggs

You can freeze hard-boiled egg yolks to use later for toppings or garnishes. Carefully place the yolks in a single layer in a saucepan and add enough water to come at least 1 inch above the yolks. Cover and

quickly bring just to boiling. Remove the pan from the heat and let the yolks stand, covered, in the hot water about 12 minutes. Remove the yolks with a slotted spoon, drain them well and package them for freezing.

It's best not to freeze hard-boiled whole eggs and hard-boiled whites because they become tough and watery when frozen.

French Toast

Egg- and milk-soaked bread, fried or oven-baked. The French call this popular dish pain perdu, lost bread. In the 15th century, thrifty cooks developed this recipe concept to revive nearly stale bread, which would otherwise have been lost. Eggs also serve to soften dry bread in bread puddings and stratas.

– See Strata, Bread Pudding

Freshness

How recently an egg was laid has a bearing on its freshness but is only one of many factors. The temperature and humidity level at which the egg is held play their parts as well. These variables are so important that an egg one week old, held under ideal conditions, can be fresher than an egg left at room temperature for one day. The ideal conditions for egg storage are temperatures between 35° and 40°F (2° to 4°C) and a relative humidity of 70 to 80%.

Proper handling means promptly gathering and washing the eggs within a few hours after they've been laid. Most commercially produced eggs reach supermarkets within a few days of leaving the laying house. If you and your market handle eggs properly, they'll still be fresh when they reach the table.

It's a misconception that you can judge freshness by placing an egg in salt water. A carefully controlled brine test is sometimes used to judge shell thickness of eggs for hatching purposes but the test has no application to freshness of table eggs.

How important is freshness? As an egg ages, the white becomes thinner, the yolk becomes flatter and the yolk membrane becomes weaker. These changes don't have any great effect on the nutritional quality of the egg or its functional cooking properties in

recipes. Appearance may be affected though. When poached or fried, the fresher the egg, the more it will hold its shape rather than spread out in the pan. However, if you hard-boil eggs that are at least a week old, you'll find them easier to peel than fresher eggs. The stronger the yolk membrane, the less likely the yolk will break inadvertently.

– See Storing

Fried Egg

– See Cooking Methods, Fried

Frittata

A pan-sized, unfolded Italian omelet in which all the ingredients cook right in the omelet. You can flavor a frittata with any combination of cooked foods you like – vegetables, grains, meat, poultry, fish, seafood or cheese. Start cooking the egg and filling mixture on top of the range until it's almost set. Then, you can finish cooking the top of the frittata by putting the pan under the broiler or in the oven. Or you can flip the frittata out of the pan upside down onto a plate and then slide it back into the pan to cook the other side. The easiest way is simply to remove the pan from the heat, cover it and let steam finish the cooking.

– See Tortilla

Games

The egg's fragility probably accounts for its popularity in games down through the centuries.

Egg Hunt

Hiding colored or decorated eggs around the house or garden for children to find has long been an Easter morning tradition. In addition to private-home egg hunts, some organizations and communities hold very large public egg hunts.

Egg Toss

Along with a sack race, an egg toss is a popular picnic game. In an egg toss, partners line up in two rows facing each other. Every member on one side tosses a raw egg across. After each successful catch, the players step backward, adding to the difficulty of the next catch. This is repeated until all but one egg is broken. The pair with the last unbroken egg wins.

Egg Rolling

According to the White House Historical Association, the traditional egg rolling that takes place on the

lawn of the White House or Capitol building started in 1878. President and Mrs. Hayes invited children to play at the White House when they were turned away from the Capitol building. Similar events are held in many other locations throughout the country. The United States, however, can't take credit for inventing the custom. Egg rolling was mentioned in a Latin treatise in 1684.

Many variations of egg rolling contests and games are played. In England and Scotland, children roll eggs downhill and the last child with an unbroken egg is the winner. In another version of egg rolling, the players push the egg to the finish line using only their noses. Very similar are egg races in which the players try to send emptied eggshells across the finish line by fanning them with a piece of cardboard or by blowing them. Since eggs are not round, winning is not as easy as it might seem.

Egg Tapping

Many countries continue the age-old ritual of egg tapping or egg-shackling. For example, Greeks form a circle and tap scarlet eggs, one against the other. The one finishing with an unbroken egg may claim all the other eggs. (The trick is protecting as much of the egg as possible with your fingers.)

Pace Egging

Up until modern times, children in English villages carried on an old sport called pace-egging. The name comes from Pasch, which means Easter in most European countries. This derives from Pesach, the Hebrew Passover which falls at the same time of the year. Similar to Halloween trick-or-treaters, pace-eggers went from house to house in costume or with paper streamers and bright ribbons attached to their clothes. Faces blackened or masked, they sang or performed skits and demanded pace-eggs, either colored hard-boiled eggs or substitutes such as candy and small coins.

– See Decorating Eggs, Easter Eggs

Germinal Disc

The entrance of the latebra, the channel leading to the center of the yolk. The germinal disc is barely noticeable as a slight depression on the surface of the yolk. If an egg is fertilized, sperm enter through the germinal disc, travel to the yolk center and a chick embryo starts to form.

– See Composition, Formation

Gluten Free

All eggs are naturally gluten free. If a chicken is fed a grain that contains gluten, i.e. corn, wheat or barley, the gluten is broken down during

the digestive process (within the chicken) and is not passed into the body tissues or any products produced by the chicken.

Gougère

– See Cream Puff

Grading

Classification determined by the interior and exterior quality of the egg at the time it is packed. In some egg-packing plants, the U.S. Department of Agriculture (USDA) provides a voluntary grading service for shell eggs. The official USDA grade shield on an egg carton certifies that the eggs have been processed, packaged and certified under federal supervision according to the U.S. Standards, Grades and Weight Classes for Shell Eggs established by USDA. Plant processing equipment, facilities, sanitation and operating procedures are continuously monitored by the USDA egg grader.

In the grading process, eggs are examined for both interior and exterior quality before they're sorted according to weight (size). Grade quality and weight (size) are not related to one another. Eggs of any quality grade may differ in weight (size). In descending order of quality, grades are designated AA, A and B.

Exterior Quality

The first step in egg grading is to examine the shell for cleanliness, soundness, texture and shape. Shell color isn't a factor in judging quality. All eggs must be clean to pass grading requirements, but a small amount of staining is permitted in Grade B. All eggs must have unbroken shells. Eggshells with cracks or markedly unsound, or flawed, shells are classified as restricted eggs. The ideal eggshell shape is oval with one end larger than the other. Abnormal shells, permitted for Grade B eggs, may be decidedly misshapen or faulty in texture with ridges, thin spots or rough areas.

Interior Quality

The next step in grading is examination of the interior of the egg. This is done by candling or by the breakout method using the Haugh unit system to evaluate the albumen, yolk and air cell (not done in commercial processing). Albumen (white) is judged on the basis of clarity and firmness or thickness. A clear albumen is free from discolorations or from any floating foreign bodies. When an egg is rotated over the candling light, its yolk swings toward the shell. The distinctness of the yolk outline

depends on how close to the shell the yolk moves, which is influenced by the thickness of the surrounding albumen. Thick albumen permits limited yolk movement while thin albumen permits greater movement – the less movement, the thicker the white and the higher the grade. Factors determining yolk quality are distinctness of outline, size and shape and absence of such defects as blemishes or mottling, embryo development or blood spots. Higher-grade eggs have shallower air cells. In Grade AA eggs, the air cell may not exceed 1/8 inch in depth and is about the size of a dime. Grade A eggs may have air cells over 3/16 inch in depth. There is no limit on air cell size for Grade B eggs.

While air-cell size is considered in grading and eggs take in air as they age, the size of the air cell does not necessarily relate to freshness because size varies from the moment contraction occurs after laying. To judge freshness, use carton dates.

– See Air Cell, Blood Spots, Breakout, Buying, Candling, Egg Products Inspection Act, Formation, Haugh Unit, Restricted Eggs, Shell, Yolk

Greening

– See Color, Yolk

Hard-Boiled/Hard-Cooked Egg

– See Cooking Methods, Hard-Boiled, Cooking Equipment, Cooker, Piercer, Slicer, Wedger; Decorating Eggs, Deviled Eggs, Egg Salad, Freezing, Peeling, Storing

Haugh Unit

A measurement used in determining albumen (white) quality by the breakout method. The test is named for Raymond Haugh who introduced it in 1937.

– See Breakout

High Altitude

–See Cooking Methods

History

East Indian history indicates that wild jungle fowl were domesticated as early as 3200 BC. Historians also note that the fowl were eaten more often than the eggs, since the eggs were saved to hatch to keep the fowl in supply. Egyptian and Chinese records show that fowl were laying eggs for man in 1400 BC. Chinese described fowl as "the domestic animal who knows time", probably due to the dependability of

the rooster's early morning call and the regularity of the hen's egg production.

Although there is some evidence of native fowl in the Americas prior to his arrival, it is believed that Columbus' ships carried to this country the first of the chickens related to those now in egg production. These strains originated in Asia.

While the fowl referred to in the earliest histories could include a vast assortment of avian representatives, most people of the world eat, and all information here refers to, the egg of the chicken (Gallus domesticas). Nearly 200 breeds and varieties of chickens have been established worldwide, but only a few are economically important as egg producers. Most laying hens in the U.S. are Single-Comb White Leghorns.

