The Hen—"Eggs"pert Producer

Most of the eggs we eat come from chickens. Hens are female chickens. They are the ones who lay eggs. It's an all day event for a chicken to make an egg and lay it.

1. The hen is born with many tiny yolks in her body. One at a time, these will grow to full size.
2. When a yolk comes to full size, it is released into a long tube called an oviduct. This release takes about 14 minutes.
3. As the yolk moves, a thick white layer of albumen also known as the egg white, is placed around it. This takes about 3 hours.
4. The next stage takes about 1 hour and 15 minutes. Water is added to the albumen to form a thin layer of white.
5. The formation of the egg shell is the last and longest step. This step can take as long as 20 hours. Pigment is added to the shell at the very end of this step making the egg shell white, cream or brown depending on the breed of the hen.
6. The hen lays the egg and the process starts again.

Generally, breeds with white ear lobes lay white eggs; breeds with red ear lobes lay brown eggs.

![Diagram of an Egg]

Parts of an Egg:
- Chalazae
- Shell Membranes
- Yolk
- Thick Albumen
- Thin Albumen
- Air Cell
- Shell
- Germinal Disk
- Vitelline Membrane

FACT:
A hen lays an egg every 24-26 hours. How many hours is that more than a day?

Alphabetize the parts of an egg:

__________________
__________________
__________________

1
Eggsploring Food Safety

Cleanliness

- Wash hands in hot, soapy water before handling food. Wash countertops, utensils and equipment that have been in contact with raw food before using them again.
- Use separate cutting boards and knives for raw and cooked foods. Wash them thoroughly with hot, soapy water after each use.
- Throw away eggs that are dirty, cracked, broken or leaking. Eggs should not be washed – they have been washed and sanitized before they are packed.
- Don’t use an egg’s shell to separate contents. Use an egg separator to separate whites and yolks. Use a clean utensil to remove any shell from an egg mixture.

Salmonella is a common microbe found around food. In large numbers, it will make people sick. Salmonella will not grow at temperatures below 40°F. This is why refrigeration of eggs and other foods is a very important part of food safety. The danger zone for food is between 40° and 140°. These temperatures are ideal for rapid Salmonella growth. Freezing does not kill Salmonella but does stop growth.

On average, only one out of 20,000 commercially produced eggs in the U.S. might contain the Salmonella bacteria.

ACTIVITY: Write a paragraph that explains 2 ways to protect yourself from Salmonella growing in your food.

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Specialty Eggs

Nutritionally Enhanced Eggs are created by varying the hens’ diets. Some shell eggs on the market have altered fat content. Research shows that for most people, dietary fat — especially saturated fat — has a much greater effect on blood cholesterol levels than dietary cholesterol. Some eggs have reduced saturated fats and increased unsaturated fats. Other eggs are enriched with omega-3 fatty acids naturally found in fish. Still other eggs have added vitamins, minerals or carotenoids. Check labels for nutrient facts.

Pasteurized Eggs are eggs that have been exposed to heat in order to destroy potential bacteria. Due to the heating process, pasteurized eggs may have slightly lower amounts of heat-sensitive vitamins, such as riboflavin, thiamin and folic acid. Pasteurized eggs are especially suitable for preparing recipes that aren’t fully cooked and when serving the very young, the elderly, pregnant women, or anyone whose immune system is weakened. They can be used in all recipes, just like non-pasteurized eggs.

Organic Eggs must be produced according to national USDA organic standards. Organic eggs are produced by hens fed diets that were grown without most conventional pesticides, fungicides, herbicides or commercial fertilizers. 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 is organic; it depends on the nutrients in the feed.

Vegetarian Eggs are produced by hens who are fed rations containing only vegetable foods.

Regardless of whether the eggs are conventional or specialty, no growth hormones are ever given to hens, nor does their feed ever contain hormones.

American Egg Board
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Farmers care about their chickens...

