

Eggs: A Practical Application

Summary

A knowledge of the chemical and physical nature of eggs and their role in food preparation.

Main Core Tie

Food And Nutrition

[Strand 4 Standard 2](#)

Background for Teachers

Exquisitely simple, yet enormously complex, the egg is one of nature's marvels. It is one of the most nutrient dense of foods and one of the most inexpensive food sources of complete protein.

PARTS OF THE EGG (See **COMPOSITION OF AN EGG** transparency in Resources). The chalazae (kuh-LAY-zuh) is a dense cord-like white strand made mostly of mucin. It is connected to each side of the yolk. It holds the yolk in the center of the egg.

The air cell at the large end of the egg is formed by the separation of the two shell membranes as the contents inside the shell shrink during cooling. The vitelline membrane separates the egg yolk from the egg white.

The egg shell is made of calcium carbonate crystals mixed with protein. The shell is a semipermeable membrane, which means air can pass through it. This allows the developing chick to get air, but it also allows bacteria through to the egg we eat. The shell is often a little rough or slightly bumpy. As an egg ages, the shell becomes smoother.

Egg whites are 15 protein. The egg white is often called the albumen because that is the main protein in egg white. Ovalbumin is 63 of the protein in egg white. It also contains the sulfur in the egg white. conalbumin is 12 of the protein in egg white. It has the ability to bind iron.

The white is divided into thick egg white and thin egg white. The fresher the egg, the more thick egg white there will be. As an egg ages, thick egg white breaks down and becomes thin egg white.

Ovomucin is a mucor protein that gives the egg white its jelly-like characteristic. Ovomucin is the protein that makes egg white thick. It coagulates slower than thin egg white. As an egg ages, the ovomucin breaks down and thick egg white turns into thin egg white. This protein does not coagulate when heated as quickly as other proteins. Because of this, the thin egg white will cook or set faster when heated.

The yolk is the yellow center part of the egg. It actually has more nutrients than the white. It is a good source of protein, iron, vitamin A, vitamin D, phosphorus, calcium, thiamine, and riboflavin. One large egg has 213 mg cholesterol. (See **NUTRIENT DENSITY OF AN EGG** transparency in Resources.)

The bloom is a thin film on the outside of the egg that helps seal the shell and helps keep bacteria out. The bloom is less effective if the egg has been washed. It is better not to wash the shell until just before using the egg.

The two inner and outer membranes separate the shell from the egg white. these are semipermeable membranes.

The germ spot is a light spot on the yolk. It is the sight where a chick would develop if the egg were fertilized and conditions were correct for the chick to grow. Occasionally you will find an egg that has a blood spot in it. This is a fertilized germ spot, but it does not affect the egg. It s still usable.

COOKING EGGS - AGED VS. FRESH EGGS Eggs need to be cooked using low temperatures because egg white is protein. Never boil an egg. Hard-and soft-cooked eggs should be cooked in hot water. To keep the shell from cracking because the air space in the end expands when heated, poke a pin hole in the large end of the egg before cooking it. Another thing you can do is put a little vinegar in the cooking water for hard- cooked eggs. If the shell cracks, the white will not leak out as much

because the vinegar is an acid and acid makes egg white protein coagulate faster. Always pour cold water over hard-cooked eggs as soon as the cooking time is up. This makes the egg easier to peel and helps keep the dark gray-green ring from forming on the outside of the yolk. High heat and a long cooking time increase the chance that a gray-green ring will form around the yolk because these two conditions let the sulfur in the white combine with the iron in the yolk to form ferrous sulfide or iron sulfide. This is a chemical reaction.

Intended Learning Outcomes

An in-depth study of eggs will help students understand the nature and versatility of eggs as a food source of protein and other nutrients and as an important ingredient in the preparation of other foods.

Instructional Procedures

See attachments below:

The students will complete a PREASSESSMENT quiz (not graded) to determine their practical knowledge of eggs as a food item.

The teacher will use an overhead and/or will break eggs into clear plastic or glass saucers to show students the different parts of an egg. The teacher can use transparency markers to highlight the part of the egg being discussed during the lesson. The teacher will explain the function or nutritional value of each item during the discussion.

During class discussion, the students will complete the first three sections of the [EGG STUDY GUIDE handout](#). The discussion should include:

- The identification of the parts of an egg and the function/s of each part.

- An explanation of the criteria used to size and grade eggs.

- The identification of the function/s of eggs in prepared foods. (See COMPOSITION OF AN EGG overhead transparency.)

The students will refer to and sketch the drawing of THE INS AND OUTS OF EGGS onto their EGG STUDY GUIDE and label the parts of the egg correctly. This sheet can be placed in the science notebook.

The teacher will lead a discussion about the nutritional contribution of eggs to the diet referring to the NUTRIENT DENSITY OF EGGS chart. The students will complete section IV of their [EGG STUDY GUIDE worksheet](#).

The students will perform a series of experiments showing the effect of heat on protein and the effect of different methods of cooling hard-cooked eggs.

The students will complete worksheet EXPERIMENTAL EGG COOKERY, answer observation questions, and summarize on a chart.

The students will perform a series of experiments showing the effects aging and incorrect preparation have on the characteristics of cooked eggs. This demonstration includes the characteristics of fresh eggs and aged eggs with respect to coagulation, appearance, and color.

The students will complete worksheet FRESH EGG AND AGED EGG EXPERIMENTS, answer observation questions, and summarize on a chart.

The students will participate in a game, JEOPARDY REVIEW GAME FOR EGG UNIT, to review the concepts discussed during the unit in order to prepare for the final quiz on the egg unit.

A copy of the review game, set up to work like Jeopardy, is included as resource. Use the chalk board to organize a game board. Write the title for each category across the top of the board. Write the number of points for each question for each category under the title. Divide the class into teams by unit. Ask the first unit to choose a category and an amount. Erase the number from the board. Ask the question, and have the unit give the answer.

Assign a unit member to keep score for the unit.

As a SUMMATIVE EVALUATION, the students will complete EGG UNIT TEST.

NOTE TO TEACHER: Correct the test in class. This will give one more opportunity to discuss the information with the class.

Authors

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