Hollandaise Sauce

A rich, lemon-flavored butter sauce thickened with egg yolks. The French chef who created this sauce most likely named it for Holland because Holland was famous for butter, a main ingredient in the sauce. In addition to its use in Eggs Benedict, Hollandaise sauce is often served over asparagus or poached salmon. Many other sauces, such as Béarnaise and Mousseline, are based on Hollandaise sauce. Hollandaise sauce can curdle if even slightly overcooked, so cook it over low heat, stir it constantly, and give it close attention.

Hormones

In the U.S., by federal law, passed into law more than 50 years ago, neither laying hens nor any other type of poultry can be fed hormones. However, eggs contain natural hormones. Therefore, the statement "no hormones" is considered misleading to the consumer. The egg industry does not use hormones in the production of shell eggs. The FDA requires a qualifying statement on the label for shell eggs which is "Hormones are not used in the production of shell eggs".

Huevos Rancheros

Spanish for rancher's eggs. Typically fried eggs served over fried corn tortillas and topped with salsa.

J

Julian Dates

Starting with January 1 as 001 and ending with December 31 as 365, these numbers represent the consecutive days of the year. This number system is sometimes used on egg cartons to denote the day the eggs are packed. You can store fresh shell eggs in their cartons in the refrigerator with insignificant quality loss for four to five weeks beyond this date.

– See Carton Dates, Expiration Date

K

Kosher Eggs

Almost all eggs are Kosher. Under Kosher dietary laws, neutral eggs are considered neither milk nor meat and may be eaten with either.

Kosher-certified eggs are produced according to biblical laws governing the selection and preparation of foods. These eggs are produced by hens at egg farms which have been inspected by a rabbi and found to merit the OU designation.

Kugel

Baked custard with noodles or potatoes served as a savory side dish or sweetened for dessert. Traditionally served on Jewish Sabbath meals.

– See Custard, Baked

L

Lecithin

One of the factors in egg yolk that helps to stabilize emulsions such as Hollandaise sauce, mayonnaise and other salad dressings. Lecithin contains a phospholipid called acetylcholine which has been demonstrated to have a profound effect on brain function.

– See Cooking Functions, Hollandaise Sauce, Mayonnaise, Nutrient

Lutein

Both lutein and zeaxanthin are carotenoids called xanthophylls, yellow-orange plant pigments. These carotenoids have been shown to reduce the risks of cataracts and age-related macular degeneration, the leading cause of blindness in those 65 and older. Lutein and zeaxanthin accumulate in the eye's lens and in the macular region of the retina. Scientists believe high levels of lutein and zeaxanthin in these areas may protect the eye from damage due to oxidation.

Lutein and zeaxanthin are commonly found in dark-green leafy vegetables, such as spinach and kale, and are well-absorbed from egg yolk. A large egg yolk contains 252 mcg of lutein and zeaxanthin (smaller amounts compared to other sources). When hens are fed a diet which includes yellow corn, alfalfa meal, corn-gluten meal, dried-algae meal or marigold-petal meal, xanthophylls are deposited in the yolks. Research has shown that, due to the egg yolk's fat content, the yolk's lutein and zeaxanthin may be more easily absorbed by the body than the lutein and zeaxanthin from richer sources. A specific recommendation for daily consumption of these carotenoids has not yet been determined.

M

Marketing

How eggs get from hen to kitchen. The marketing chain begins at the laying farm where eggs are gathered, packed and refrigerated. On many farms, the grading and packing are done on the farm. At other farms, eggs are picked up several times a week by the grading station's refrigerated trucks. At the grading station, the eggs are washed, sorted by size, graded for quality and packed into cartons.

Ideally, eggs move from the grading station to the store or store warehouse three to five times a week, depending on available storage space. Many large supermarket chains receive all their eggs at warehouses from which the eggs are distributed to individual stores. Individual retail outlets need both adequate refrigerated space in the back and refrigerated self-service counters out front to merchandise eggs properly.

Sales techniques depend on the local retailer and, sometimes, the supplier. Sales are often stimulated by attractive cartons and point-of-purchase displays as well as advertising and consumer education activities.

Activities of the American Egg Board help to keep consumers aware of the egg as a convenient, versatile, nutritious and economical mealtime staple. State and regional egg promoters inform consumers through lectures, articles, recipes and demonstrations. Advertising and publicity messages help to heighten buyer awareness of the egg and its importance to meal planning.

– See American Egg Board, Grading

Marshmallow

A soft confection made from sugar, corn syrup, egg whites and gelatin. In addition to being consumed on their own as a sweet, marshmallows are popularly used as a hot cocoa topping, an ingredient in some ice creams and a base in various candies.

Mayonnaise

A salad dressing made of eggs, oil, lemon juice or vinegar and seasonings. The egg yolk acts as an emulsifying ingredient to keep the oil and lemon juice or vinegar from separating. Mayonnaise is used as a spread, dressing and sauce and as the base for many other preparations, including aïoli, rémoulade sauce, tartar sauce and Thousand Island dressing. For food safety in making mayonnaise, cook the egg yolks and the liquid from the recipe over low heat until the mixture reaches 160°F (71°C). Then add the oil to the egg liquid mixture very slowly, so the oil can be properly incorporated.

– See Doneness Guidelines, Cooking Egg Yolks for Use in Recipes, Partnership for Food Safety Education, Raw Eggs, Salmonella

Meat Replacement

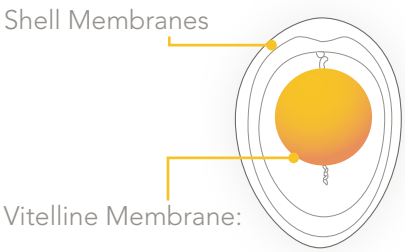
One egg of any size equals one ounce of lean meat, poultry, fish or seafood from the Protein Foods Group. Along with varying amounts of many other nutrients, one large egg provides 6.28 grams of high-quality, complete protein or about 12.6% of the Daily Reference Value (DRV) for protein.

– *See Biological Value, Buying, Daily Reference Values (DRVs), My Plate, Nutrient, Nutrient Density, Protein*

Membranes

Shell Membranes:

Just inside the shell are two shell membranes, inner and outer. After the egg is laid and begins to cool, at the large end of the egg, an air cell forms between these two membranes.



Vitelline Membrane:

The strength of this yolk covering protects the yolk from breaking. The vitelline membrane is weakest at the germinal disc and tends to become more fragile as the egg ages.

– *See Air Cell, Composition, Formation, Germinal Disc, Grading*

Meringue

A foam of beaten egg whites and sugar. Egg foams were used in pastries much earlier, but the name meringue came from a pastry chef named Gasparini in the Swiss town of Merhrinyghen. In 1720, Gasparini created a small pastry of dried egg foam and sugar from which the simplified meringue evolved. Its fame spread and Marie Antoinette is said to have prepared the sweet with her own hands at the Trianon in France.

The most critical factor in making meringue is humidity. Because it has a high sugar content, meringue can absorb moisture from the air and become limp and sticky. For best results, make meringue on a bright, dry day.

Be sure that beaters and bowls are clean and completely free of fat or oil because the least bit of fat will prevent beaten egg whites from reaching their full volume. As plastic bowls tend to absorb fat, use only metal or glass bowls.

After separating eggs, allow the whites to stand at room temperature about 20 to 30 minutes before beating so they will reach their fullest volume.

Beat the whites with cream of tartar, using 1/8 teaspoon for each 2 egg whites, until foamy. (Cream of tartar lends stability to egg foams.) When foamy, gradually beat in the sugar, 1 to 2 tablespoons at a time. Continue beating until the sugar is dissolved

and soft peaks form. (If the sugar is not completely dissolved, the meringue will be gritty. Rub just a bit of the meringue between your thumb and forefinger to feel if the sugar has dissolved).

There are several kinds of meringues; each suited to a special use. The differences are in the ratio of egg whites to sugar, the method of mixing or the method of cooking.

Soft Meringue

Used to top pies and puddings. The usual ingredient ratio is 2 tablespoons of sugar to each egg white. Beat the meringue until soft peaks form, then swirl it over a hot, precooked pie filling or pudding. Sometimes, after baking, liquid accumulates between the meringue and the filling. You can minimize this weeping if the filling is hot when you put the meringue on it. To keep a pie meringue from shrinking during baking, make sure the meringue touches the edge of the crust or the dish all around. A 3-egg-white meringue will cover a 9-inch pie.

In a preheated 350°F (177°C) oven, bake a pie topped with a 3-egg-white meringue until the meringue reaches 160°F (71°C) and the meringue peaks are lightly browned, about 12 to 15 minutes. For a meringue containing more egg whites, bake in a preheated 325°F (163°C) oven until the meringue reaches 160°F (71°C) and the peaks are lightly browned, about 25 to 30 minutes. After cooling, refrigerate meringue-topped pies until serving and return leftovers to the refrigerator.

Hard or Swiss Meringue

Used as a confection or a foundation for fillings of fruits or puddings. The usual ingredient ratio is 4 tablespoons of sugar to each egg white. Beat until stiff peaks form.

You can bake a meringue on a baking sheet greased with unsalted shortening (not oil) or on a baking sheet lined with parchment paper or aluminum foil. Depending on how you intend to use a hard meringue,

you can pipe it through a pastry tube, shape it gently with a spoon or spatula, or bake it in a greased pie plate, cake pan or springform pan.

Meringue baked in a pie plate forms a delicate crust for fillings, such as chocolate or lemon, and the result is often known as Angel Pie. Meringue baked in a cake or springform pan is often served with whipped cream and fruit and is called Schaum Torte or Pavlova.