America’s egg farmers believe in consumer choice. Hens are raised and lay their eggs in a multitude of housing systems subject to consumer demand. No matter the system employed America’s egg farmers are committed to the health and well being of their hens, and dedicated to providing their customers a fresh, nutritious egg.

Without deference to the manner in which the eggs are produced, most of 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 modern cage systems, cage-free, free-range to organic systems. Proper light, housing, and diet are critical to the production process to ensure high-quality egg production.

Let’s look at some of the different farming practices.

Cage-free eggs are laid by hens living on indoor floor operations and are sometimes called free-roaming hens. The hens are usually housed 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 provides floor space, nest space, and perches. Depending upon the farm, these housing systems may or may not have an automated egg collection system.

Free-range eggs are produced by hens raised outdoors or that have access to the outdoors, as weather permits. Shelter is provided during inclement weather and to help protect hens from predators. In addition to having continuous access to fresh food and water, these hens may forage for wild plants and insects and are sometimes referred to as pasture-fed hens. These hens are also provided with floor space, nest space and perches. Free-range hens also are cared for under common handling and care practices.

Cage-laid eggs are produced from hens living in communal cage systems. There are multiple cage systems, depending upon the size of the bird, and the facility. Farmers who utilize cage systems also participate in common handling and care practices. While providing hens with access to fresh food and water, cages also work as nesting space. Cage-laid eggs are collected with an automatic collection system. Cage systems provide shelter, as well as protecting the hens from predators.

IT'S IN THE YOLK

- The yolk is the yellow part of the egg. It is the major source of vitamins, minerals and fat from the egg. It also contains about half of the protein.
- Some egg yolks are more yellow than others because... you are what you eat.
- Hens that eat feeds containing yellow corn and alfalfa meal lay eggs with medium yellow yolks, while those hens eating wheat or barley lay eggs with lighter colored yolks.
- A diet made up of colorless foods, like white cornmeal, produces almost colorless yolks.

WHEN YOU EAT A LARGE EGG, YOU GET:

70 calories & some amount of these VITAMINS...
- vitamin A
- vitamin D
- vitamin E
- vitamin B12
- biotin
- choline
- folate

and MINERALS...
- calcium
- phosphorus
- copper
- potassium
- iron
- sodium
- magnesium
- sulfur
- manganese
- zinc

Ever wonder why some eggs peel easier than others? ...The fresher the egg, the more difficult to remove the shell.
EGGS ARE GRADED TOO!

Grade AA: Eggs stands up tall. Yolk is firm. Area covered by white is small. There is a large proportion of thick white to thin white.

Grade A: Egg covers a relatively small area. Yolk is round and upstanding. Thick white is large in proportion to thin white and stands fairly well around yolk.

Grade B: Egg spreads out more. Yolk is flattened. There is about as much or more thin white as thick white.

Grade is determined by the inside and outside quality of the egg when the egg is packed. There is no difference in nutrition among the grades. Egg cartons from USDA-graded eggs must display a Julian date - which is the date the eggs were packed. The cartons may have other markings, including the USDA Grade Shield (signifying that the eggs were graded by the U.S. Department of Agriculture) or a logo identifying that the eggs were produced according to certain animal care guidelines.

Eggs sold in stores for your use and eggs sold to restaurants for cooking cannot hatch chicks. They are not fertile.

What do you know?
Write the name of the egg part on the line next to the description. Hint: Refer to parts of an egg on p 1.

Outer covering of egg. It is made up mainly of calcium carbonate; may be white or brown depending on the breed of hen. The color does not affect egg quality, flavor, nutritional value, shell thickness or how it cooks.

Yellow part of egg. The color varies with the feed eaten by the hen, but doesn’t indicate nutritional content. This egg part is a major source of egg’s vitamins, minerals, fat and about half of the protein.

Twisted, cord-like strands of egg white that hold the yolk in the center of the egg; its presence indicates the egg is fresh.

Clear seal which holds the egg yolk.