Depending on the oven temperature and baking time, you can vary the texture of the finished meringue from dry and crisp to chewy. If you bake or, more properly, dry, a meringue in a preheated 225°F (107°C) oven for 1 to 1-1/2 hours until a cake tester or wooden pick inserted in the center comes out clean, it will be white, dry and crisp. For complete drying, turn off the oven and leave the meringue in the oven for at least an hour longer. Dry a shorter time to produce a chewier center. For a light golden hue, bake at 250°F (121°C) for less time or until the center is done as you wish.

You can store hard meringues for several months in a tightly sealed container with waxed paper between the layers. If the meringue loses its crispness, reheat it in a preheated 250°F (121°C) oven for 15 to 20 minutes.

Italian Meringue

Also known as Boiled Frosting and used to frost cakes, as a topping like soft meringue or as a base for frozen desserts and may also be baked like hard meringue or poached. When folded into whipped cream, Italian meringue becomes Chantilly Meringue, which may be combined with fruit as a filling for cream puffs or used as a frosting. To make Italian meringue, beat hot sugar syrup into beaten, cooked egg whites.

– See Raw Eggs

Poached Meringues

Also known as Snow Eggs or Oeufs à la Neige and often served with custard or fruit sauce. Poached meringues are also the islands in Floating Island Pudding. You can poach soft, hard and Italian meringue mixtures.

To poach, drop the meringue mixture by spoonfuls onto simmering milk or water and simmer, uncovered, until firm, about 5 minutes. You don't need to turn over smaller spoonfuls but large ones may require turning halfway through the cooking time. Remove the poached puffs from the liquid with a slotted spoon and drain them on absorbent paper. Chill the poached meringues until you serve them.

Microwave Cooking

Incredible edible eggs, nature's own convenience food, and the microwave oven add up to quick and easy meals with a minimum of clean up. Despite all its attributes, though, the microwave oven doesn't do justice to airy soufflés or puffy omelets. These dishes need the dry heat of a conventional oven to puff beautifully.

For successful eggs in the microwave, keep these few points in mind:

Egg yolk, because it contains fat, tends to cook more quickly than egg white so omelets, scrambled eggs and dishes where the eggs are beaten cook more evenly in the microwave oven than do other egg preparations. They can also be cooked using full power (HIGH).

Size of eggs matters even more in a microwave, when using a jumbo egg instead of a large-size egg, additional time may be needed.

Use minimum times when cooking eggs in the microwave, as they are easily overcooked. Add time in small increments, 10 to 15 seconds, to prevent overcooking. And remember, eggs will continue to cook and firm up after they are removed from the microwave.

To encourage more even cooking, cover microwave cooking containers; stir the ingredients, if possible; and, if your oven doesn't have a turntable, rotate the dish during cooking.

Never microwave an egg in its shell because it will explode. Even out of the shell, eggs may explode in the microwave because rapid heating causes steam to build up under the yolk membrane faster than it can escape.

Microwave Recipes

NOTE: Microwave ovens vary. Cook time may need to be adjusted.

MICROWAVE ONE EGG SCRAMBLE: Beat 1 large egg and 1 tablespoon water in 8-oz. white ramekin or 6-oz. custard cup until blended. Microwave on HIGH 30 seconds; stir. Microwave

until egg is almost set, 15 to 30 seconds longer. Season with salt and pepper.

MICROWAVE TWO EGG SCRAMBLE: Beat 2 large eggs and 2 tablespoon water in microwave-safe bowl until blended. Microwave on HIGH 45 seconds; stir. Microwave until egg is almost set, 30 to 45 seconds longer. Season with salt and pepper.

MICROWAVE TWO EGG OMELET: Beat 2 eggs, 2 tablespoon water in small bowl until blended. Microwave 1 teaspoon butter in 9-inch glass pie plate on HIGH until melted, about 30 seconds. Tilt plate to coat bottom evenly. Pour egg mixture into hot pie plate. Cover tightly with plastic wrap, leaving a small vent. Microwave on HIGH 1-3/4 to 2 minutes. Do not stir. When top is thickened and no visible liquid egg remains, place shredded cheese or cooked fillings such as diced ham, crisp bacon, sautéed mushrooms, roasted peppers, caramelized onions on one half of the omelet. Fold omelet in half with turner; slide from pie plate onto serving plate. Serve immediately.

MyPlate

MyPlate is part of a larger communications initiative based on the 2010 Dietary Guidelines for Americans to help consumers make better food choices. MyPlate is designed to remind Americans to eat healthfully.

MyPlate illustrates the five food groups using a familiar mealtime visual, a place setting. For a balanced diet that includes all the food groups in good proportions, you can find recommendations based on your age, gender and activity level at www.choosemyplate.gov/.

Eggs are included in the Protein Foods Group. One egg equals one ounce of lean meat, poultry, fish or seafood. (Three egg yolks = 1 ounce, 3 egg whites = 2 ounces).

N

Natural

The U.S. Department of Agriculture identifies all shell eggs as natural.

Nest-Run Eggs

Eggs which are packed as they come from the production facilities without having been washed, sized, and candled for quality, with the exception that some checks, dirties, or other obvious undergrades may have been removed.

– *See Egg Products; Grading; Restricted Eggs*

Nutrient

Nutrients are chemical elements that are essential to plant and animal nutrition. While no one food (other than mother's milk, perhaps) provides all the nutrients a human needs, the egg contains a wide array of essential nutrients. After all, the egg was designed by nature to supply everything needed for the creation and nourishment of a baby chick.

Nutrient Content of One Large Egg Raw, Fresh [1,2]

Nutrient	Whole Egg	Egg White	Egg Yolk
Energy (cal)	72	17	55
Protein (g)	6.3	3.6	2.7
Carbohydrate (g)	0.36	0.24	0.61
Total Fat (g)	4.8	0.06	4.5
Monounsaturated Fat (g)	1.8	0	2
Polyunsaturated Fat (g)	1	0	0.72
Saturated Fat (g)	1.6	0	1.6
Trans Fat (g)	0.02	0	0.02
Cholesterol (mg)	186	0	184
Choline (mg)	126	0.4	116
Riboflavin (mg)	0.2	0.15	0.09
Vitamin B_{12} (µg)	0.45	0.03	0.33
Folate (µg)	24	1	25
Vitamin D (IU)	41	0	37
Vitamin A (IU)	270	0	245
Vitamin B_6 (mg)	0.09	0	0.06
Thiamin (mg)	0.02	0	0.03
Vitamin E (mg)	0.5	0	0.44
Selenium (µg)	15.4	6.6	9.5
Phosphorus (mg)	99	5	66
Iron (mg)	0.88	0.03	0.46
Zinc (mg)	0.65	0.01	0.39
Calcium (mg)	28	2	22
Sodium (mg)	71	55	8
Potassium (mg)	69	54	19
Magnesium (mg)	6	4	1

[1] *U.S. Department of Agriculture, Agricultural Research Service, 2010. USDA National Nutrient Database for Standard Reference, Release 23. Nutrient Data Laboratory Home Page: http://www.ars.usda.gov/nutrientdata.*

[2] *Discrepancies between nutrients levels in the white+yolk vs. the whole egg are due to sampling error.*

All eggs contain the nutrients; protein and fat. Egg protein is of such high quality that it is often used as the standard by which other protein foods are measured. Egg protein contains all the essential amino acids (building blocks of protein which the body needs but cannot make) in a pattern that matches very closely the pattern the human body needs. This is why eggs are classified with meat in the Protein Food Group and why egg protein is called complete protein.

With the exception of vitamin C, an egg contains varying amounts of all the essential vitamins plus many minerals. An egg yolk is one of the few foods which naturally contain vitamin D, the sunshine vitamin.

Altogether, according to the USDA National Nutrient Database for Standard Reference, Release 23 (2010), a single large egg (50 grams) supplies 72 calories and contains the following nutrients: 6.3 grams of protein, 0.4 grams of carbohydrates, 4.8 grams of total fat,

As is true for most foods, cooking causes some minor nutrient losses in the egg. Of the nutrients in an egg, the vitamins riboflavin, thiamin and folic acid are generally less heat stable than other nutrients. You can preserve the highest nutrient content possible by proper cooking.

– *See Biological Value; Nutrient Density, Nutrition Education and Labeling Act, Protein*

Nutrient Density

The ratio of nutrients to calories that a food supplies when eaten. Foods that supply significant amounts of one or more nutrients compared to the number of calories they supply are called nutrient dense. Nutrient-dense foods help you get important nutrients without excess calories.

Eggs have a high nutrient density because they provide a number of nutrients in proportion to their calorie count. One egg has 13 essential vitamins and minerals in varying amounts, high-quality protein, and antioxidants, all for 70 calories. Eggs are an excellent source of choline and selenium, and a good source of high quality protein, vitamin B_{12}, phosphorus and riboflavin. The nutrients found in eggs can play a role in weight management, muscle strength, healthy pregnancy, brain function, eye health and more.

– *See Biological Value, Calories, Choline, Daily Reference Value (DVRs), Nutrient, Protein*

It's All In An Egg!
Thirteen Essential Vitamins and Minerals

	Essentials	Facts	Daily Value
Excellent Source*	Choline	Essential for normal function of all cells, including those involved with metabolism, brain and nerve function, memory and the transportation of nutrients throughout the body. Choline also helps prevent birth defects, as well as helps promote brain and memory development in infants.	23%
Excellent Source*	Selenium	Acts as an antioxidant to prevent the breakdown of body tissues. Selenium works hand-in-hand with vitamin E to protect against some chronic diseases.	22%
Good Source*	Riboflavin	Helps to produce energy in all the cells of the body.	14%
Good Source*	Vitamin D	Works with calcium to strengthen bones and teeth.	10%
Good Source*	Phosphorus	Essential for healthy bones, teeth and cell membranes. Phosphorus is also required for energy production in the body.	10%
	Vitamin B_{12}	Works to support normal digestion and nerve cell function.	8%
	Pantothenic Acid	Helps break down food and assists body cells in producing energy.	7%
	Folate	Promotes proper fetal development and red blood cell formation.	6%
	Iron	Plays an important role in red blood cell production and oxygen transport.	5%
	Vitamin A	Supports growth and maintains healthy skin, vision and immune function.	5%
	Vitamin B_6	Keeps nerve transmission running smoothly and aids protein in immune function.	5%
	Zinc	Assists in maintaining immune function, as well as body tissue growth and repair.	4%
	Calcium	Helps build and maintain strong bones and teeth. This mineral also plays an important role in nerve function, muscle contraction and blood clotting.	3%

[1] *U.S. Department of Agriculture Research Service, USDA Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Release 23 (2010). NDB No: 01123.*

* *Excellent Source and Good Source as defined by US Food and Drug Administration*

Nutrient-Enhanced Eggs

Eggs created by varying the hens' diets. Some shell eggs on the market have altered fat content. So, some eggs have reduced saturated fats and increased unsaturated fats. Other eggs are enriched with omega-3 fatty acids, the fats found in fish which are considered to be beneficial. Still other eggs have added vitamins, minerals or carotenoids. Check labels for nutrient facts.

– See Fat, Lutein, Omega-3 Fatty Acids

Nutrient Labeling and Education Act (NLEA)

The 1990 Nutrition Labeling and Education Act (NLEA) requires most foods, including eggs, to carry a nutrition label. Current labels express nutrients as a percentage of Daily Values (DVs) for a 2,000-calorie diet, rather than a percentage of the U.S. Recommended Daily Allowances (U.S. RDAs).

Eggs are produced by nature, not processed according to a formula, and may differ somewhat in nutrient content based on the individual hen and her diet, even within the same size. Based on assay figures and labeling rounding rules for nutrients, a label on a typical one-dozen carton of large eggs might read as follows:

– See Daily Reference Values (DRVs), Daily Values (DVs), U.S. Recommended Daily Allowance

Nutrition Facts
Serving Size 1 egg (50g)
Servings per Container 12

Amount Per Serving

Calories 70	Calories from Fat 45
	% Daily Value*
Total Fat 5g	**8%**
Saturated Fat 1.5g	**8%**
Trans Fat 0g	
Cholesterol 185mg	**62%**
Sodium 70mg	**3%**
Potassium 70mg	**2%**
Total Carbohydrate 0g	**0%**
Protein 6g	**12%**

Vitamin A 6%	• Vitamin C 0%
Calcium 2%	• Iron 4%
Vitamin D 10%	• Thiamin 0%
Riboflavin 15%	• Vitamin B6 4%
Folate 6%	• Vitamin B12 8%
Phosphorus 10%	• Zinc 4%

Not a significant source of dietary fiber and sugars.

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Protein		50g	65g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

O

Oeufs à la neige

– See Meringues – Poached Meringues

Oiling

A thin film of odorless, tasteless mineral oil sprayed on eggs before cartoning. The oil replaces the natural bloom, the protective coating on the outside of the egg which is removed during washing. About 10% of eggs are oiled.

– See Bloom, Cuticle

Omega-3 Fatty Acids

The omega-3 fatty acids found naturally in fish and seafood are considered essential components of the diet because your body can't make them from the foods you eat. Shell eggs also contain some naturally occurring omega-3 fatty acids, on average about 30 mg per egg. Omega-3-enhanced eggs provide more, from 100 to over 600 mg per egg.

– See Fat

Omelet

Beaten eggs cooked in a pan and rolled or folded. The ancient Romans supposedly made the first omelet and, because it was sweetened with honey, they called it ovemele (eggs and honey). Some insist this was the origin of the word omelet. Others maintain the word was derived from amelette (Fr) meaning blade, describing the long, flat shape of an omelet.

Whatever its origin, an omelet can hold or be topped with any food from caviar to leftover meatloaf. The list of filling and topping possibilities is endless, limited only by your imagination and the contents of your refrigerator. Select, prepare and cook the filling ingredients before starting the eggs because omelets cook so quickly that you won't have time later.

Omelets take different forms depending on how you cook them. The quickest and easiest form of omelet, the French or plain omelet, cooks in about a minute or two on top of the range. Conveniently, no stirring is required for a microwaved French omelet. For a puffy or soufflé omelet, separately beat the egg yolks and whites, cook on top of the range, then finish the omelet in the oven. However you prepare them, easy-to-make omelets don't require special pans or chef skills. Visit www.IncredibleEgg.org for omelet recipes.

– See Frittata, Omelet Fillings, Tortilla

Omelet Fillings

Almost any food can fill an omelet – vegetables or fruits; grains, including rice; lean meat, poultry, fish or seafood; yogurt or cheeses of all kinds. To invent your own omelet filling, use one or more filling ingredients to total about 1/3 to 1/2 cup for each omelet. Flavor the omelet, the filling or both with about 1/8 to 1/4 teaspoon of your favorite herb, spice or seasoning blend, or a dip, salad dressing or other flavoring mix.

Omelets cook very quickly, so heat refrigerator-cold fillings to serving temperature or fully cook raw foods before you begin cooking the eggs. Fill an omelet right after you've finished cooking it. At this point, the omelet will be hot enough to melt cheese and warm some filling ingredients, such as yogurt, peanut butter, jelly or sliced fruit.

Omelet King

Howard Helmer, holder of three Guinness World Records for omelet making – fastest omelet-maker (427 omelets in 30 minutes); fastest single omelet (42 seconds from whole egg to omelet); and omelet flipping (30 flips in 34 seconds).

Howard is known for spreading the good word of the good egg to consumers across the country through appearances on radio and television, newspaper and magazine articles and live cooking demonstrations.

Organic Eggs

Eggs produced according to national U.S. Department of Agriculture organic standards related to methods, practices and substances used in producing and handling crops, livestock and processed agricultural products.

All organic eggs are free-range eggs and must meet all of the requirements for those, including being raised outdoors or having access to the outdoors as weather permits.

Among other requirements, organic eggs are produced by hens fed rations having ingredients that were grown without most conventional pesticides, fungicides, herbicides or commercial fertilizers. While growth hormones are also prohibited, no commercial laying hen rations (whether organic or not) ever contain hormones. Due to higher production costs and lower volume per farm, organic eggs are more expensive than eggs from hens fed conventional feed. The nutrient content of eggs is not affected by whether or not the feed ration is organic.

– See Production

Ovary

The hen's reproductive organ in which egg yolks develop.

– See Formation

Oviduct

The organ in the hen which accepts the yolk after ovulation, where the egg is completed.

– See Formation

Oviposition

Laying of the hen's egg.

– See Formation

Ovulation

Release of the egg yolk from the hen's ovary.

– See Formation

P

Packaging

While the most familiar egg package is the pulp or foam carton holding one dozen eggs, eggs are now being packed in more different package sizes than ever before. In some regions, cartons or other packs of 6, 8, 12, 18, 30, 36 or 60 eggs are available, making it easy to buy eggs for households of almost any size. To maintain quality, buy only as many eggs as you will use within three to four weeks.

Whether made of pulp, foam or clear plastic, the carton insulates the eggs from jolts. New package designs are constantly being tested to provide the best protection for the eggs. The carton also prevents loss of moisture and carbon dioxide from the eggs and keeps the eggs from picking up undesirable odors and flavors. Because temperatures fluctuate more on the refrigerator door and slamming can cause breakage, it's best to store eggs in their carton on a middle or lower inside shelf.

Packing machines place eggs in their cartons large end up to keep the air cells in place and the yolks centered.

The carton shows brand, grade, egg size and nutrient content.

Pain Perdu

– See French Toast

Partnership For Food Safety Education

Composed of government agencies, organizations such as American Egg Board, and other nonprofit groups, the Partnership works to educate consumers on the proper handling of foods to prevent foodborne illness.

www.befoodsafe.org
www.fightbac.org
www.befoodsafe.gov

The Be Food Safe and Fight Bac! programs of the Partnership are based on four simple steps:

Clean

Wash hands and surfaces often.

Separate

Don't cross-contaminate.

Cook

Cook to proper temperatures.

Chill

Refrigerate promptly.

– *See Cooking Methods, Doneness Guidelines, Egg Safety, Fight BAC!, Raw Eggs, Salmonella*

Pasteurized Eggs

Eggs that have been exposed to heat in order to destroy potential bacteria. Due to the heat process, pasteurized eggs may have slightly lower amounts of heat-sensitive vitamins, such as riboflavin, thiamin and folic acid.

Along with updating recipes to cook them properly -- using pasteurized egg products and shell eggs is an option for safely preparing recipes calling for raw or undercooked eggs. Although the rate of egg contamination with Salmonella bacteria is only about 1 in 20,000 eggs, it's best to choose one of these options when you make raw or only partially cooked recipes – especially when you serve the very young, the elderly, pregnant women or anyone whose immune system is impaired.

Pasteurized shell eggs are especially suitable for preparing egg recipes that aren't fully cooked, but you can also use them for other recipes, too, including baked goods. The heating process may create cloudiness in the whites and increase the time you need to beat the whites for foam formation. Allow up to about four times as much time for full foam formation to occur in pasteurized egg whites as you would for the whites of regular eggs. Prepare other recipes as usual.