Pocket of air formed at large end of egg; caused by contraction of egg contents during cooling after laying; increases in size as the egg ages. (It forms at the large end because this end is more porous!)

The white part of the egg nearest to the shell.

This white part is the major source of an egg’s riboflavin and protein, stands higher and spreads less than thin white.

Two, an inner and an outer, surround the albumen; provide a protective barrier against bacterial entry; the air cell forms between them.

Avian influenza or bird flu is a virus that can infect wild birds (such as ducks, gulls and shorebirds) and domestic poultry (such as chickens, turkeys, ducks and geese). Most egg producers protect their chickens from this disease by keeping the hens inside houses so they won’t come in contact with wild birds that may have the flu or other diseases. They also limit the number of people who enter the hen houses or are allowed to visit the farm. Anyone entering the hen houses wears disinfected shoes and clothing. Sometimes delivery trucks are stopped before they get to the farm and their package/cargo is loaded into a safe vehicle for delivery to the farm. Sometimes the farm employees and anyone coming to the farm are given directions on how to get to the farm so they will stay out of areas where bird diseases have been reported. This may add many miles to their journey. This is all part of the bio-security system today’s farmers have put into place to protect your food supply.

For more information, go to www.eggsafety.org.
# Math Challenge

## Egg Sizes
Minimum ounces per dozen

<table>
<thead>
<tr>
<th>Size</th>
<th>Ounces per dozen</th>
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<tbody>
<tr>
<td>Jumbo</td>
<td>30 oz.</td>
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<tr>
<td>Extra Large</td>
<td>27 oz.</td>
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<tr>
<td>Large</td>
<td>24 oz.</td>
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<tr>
<td>Medium</td>
<td>21 oz.</td>
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<tr>
<td>Small</td>
<td>18 oz.</td>
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<tr>
<td>Pee Wee</td>
<td>15 oz.</td>
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Size is determined by the average weight per dozen. There are 16 ounces in a pound.

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### Chart the number of ounces in the following number of eggs.

<table>
<thead>
<tr>
<th>Number of eggs</th>
<th>Jumbo</th>
<th>Extra Large</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Pee Wee</th>
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*Hint: Dividing by 12 will give you the weight of one egg.*

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You need 3 jumbo eggs for your brownie recipe. How many ounces do you need?

Oops. No jumbo eggs in the refrigerator. All you have is peewee eggs. How many peewee eggs do you need to use?

How many ounces of eggs do you have if you have 3 dozen peewee eggs?

How many pounds and ounces of eggs do you have?

How many ounces of eggs do you have if you have a half dozen jumbo eggs?

How many peewee eggs equal this same amount of jumbo eggs?
The Chicken or the Egg?

Egg farmers who provide eggs for people in cities and suburbs know that their job is to put the chicken first. Their goal is to create a healthy hen. The healthier the hen, the more eggs she will produce.

During the 1940s, most people kept small flocks of hens in their backyards for eggs and meat. The hens were exposed to cold and freezing temperatures, diseases spread by contact with other birds and contamination of their feed. These problems caused as many as 40 out of 100 chickens to die. The strongest hens were only able to lay 112 eggs per year. These eggs were unwashed and kept at warm temperatures. These hens needed eight pounds of feed to produce one dozen eggs.

As more and more people moved to the cities, fewer people raised their own chickens. There were not enough eggs to meet the demand. Egg farmers looked for ways to enlarge their flocks to provide more eggs.

By the early 1960s, improved technology and use of mechanical equipment resulted in a shift from small farm flocks to larger commercial operations. Flocks of 100,000 laying hens are not uncommon and some flocks number more than 1 million!

The egg industry and farmers pioneered many improvements in layer hen flocks. Today, many egg producers keep their hens in clean, dry laying houses. Temperature, humidity and light are controlled and the air is kept circulating in them. Birds are either given the run of the floor area or are housed in cages. Automatic feeders move food through troughs for the hens to eat. Along with the food, clean water is always available to the hens.