Pasteurized shell eggs must be kept refrigerated. You can store them for at least 30 days from the pack date.

Pasture-Fed Hens

– *See Free-Range Eggs*

Pavlova

– *See Hard or Swiss Meringue*

Peeling

Removing the shell and membranes from a hard-boiled egg.

Opinion among researchers is divided as to whether or not salt in the cooking water helps make hard-boiled eggs easier to peel. Some research indicates that a 1 to 10% salt level (2 to 4 tablespoons per gallon of water) makes unoiled eggs easier to peel, but peelability of oiled eggs is not significantly affected. About 90% of the eggs available at retail are unoiled.

A nicely centered yolk makes very attractive deviled eggs and garnishes. However, as an egg ages, the white thins out which gives the yolk more opportunity to move about freely. This can result in a displaced yolk when you cook the egg. Using the freshest eggs possible will minimize this displacement, but very fresh eggs are more difficult to peel after hard boiling.

The air cell that forms between the shell membranes as the egg ages helps to separate shell from egg but, in very fresh eggs, the air cell is still small. The best compromise for attractive eggs with centered yolks that are relatively easy to peel seems to be using eggs that have been refrigerated for about a week to 10 days. Some new research suggests that yolk centering may be better if you store eggs small-end up for 24 hours before hard-boiling.

Immediately after cooking, thoroughly cool eggs in a bowl of ice or under running cold water; five minutes isn't too long. Peel the eggs right after cooling for immediate use or refrigerate them in the shell in the carton for use within one week. To peel an egg, crackle the shell all over by gently tapping the egg on a table or countertop.

Roll the egg between your hands to loosen the shell. Then peel off the shell, starting at the large end. Hold the egg under running water or dip it in water to make peeling easier.

– See Air Cell; Composition; Cooking Equipment, Piercer; Cooking Methods, Hard-Boiled

Pet Food

Eggs are often an important part of prepared pet-food formulas. Some pet owners also feed eggs to their pets as treats or prepare home-cooked pet food using eggs.

Pickled Eggs

Hard-boiled eggs marinated in vinegar and pickling spices, spicy cider, or juice from pickles or pickled beets.

Unopened containers of commercially pickled eggs keep for several months on the shelf (see specific product for details). After opening, keep refrigerated and use within seven days. Home-prepared pickled eggs must be kept refrigerated and used within seven days. Home canning of pickled eggs is not recommended. Although the acidity of the pickling solution is usually sufficient to prevent the growth of bacteria, it eventually causes the eggs to disintegrate.

– See Cooking Methods, Hard-Boiled; Peeling

Poached Eggs

– See Cooking Methods, Poached

Popovers

An egg-rich, hollow bread baked in small cups or pans. A very hot oven creates the steam inside the batter that pops the individual breads to magnificent heights.

Pot de Crème

– See Custard-Baked

Preservation

Refrigeration, drying or freezing are the best ways to preserve egg quality. Fresh eggs are so readily available that long storage periods are rarely necessary. However, centuries before modern methods of egg production, transportation and refrigeration became known, people did their ingenious best to preserve the egg intact.

The ancient Chinese stored eggs up to several years by immersion in a variety of such imaginative mixtures as salt and wet clay; cooked rice, salt and lime; or salt and wood ashes mixed with a tea infusion. Although the Chinese ate them with no ill effects of which we are aware, the eggs thus treated bore little similarity to fresh eggs, some exhibiting greenish-gray yolks and albumen resembling brown jelly.

Immersion in different liquids too numerous to mention was explored, lime water being a favorite in the 18th century. During the early 20th century, water glass was used with considerable success. Water glass, a bacteria-resistant solution of sodium silicate, discouraged the entrance of spoilage organisms and evaporation of water from eggs. It didn't penetrate the eggshell, imparted no odor or taste to the eggs and was considered to have somewhat antiseptic properties. However, it did a rather poor job at relatively high storage temperatures. Eggs preserved in a water-glass solution and stored in a cool place keep 8 to 9 months.

Dry packing in various substances ranging from bran to wood ashes was used occasionally, but costs of transporting the excess weight of the packing material far exceeded the dubious advantages.

In an attempt to seal the shell pores to prevent loss of moisture and carbon dioxide, a great variety of materials including cactus juice, soap and shellac were investigated with varying degrees of success. The only coating considered fairly efficient was oil, which still is used occasionally today.

Thermostabilization, immersion of the egg for a short time in boiling water to coagulate a thin film of albumen immediately beneath the shell membrane, was rather extensively practiced by housewives of the late 19th century. Mild heating destroyed spoilage organisms but didn't cook the eggs. If kept in a cool place, thermostabilized eggs coated with oil keep several months, although some mold growth may take place.

During the first half of the 20th century, storing eggs in refrigerated warehouses was a common practice. Preservation was later improved with the introduction of carbon dioxide into the cold storage atmosphere. Today, very few, if any, cold storage eggs find their way to the retail market.

– See Cold Storage, Oiling

Price Per Pound

An easy way to compare the price of eggs with other protein foods.

– See Buying

Profiteroles

–See Cream Puffs

Production

Egg Production during the year ending November 30, 2011 totaled 91.9 billion eggs, up slightly from 2010. Table egg production, at 79.0 billion eggs, was up 1 percent from the previous year.

Breeds

Maximum production of top-quality eggs starts with a closely controlled breeding program emphasizing favorable genetic factors. The Single-Comb White Leghorn hen dominates today's egg industry. This breed reaches maturity early, utilizes its feed efficiently, has a relatively small body size, adapts well to different climates and produces a relatively large number of white-shelled eggs, the color preferred by most consumers. Brown-shelled eggs are now available in most markets, but have long been the traditional favorite in the New England region. Commercial brown-egg layers are hens derived from the Rhode Island Red, New Hampshire and Plymouth Rock breeds which predominated in that area of the country.

– See Color, shell

Resistance to Disease

Selective breeding is reinforced by good sanitation and vaccination.

Environment

Light Control

Of primary importance during both the growing and laying periods, controlled, low-intensity light can be used in house systems to delay sexual maturity until the bird's body is

big enough to produce larger eggs. Intensity and duration of light can be adjusted to regulate production.

Temperature

Laying houses maintained between 57° and 79°F (14° and 26°C) are desirable.

Humidity

A relative humidity between 40 and 60% is optimal.

Housing Systems

America's egg farmers are committed to producing a fresh, high-quality product and therefore are committed to the health and well-being of their hens. Housing systems today vary, but all ensure the hens are provided with adequate space, nutritious feed, clean water, light and fresh air. America's egg farmers produce eggs from multiple production systems – conventional, cage-free, free-range, and enriched colony. All organic systems are free-range.

Conventional: Eggs laid by hens living in cages with access to feed, water, and security. The cages serve as nesting space as well as for production efficiency. In this type of hen house, the birds are more readily protected from the elements, from disease and from natural and unnatural predators.

Cage-free: Eggs laid by hens at indoor floor operations, sometimes called free-roaming. The hens may roam in a building, room or open area, usually in a barn or poultry house, and have unlimited access to fresh food and water, while some may also forage for food if they are allowed outdoors. Cage-free systems vary and include barn-raised and free-range hens, both of which have shelter that helps protect against predators. Both types are produced under common handling and care practices, which provide floor space, nest space and perches. Depending on the farm, these housing systems may or may not have an automated egg collection system.

Free-range: Eggs produced by hens that have access to outdoors in accordance with weather, environmental or state laws. In addition to consuming a diet of grains, these hens may forage for wild plants and insects and are sometimes called pasture-fed hens. They are provided floor space, nesting space and perches.

Organic: Eggs produced according to national U.S. Department of Agriculture organic standards related to methods, practices and substances used in producing and handling crops, livestock and processed agricultural products.

Organic eggs are produced by hens fed rations having ingredients that were grown without most conventional pesticides, fungicides, herbicides or commercial fertilizers.

Enriched Colony: A production system that contains adequate environmental enrichments to provide perch space, dust bathing or a scratch area(s), and nest space to allow the layers to exhibit inherent behavior. Enriched colony systems are American Humane Certified.

Feed

Since more is known about the nutritional requirements of the chicken than of any other domestic animal, feed rations are scientifically balanced to assure layer health along with optimum quality eggs at least cost. Automatic feeders, activated by a time clock, move feed through troughs that allow for feeding ad libitum. Birds are also provided water at all times via nipple valves separate from the feed troughs.

Poultry rations are designed to contain all the protein, energy (carbohydrates), vitamins, minerals, and other nutrients required for proper growth egg production, and health of the layer hen. Feed might be based on sorghum, grains, corn, cottonseed meal or soybean meal, depending on the part of the country in which the ration is produced and which ingredient is most available and cost effective. The hen's ration may contain the same types of additives approved for human food. Antioxidants or mold inhibitors (also used in mayonnaise and bread) are added to maintain the quality of the feed. An additive is not approved for use in poultry feed unless adequate research has been undertaken to determine its pharmacological properties and possible toxicity and to discover any potentially harmful effects on animals.

Federal regulations prohibit the feeding of hormones to any kind of poultry in the U.S. Antibiotics are only rarely used when chickens are ill, at which time they seldom lay eggs. If antibiotics are used, FDA regulations require a withdrawal period for laying hens to ensure eggs are free of antibiotics.

How much a layer eats depends upon the stage of life, the hen's size, the rate of egg production, temperature in the laying house and the energy level of the feed. In general, about 4 pounds of feed are required to produce a dozen

eggs. A Leghorn chicken eats about 1/4 pound of feed per day. Layers of brown-shelled eggs are slightly larger and require more feed.

The type of feed affects egg quality. Shell strength, for example, is determined by the presence and amounts of vitamin D, calcium and other minerals in the feed. Too little vitamin A can result in blood spots. Yolk color is influenced by yellow-orange plant pigments in the feed. Maximum egg size requires an adequate amount of protein and essential fatty acids.

Flock Management

Molting, or loss of feathers, is a natural occurrence common to all birds regardless of species. In the wild, egg quality declines as the hen ages and, at about 18 to 20 months of age, molting occurs and egg production ceases. In conventional egg production, a fairly common practice is to place the flock into a controlled molt. A low-protein diet minimizes stress on the birds as they go through this transition period. After a rest period of 4 to 8 weeks, the birds start producing eggs again. Researchers have found that two periods of controlled molting, one at 14 months and another at 22 months, increases egg production more than one molt at 18 or 20 months, though few egg farmers place flocks into two controlled molts. Controlled molting is not permitted in organic flocks, though natural mottling can occur.

Egg Handling

In most commercial egg production facilities, automated belts gather eggs every day. Gathered eggs are moved into refrigerated holding rooms where temperatures are maintained between 40° and 45°F (4° and 7°C).

– See Cleaning

Egg Processing and Distribution

Some producers sell their eggs nest-run (ungraded) to processing firms which clean, grade, size and carton the eggs and ship them off to retail outlets. Most farms and ranches carry out the entire operation.

– See Egg Products, Egg Products Inspection Act, Grading, Nest-Run Eggs

Protein

A combination of amino acids, some of which are called essential, meaning the human body needs them from the diet because it can't synthesize them. Adequate dietary protein intake must include all the essential amino acids your body needs daily. The egg boasts them all: histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine. These

amino acids are present in a pattern that matches very closely the pattern the human body needs, so the egg is often the measuring stick by which other protein foods are measured. In addition to the nine essential amino acids, there are nine other amino acids in an egg.

Many different ways to measure protein quality have been developed. According to the Protein Digestibility Corrected Amino Acid Score (PDCAAS), whole egg, whey protein, casein and soy-protein concentrate all score 1 on a scale of 0 to 1. Whole egg exceeds all other protein foods tested with a score of 1.21 (above human needs) in the Amino Acid Score (AAS) rating system. At 3.8, the Protein Efficiency Ratio (PER) of eggs also outscores other proteins. When Nitrogen Protein Utilization (NPU) is evaluated, whole egg at 98% falls just below whey protein and casein (both at 99%). On a scale with 100 representing top efficiency, the Biological Value (BV) of eggs is rated between 88 and 100, with only whey protein rated higher (100).

Altogether each large egg provides a total of 6.29 grams of high-quality, complete protein. For this reason, eggs are classified with meat in the Protein Foods Group. One egg of any size equals one ounce of lean meat, poultry, fish or seafood. In addition to about 12.6% of the Daily Reference Value (DRV) for protein, a large egg provides varying amounts of many other nutrients, too.

– *See Biological Value, Buying, Daily Reference Values (DRVs), Food Guide Pyramid, Meat Replacement, Nutrient, Density*

Pullet

A young female chicken less than 1 year old. For egg layers, a pullet is a young female before she reaches sexual maturity and starts laying eggs, around 17-18 weeks.

Quiche

An unsweetened, open-faced custard pie, served hot or cold as a main dish, appetizer or snack. A quiche requires only a few ingredients: eggs, milk, seasonings and whatever else you might want to add in the way of flavoring, such as shredded cheese or chopped cooked vegetables, meat, poultry, fish or seafood. You can make a family-sized quiche in a regular pie plate or in a quiche dish. Custard cups make handy holders for individual quiches.

A traditional quiche is made in a pastry crust. For less fat, you can also make a crust out of cooked rice or cereal, bread or cracker crumbs, mashed beans or potatoes, or chopped spinach. You can line custard cups with bread for toast cups or use won ton wrappers or tortillas in place of pastry. Visit www.IncredibleEgg.org for quiche recipes.

– *See Cooking Equipment, Custard Cups, Quiche Dish*

Quiche Lorraine

A classic quiche flavored with bacon and Swiss cheese. Frenchmen claim that this savory custard pie originated in the province of Lorraine, but Germans insist it's a creation from Alsace.

Raw Eggs

Since raw eggs may contain the bacteria Salmonella enteritidis, it's recommended that you don't consume raw or undercooked eggs. Salmonella may be found inside the egg, most likely in the white, so it's necessary to properly cook all eggs and egg dishes before eating. For safety, many recipes that contain raw or undercooked eggs can be revised with a cooking step. Pasteurized shell eggs or pasteurized egg products are also safe alternatives to use in these recipes.

– *See Cooking Methods, Doneness Guidelines, Products, Egg Safety, Fight BAC!, Partnership for Food Safety Education, Pasteurized Eggs, Salmonella*

Recommended Daily Allowances

A term used to denote nutrient recommendations for 26 nutrients for 18 different population subgroups. RDAs are based on information on nutrient allowances for healthy people from the National Research Council of the National Academy of Sciences. In 2005, a broader set of dietary reference values, known as the Dietary Reference Intakes (DRIs) replaced the RDA and RNIs intended to help individuals optimize their health and prevent disease. This

information is revised about every five years and is used to determine the Daily Value and Reference Daily Intake figures used on food labels.

Reference Daily Intakes

A term that replaced the U.S. Recommended Daily Allowances (U.S. RDAs). RDIs are based on a population-weighted average of the latest RDAs for vitamins and minerals for healthy Americans over 4 years old. RDIs are not recommended daily intake figures for any particular age group or sex. They are simply average values for the entire U.S. population. For vitamins and minerals, RDIs are:

– *See Daily Reference Values (DRVs), Daily Values (DVs), Recommended Dietary Allowances (RDAs), U.S. Recommended Daily Allowances (U.S. RDAs)*

Vitamin and Mineral Reference Daily Intakes (RDIs)

Vitamins		Minerals	
A*	5000 IU	Calcium*	1000 mg
C*	60 mg	Iron*	18 mg
D	400 IU	Phosphorus	1000 mg
E	30 IU	Iodine	150 mcg
K	80 mcg	Magnesium	400 mg
Thiamin (B1)	1.5 mg	Zinc	15 mg
Riboflavin (B2)	1.7 mg	Selenium	70 mcg
Niacin	20 mg	Copper	2 mg
B6	2 mg	Manganese	2 mg
Folate	400 mcg	Chromium	120 mcg
B12	6 mcg	Molybdenum	75 mcg
Biotin	300 mcg	Chloride	3400 mg
Pantothenic Acid	10 mg		

Listing the percentage of RDI for this nutrient is mandatory on food labels. Listing the percentage of RDI for other nutrients on food labels is optional.

Source: http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/FoodLabelingGuide/ucm064928.htm#.T3SOqywnUM4.email

Remoulade

Classic French mayonnaise-based sauce with mustard, capers, chopped gherkin pickles, herbs and anchovies.
– See Mayonnaise

Restricted Eggs

Ungraded eggs, specifically checks, dirties, incubator rejects, inedibles, leakers and loss eggs.

Checks have a broken shell or a crack in the shell, but the shell membranes are intact so that the egg contents don't leak.

Dirties may have adhering dirt, prominent or conspicuous stains, or moderate stains covering more than one-fourth of the shell surface.

Incubator rejects have been subjected to the incubation process for a period of time.

Inedibles are moldy, musty or sour or exhibit rot, blood rings, green whites, stuck yolks or embryo chicks.

Leakers have a crack or break in both shell and shell membranes so that the contents are leaking.

Loss eggs are leakers, inedibles and any eggs that have been cooked, frozen or contaminated.

The Egg Products Inspection Act (EPIA) controls the disposition of restricted eggs to prevent them from getting into consumer channels. Checks and dirties may be sent to U.S. Department of Agriculture (USDA) -inspected egg-products plants where they can be handled and processed properly. They can't be sold in the shell to restaurants, bakeries, food manufacturers or consumers unless such sales are specifically exempted by section 15 of the Act and not prohibited by state law. All other restricted eggs must be disposed of according to approved procedures.

Roasted Egg

An egg which appears on the Jewish Passover plate as part of the ritual. The egg is hard-boiled, then roasted in the oven until the shell becomes brown.

S

Sabayon Sauce

– See Zabaglione

Salmonella

One of several types of bacteria which can cause foodborne illness (salmonellosis) if ingested in large numbers. The Salmonella group of bacteria can be found in the intestinal tract of animals, birds, insects, reptiles, fish, seafood and people. Salmonella can be passed to humans through the consumption of contaminated foods that have been in contact with unwashed hands, raw meat or poultry, eggs, seafood, milk, or by coming in contact with contaminated animal feces. It was once thought that inside

of the chicken egg was sterile, the shell protecting the contents from any kind of contamination. Dr. St. Louis and colleagues discovered in the late 1980's that a bacteria, Salmonella Enteritidis, could indeed get inside the egg through the hens reproductive tract. Since this discovery, researchers, egg producers, and government agencies have worked hard to implement and maintain practices to ensure that the hen does not have the ability to shed SE into the egg. The chance of an egg becoming infected with SE is very low. If it is present in the egg, producers can control the growth through refrigeration and kill it with processes like pasteurization. SE will not grow at temperatures below 40°F (4°C) and is killed at 160°F (71°C). Temperatures between 40°F (4°C) and 140°F (60°C), known as the danger zone, are ideal for rapid growth. Eggs are required to be refrigerated at or below 45°F (7°C) no later than 36 hours after being laid.