Chickens are fed a balanced diet of corn, wheat or milo grains and soybean meal. Vitamins and minerals are added to their food. Today’s hen eats a better balanced diet than most people eat!

How much a hen eats depends upon the hen’s size, rate of egg production, temperature and the energy level of the feed. Today, it takes about four pounds of feed to produce one dozen eggs.

High-quality egg production begins with using the right breed of chicken. The Single Comb White Leghorn breed is used most today. This breed reaches maturity early, utilizes feed well, and produces a large number of white-shelled eggs.

Today, chickens are more than twice as productive as their ancestors thanks to better nutrition and care. Each of the 275 million hens in the U.S. produces 250-265 eggs per year.

A rooster (male chicken) does not need to be present for a hen to produce an egg.

A pullet is a young hen less than one year old.

FACT: Hormones are never used in U.S. egg production.
From the Farm to your Store

From the moment the egg is laid, physical and chemical changes begin. Newly laid eggs must be gathered frequently and refrigerated quickly. Warm temperatures lower the eggs' freshness and quality.

Some eggs are still gathered by hand. Most large laying houses use automated gathering machines to do the job. Eggs that are gathered are moved into refrigerated holding rooms. Humidity is kept high to keep moisture from being lost from the eggs. Eggs are washed, sanitized, graded and packaged. They are stored in large refrigerated coolers, then transported in refrigerated trucks to stores.

Eggs are brought from the laying houses on conveyor belts for cleaning, grading and packaging.

The eggs are weighed by electronic scales and packaged by size based on weight.

Eggs are washed and sanitized. Sometimes a thin coat of mineral oil is applied to help maintain egg quality.

Eggs are inspected for quality control by viewing them with special lights. This is called candling, where quality of the inside of the egg and shell cracks are determined.

Packaged eggs are put in boxes and moved into a refrigerated room (cooler) for storage until they are shipped by refrigerated trucks to stores.

**CHOLESTEROL** is not fat. It is a fatty, wax-like substance found in every cell of animals, including humans. Our body uses, needs and produces cholesterol. Cholesterol is needed for the structure of cell membranes and is needed by the body to produce vitamin D and to insulate nerve fibers. It also serves as the building blocks of hormones.

Dietary cholesterol, found in all foods from animals, does not significantly raise blood cholesterol levels. Usually your body produces less cholesterol if there is plenty available in the blood system.

Studies show that it is not the cholesterol in the food that causes most people's problems, but the saturated fat found in foods. Most of the fat in an egg is unsaturated, so the good news is that it is okay to eat an egg a day.

Here are some ways to cut fat:

- Choose skim or low-fat dairy products.
- Choose lean meats and trim off fat.
- Eat fresh fruit rather than cookies or candy.
- Choose low-fat snack foods such as soda crackers, pretzels, air popped popcorn or graham crackers.
- Poach or hard-cook rather than fry eggs.
Each of the baskets below contains numbers. Use +, −, x, or ÷ between each number to get the correct answer.

CROSSWORD • CROSSWORD • CROSSWORD

Across
1. To change from doing a job by hand to using a machine to do a job. (page 7)
4. The part of an egg that holds the yolk in place. (page 1, 4)
5. A microbe that can make you sick. (page 2)
10. The largest chicken egg sold in stores. (page 5)
11. The hard outer layer of an egg. (page 2, 4)
12. A process used to cool foods and keep them out of the danger zone so microbes cannot grow. (page 2)

Down
2. Type of oil put on eggs. (page 7)
3. The quality rating of eggs. (page 4)
4. A fatty, wax-like substance produced by all animals. (page 7)
5. To clean thoroughly so that bacteria are destroyed. (page 7)
6. Chicken houses are called this. (page 6)
7. A young hen under 12 months old. (page 6)
8. The yellow part of the egg. (page 1, 4)
9. The size of the smallest chicken egg sold. (page 5)