The majority of salmonellosis outbreaks have been attributed to foods other than eggs – nuts, vegetables, chickens, beef and fish – and through cross contamination of utensils and other foods used during preparation. Of the outbreaks involving eggs, most have occurred in foodservice operations and have been the result of inadequate refrigeration and insufficient cooking.

You can avoid illness from SE through adequate refrigeration, proper cooking and sanitary kitchen and food handling procedures.

– See Buying, Cooking Methods, Doneness Guidelines, Egg Safety, Fight BAC!, Partnership for Food Safety Education, Raw Eggs, Storing

Saturated Fat

– See Fat

Sauces

In addition to the primary function of thickening sauces, eggs enrich flavor, add color and increase nutritive value.

You can use a milk or cream sauce thickened with eggs to bind casseroles and meatloaves or serve a sweetened egg-thickened sauce with a dessert.

Butter sauces are emulsions of butter and other liquids. When heated, the egg both thickens and strengthens the emulsion. Hollandaise is the best known sauce of this type.

Other egg sauces include those in which chopped hard-boiled eggs are an ingredient.

– See Custard, Stirred; Hollandaise Sauce

Schaum Torte

– See Hard or Swiss Meringue

Scotch Eggs

Hard-boiled eggs coated with sausage, breaded and deep-fried.

Scrambled Eggs

– See Cooking Methods, Scrambled

Serving Sizes

A serving of an individual food is defined by U.S. Department of Agriculture (USDA) for dietary guidance and by FDA for food labels. One egg equals one serving.

– See My Plate

Shell

The egg's outer covering, accounting for about 9 to 12% of its total weight, depending on the egg size. The shell is the egg's first line of defense against bacterial contamination.

The shell is largely composed of calcium carbonate (about 94%) with small amounts of magnesium carbonate, calcium phosphate and other organic matter, including protein.

Shell strength is greatly influenced by the minerals and vitamins in the hen's diet, particularly calcium, phosphorus, manganese and vitamin D. If the diet is deficient in calcium, for instance, the hen will produce a thin or soft-shelled egg or possibly an egg with no shell. Occasionally an egg may be prematurely expelled from the uterus due to injury or excitement. In this case, the shell has not had time to be completely formed. Shell thickness is also related to egg size which, in turn, is related to the hen's age. As the hen ages, egg size increases. The same amount of shell material which covers a smaller egg must be stretched to cover a larger one, hence the shell is thinner.

Seven to 17 thousand tiny pores are distributed over the shell surface, a greater number at the large end. As the egg ages, these tiny holes permit moisture and carbon dioxide to move out and air to move in to form the air cell. The shell is covered with a protective coating called the cuticle or bloom. By blocking the pores, the cuticle helps to preserve freshness and prevent microbial contamination of the contents.

Egg shell uses vary from the thrifty, such as compost, to the creative, as in decorated eggs.

– See Air Cell; Bloom; Color, Shell; Composition; Decorating Eggs; Formation; Oiling

Shirred Eggs

– See Cooking Methods-Baked

Size

Several factors influence the size of an egg. The major factor is the age of the hen. As the hen ages, her eggs increase in size.

The breed of hen from which the egg comes is a second factor. Weight of the bird is another. Pullets significantly underweight at sexual maturity will produce small eggs.

Environmental factors that lower egg weights are heat, stress, overcrowding and poor nutrition.

All of these variables are of great importance to the egg producer. Even a slight shift in egg weight influences size classification and size is one of the factors considered when eggs are priced. Careful flock management benefits both the hens and the producer.

– *See Buying, Grading, Production, Treatment of Hens*

Size Equivalent

Although you can use any size egg for frying, scrambling, hard-boiling or poaching, most recipes for baked items such as custards and cakes are based on the use of large eggs.

– *See Buying*

Egg Size Substitution

Large	Jumbo	X-Large	Medium	Small
1	1	1	1	1
2	2	2	2	3
3	2	3	3	4
4	3	4	5	5
5	4	4	6	7
6	5	5	7	8

Source: American Egg Board

Number of eggs equivalent to 1 cup.

Egg Size	Whole	Whites	Yolks
Jumbo	4	5	11
X-Large	4	6	12
Large	5	7	14
Medium	5	8	16
Small	6	9	18

Source: American Egg Board

Snow Eggs

– *See Meringue-Poached Meringues*

Soufflé

A puffy, delicate, light-as-air creation. Savory or sweet, hot or cold, soufflés are sensational and impressive whether served as a main dish, accompaniment or dessert.

Strictly speaking, a true soufflé consists of a thick white sauce blended with beaten egg yolks and leavened by stiffly beaten whites. It may also contain pureéd, shredded or finely chopped meat, poultry, fish, seafood, cheese or vegetables, and is always served hot. You can substitute a condensed cream soup or quick-cooking tapioca cooked in milk for the white sauce. For sweet or dessert soufflés, you can add sugar to the sauce.

Like many skills, making a successful soufflé is easy when you know how. A mastery of the following basics will have you turning out soufflés with the best of them.

If you don't have a traditional soufflé dish, use a straight-sided casserole dish or even a straight–sided uncoated saucepan of the proper size. For individual servings, you can use large custard cups or ovenproof coffee or soup mugs. As it bakes, the soufflé will increase in volume 2 to 3 times, so container size is important. If the container is too large, the mixture will not rise above the rim and have the lofty look that is part of a soufflé's charm. If the container is too small, the mixture may run over. Usually a 4-egg soufflé will fit a 1 1/2- to 2-quart container. Use a 2- to 2 1/2-quart container for a 6-egg soufflé. You can fill the container to within 1/2-inch of the top.

Savory Cheese Soufflé

Sweet Chocolate Dessert Soufflé

A soufflé needs to cling to the sides of the container to reach its maximum height. So, don't butter the container unless you also lightly dust the buttered bottom and sides of the container with grated Parmesan cheese, cornmeal or very fine, dry bread crumbs, which will lend flavor and a nice crusty texture. For dessert soufflés, you can dust with sugar, finely chopped nuts or cookie crumbs, if you like.

If your container is a tad too small or your beating and folding skills are exceptional, you can fit a collar around the top of the container to keep the soufflé in bounds. Make a 4-inch band of triple-thickness aluminum foil long enough to go around the container and overlap 2 inches. Butter and dust the band. Wrap the band around the outside of the dish with the dusted side in and fasten it with strong masking tape or string. The collar should extend at least 2 inches above the rim of the container.

– *See Cooking Terms, add cream of tartar, gently folded, separated, stiff but not dry*

Soufflé, Cold

A term loosely applied to a number of airy egg dishes with a texture closely resembling a soufflé. For the

purist, however, cold soufflés are more accurately known as snows or sponges, chiffons or Bavarians.

Snows or sponges are clear gels plus egg whites. To make one, you add unbeaten egg whites to a partially-set basic gelatin mixture and beat until soft peaks form. Then chill until firm.

Chiffons consist of beaten egg whites added to custard gels. For the custard base, you cook egg yolks with gelatin. Then fold in stiffly beaten egg whites and chill the mixture. You can enjoy a chiffon as is or use it for a pie filling.

Bavarians are custard gels you make with egg yolks, then add both beaten egg whites and whipped cream.

These recipes are usually made with raw whites and/or yolks, but some can be cooked.

– *See Doneness Guidelines, Cooking Yolks and Whites for Recipes, Egg Safety, Partnership for Food Safety Education, Raw Eggs, Salmonella*

Sponge Cake

An airy foam cake similar to angel food cake, except that sponge cake may be made with egg yolks or with whole eggs. True sponge cakes contain no fat or leavening agent other than eggs.

– *See Angel Food Cake, Foams*

Storing

The refrigerator is where you should store your eggs. It's best to place the eggs on an inside shelf. Repeated opening and closing of the door causes temperature fluctuations and slamming can result in breakage. The carton in which you purchase them helps keep the eggs from picking up odors and flavors from other foods and helps prevent moisture loss.

You can keep fresh, uncooked eggs in the shell refrigerated in their cartons for at least four to five weeks beyond the pack date or about three weeks after you bring them home. Properly handled and stored, eggs rarely spoil. If you keep them long enough, they are more likely to simply dry up. But don't leave eggs out. They'll age more in one day at room temperature than they will in one week in the refrigerator.

As soon as you've cooled them, refrigerate hard-boiled eggs in their shells and use them within one week. When storing hard-boiled eggs, you may notice a gassy odor in your refrigerator. It may be more noticeable when you open the refrigerator infrequently. The odor is caused by hydrogen sulfide, which forms when the eggs are cooked, is harmless and usually dissipates within a few hours.

For outdoor eating occasions, you can keep eggs refrigerator-cold with ice

Egg Storage Chart		
Product	**Refrigerator**	**Freezer**
Raw eggs in shell	3 to 5 weeks	Do not freeze.
Raw egg whites	Up to 4 days	12 months
Raw egg yolks	Up to 4 days	Yolks alone do not freeze well. – See Freezing Eggs
Hard-boiled eggs	1 week	Do not freeze.
Egg substitutes, liquid		
Unopened	10 days	Do not freeze.
Opened	3 days	Do not freeze.
Egg substitutes, frozen		
Unopened	After thawing, 7 days, or refer to "Use-By" date on carton.	12 months
Opened	After thawing, 3 days, or refer to "Use-By" date on carton.	Do not freeze.
Casseroles made with eggs	3 to 4 days	After baking, 2 to 3
Eggnog, commercial	3 to 5 days	months.
Eggnog, homemade	2 to 4 days	6 months
Pies, pumpkin or pecan	3 to 4 days	Do not freeze.
Pies, custard and chiffon	3 to 4 days	After baking, 1 to 2 months.
Quiche with any kind of filling	3 to 4 days	Do not freeze. After baking, 1 to 2 months.

Source: U.S. Department of Agriculture (USDA)

or commercial coolant in an insulated bag or picnic cooler as long as the ice lasts or the coolant remains almost at freezing. Unless it's quite cold weather, for hiking, backpacking, camping and boating, when refrigeration or cooler facilities aren't available, use dried eggs which are usually available in sporting goods stores. You can reconstitute dried eggs with purified water and use them in most of the ways you would use fresh eggs. Pickling and other forms of preservation are additional possibilities.

Refrigerate leftover egg whites in a covered container for up to four days. Store leftover yolks in water in a covered container in the refrigerator and use them in a day or two. If you can't use the yolks quickly enough, hard boil

them. If you find yourself with more eggs than you will use in several weeks, freeze them.

– See Egg Products, Freezing, Leftover Egg Parts, Pickled Eggs, Preservation

Strata

A custard mixture poured over layers of bread, cheese and sometimes additional ingredients, and baked. The strata casserole was created to use up stale bread.

Stuffed Eggs

– See Deviled Eggs

Syneresis

– See Curdling

T

Tartar Sauce

A mayonnaise-based sauce with chopped pickles, onion, traditionally served with fried fish.

Tempuring

The technique used to blend uncooked eggs into hot mixtures. To temper, beat eggs and stir in a little of the hot mixture to warm (temper) the eggs. Then stir the warmed eggs into the remaining hot mixture. Tempering helps to prevent the eggs from curdling.

– See Curdling

Thickener

– See Cooking Functions, Sauces

Thousand Island Dressing

A mayonnaise-based with chili sauce, chopped pickles, onions, hard-boiled egg, green olives, green pepper.

– See Mayonnaise

Thousand-Year-Old Eggs

– See Preservation

Tortilla

Spanish term for a frittata.

– See Frittata

Treatment of Hens

Laying hens represent an egg producer's living and are treated with care. Like humans, hens seem to be more productive when they're healthy. In 1945, the average hen laid 151 eggs per year. Now as a result of breeding and better nutrition, housing and general management of facilities, the average hen lays between 250 and 300 eggs per year.

America's egg farmers believe in consumer choice. Hens are raised and lay their eggs in a multitude of housing systems subject to consumer's demand. No matter the system used, farmers are committed to the health and well-being of their hens.

Without deference to the manner in which the eggs are produced, America's egg farmers follow guidelines to ensure the hens are provided with adequate space, nutritious feed, clean water, light, and fresh air.

The farming practices range from cage systems, cage-free, free-range, to organic systems. Proper lighting, housing, and diets are critical to the production process to ensure high-quality egg production. Scientifically balanced feed insures that the birds are protected from improper or inadequate diets – a vast improvement over the days when hens foraged for food in barnyards or ate household scraps.

Chickens, like some other animals, may exhibit cannibalistic tendencies. To protect the birds from each other, part of their upper beaks or both lower and upper beaks are trimmed. The trimming process is done by a special machine which cauterizes the beak and may be compared to clipping a dog's claws. The birds are still able to eat and drink.

– See Beak Trimming, Production

U

Unsaturated Fat

– See Fat

Uses, Other

Beyond the culinary assets of eggs, numerous individual egg properties benefit mankind and other animals throughout a wide range of technologies:

Cosmetics

Egg white has long been used as a facial. Egg yolks are used in shampoos and conditioners and, sometimes, soaps. Cholesterol, lecithin and some of the egg's fatty acids are used in skin care products, such as revitalizers, make-up foundations and even lipstick.

Animal Feed

The excellent nutrition of eggs enhances various pet foods. Egg white is used as a protein reference in feeding laboratory animals. Eggshells from processing plants are often dried, crushed and fed to laying hens as a rich calcium source and high-quality protein source (from egg white left inside the shells).

Experiments

Microorganisms bred in laboratories often grow better if a small amount of egg yolk is added to the culture medium.

Medical and Pharmaceutical

Fertile eggs are used to manufacture many vaccines (including influenza shots), as a source of purified protein and as an aid in the preservation of bull semen for artificial insemination.

Nutraceutical

In some areas of the world, such as China, India and Eastern Europe, eggs have been used for centuries

as the base for health potions. Today a number of nutraceutical uses of eggs are being employed and scientists are studying potential future egg benefits. Current applications include:

Lysozyme, an egg white protein, is used as a food preservative and as an antimicrobial agent in pharmaceutical products. (Nature also provides lysozyme in human tears and saliva for infection prevention.)

Avidin is an egg white protein and biotin is a vitamin found in egg white and, to a much greater extent, in egg yolk. Avidin-biotin technology is being used in various medical diagnostic applications such as immuno-assay, histopathology and gene probes.

Sialic acid, an amino acid, has been shown to inhibit certain stomach infections.

Liposomes, fatty droplets found in eggs, are used as a controlled delivery mechanism for various drugs.

Immunoglobulin yolk (IGY), a simple egg-yolk protein which has immunological properties, is used as an anti-human-rotavirus (HRV) antibody in food products.

Phosvitin, a phosphoprotein found in egg yolk, provides antioxidant benefits in food products.

Choline, a B vitamin combined with lecithin in egg yolk, is important in brain development and is used to treat certain liver disorders. Eggs are one of the best food sources of choline.

Ovolecithin, a phospholipid found in egg yolk, has a high proportion of phosphatidycholine and contains fatty acids – such as arachidonic acid (AA) and docosahexanoic acid (DHA) – which have been shown to improve visual activity in infants and to improve fatty-acid status. Egg lecithin has both emulsifying and antioxidant properties and, beyond its usefulness in keeping the oil and vinegar of mayonnaise in suspension, it's used chiefly in medicine.

Shell-membrane protein is being used experimentally to grow human skin fibroblasts (connective tissue cells) for severe-burn victims and, in Japan, is being used in cosmetics.

U.S. Recommended Daily Allowances

A term that once indicated suggested intake levels for nutrients. U.S. RDAs simplified the RDAs of the National Academy of Sciences by providing a single recommended allowance for the general healthy population. With few exceptions, these allowances were based on the highest RDA for each nutrient – the amounts required

for young adult males. Since these values were excessively high for children, women and the elderly, U.S. RDAs have been replaced by RDIs which represent average RDAs.

– *See Daily Reference Values (DRVs), Daily Values (DVs), Recommended Dietary Allowances (RDAs), Reference Daily Intakes (RDIs)*

V

Vegetarian Diets

Eggs can be an important source of complete protein in diets that omit meats. One egg equals one ounce of lean meat, poultry, fish or seafood. Since an egg contains all the essential amino acids in proportion to human needs in addition to vitamin B_{12}, a nutrient not found in vegetarian sources, adding an egg to a vegetarian diet can improve the healthfulness of a vegetarian diet.

– *See Nutrient, Protein, Reference Daily Intakes (RDIs)*

Vegetarian Eggs

Eggs produced by hens fed rations containing only vegetable foods.

Vitamins

An egg contains varying amounts of essential vitamins but no vitamin C.

– *See Biological Value, Nutrient, Reference Daily Intakes (RDIs)*

Vitelline Membranes

– *See Composition, Membranes*

W

Washing Eggs

– *See Cleaning*

Water Bath

Also known as a bain-marie. Some delicate dishes, such as custard, are cooked in the oven in a water bath. Before baking, place the baking dish or pan holding the custard in a larger baking pan and add very hot water to within 1/2 inch of the top of the custard. The water insulates the custard from too much heat and promotes even cooking.

– *See Custard, Baked*

Water Glass

A solution of sodium silicate formerly used to preserve eggs.

– *See Preservation*

Weeping

– *See Curdling; Meringue, Soft Meringue*

Weight

– *See Buying; Grading; Size*

Well Beaten

– *See Cooking Terms, Well Beaten*

White

– *See Albumen; Color, White; Composition; Foam*

X

Xanthophylls

– See Lutein, Color-Yolk

Y

Yolk

The yolk, or yellow portion, of an egg makes up about 34% of the liquid weight of the egg. It contains all of the fat in the egg and a little less than half of the protein. The yolk of a large egg contains about 55 calories.

With the exception of niacin and riboflavin, the yolk contains a higher proportion of the egg's vitamins than the white, including vitamins B_6 and B_{12}, folic acid, pantothenic acid and thiamin. All of the egg's vitamins A, D, E and K are in the yolk. Egg yolks are one of the few foods naturally containing vitamin D. The yolk also contains more calcium, copper, iron, manganese, phosphorus, selenium and zinc than the white.

Double-yolked eggs are often produced by young hens whose egg production cycles are not yet completely synchronized. They're often produced too, by hens which are old enough to produce extra large-sized eggs. Genetics is a factor, also. Occasionally a hen will produce double-yolked eggs throughout her egg-laying career. It's rare, but not unusual, for a young hen to produce an egg with no yolk at all.

In fertilized eggs, the yolk is the site of embryo formation.

It's the yolk which is responsible for the egg's emulsifying properties.

– See Breakout; Color, Yolk; Composition; Fat; Fertile Eggs; Formation; Germinal Disc; Grading; Nutrient

Z

Zabaglione

Italian dessert sauce made with egg yolks, marsala wine and sugar cooked over slow, simmering water. Called Sabayon in France.

Zeaxanthin

–See Lutein

Notes

Notes

Notes

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