

Teacher's Guide

AG IN THE CLASSROOM—HELPING THE NEXT GENERATION UNDERSTAND THEIR CONNECTION TO AGRICULTURE

Colorado Egg Producers Association
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 www.coloradoegg.com

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Nebraska Ag in the Classroom
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The Incredible Egg: an activity book for grades 3-5

American Egg Board
The Incredible Edible Egg Web Site
<http://www.aeb.org/>

Other Reading:
The Nature and Science of Eggs
(Exploring the Science of Nature)
 by Jane Burton
 published by Gareth Stevens Publishing,
 1998
 Describes the purpose, parts, fertilization,
 development, and other aspects of eggs.
 Includes experiments and activities.

Chicken and Egg
 by Christine Back
 published by S. Burdett Co, 1986
 Photographs, drawings, and text on two
 different levels of difficulty follow the
 development of a chick embryo from the
 fertilization and laying of the egg to the
 time the chick hatches.

Comments, questions, suggestions and
 feedback about the Colorado Reader are welcome.
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In this issue...

Page 1-Vocabulary

Part of an Egg:

Shell - outer covering of an egg.
 Composed mainly of calcium
 carbonate. It takes longest in the
 egg-laying process to make the
 protective shell.

Germinal Disk - a slight depression
 on yolk surface where an embryo can
 begin to develop if the egg has been
 fertilized and kept warm.

Yolk - the yellow portion of an egg;
 it is the major source of an egg's
 vitamins, minerals, fat and contains
 about half of the protein.

Vitelline Membrane - the

membrane which surrounds the yolk.

Air Cell - pocket of air formed at
 large end of egg.

Thin Albumen - the egg white
 nearest to the shell.

Thick Albumen - egg white nearest
 the yolk.

Chalazae - twisted, cord-like strands
 of egg white which anchors yolk in
 center of egg.

Shell Membrane - there are two
 membranes inside the shell that
 surrounds the albumen; it's the barrier
 against bacteria. The air cell forms
 between the two membranes.

(continued on page 2)

Parts of an Egg

FACT:
 A hen lays
 an egg about
 every 28
 hours. How
 many hours
 is that more
 than a day?
4 hours

Alphabetize the parts of an egg:

<u>air cell</u>	<u>shell</u>	<u>thin albumen</u>
<u>chalazae</u>	<u>shell membranes</u>	<u>vitelline membrane</u>
<u>germinal disk</u>	<u>thick albumen</u>	<u>yolk</u>

(continued from page 1)

Page 2:

Tips on Food Safety – Storage:

- Refrigerate at 45° F or below (do not freeze)
- Store away from strong odors
- Rotate- first in/first out

Handling:

- Wash hands
- Use only clean, uncracked eggs
- Use clean, sanitized utensils and equipment

Preparation:

- Cook eggs thoroughly
- Keep cold egg dishes below 40° F
- Keep hot egg dishes about 140° F
- Never leave egg dishes at room temperature more than 1 hour

Page 3 Activity:

Have each student look in a dictionary for one of the vitamins and minerals listed. Ask them to share what they learn about their assigned word. There are 25 items on the list (27 if you count the words “vitamin” and “mineral”).

More Information about Nutrition

Eggs are among the most nutritious foods. An egg contains varying amounts of 13 vitamins plus many minerals. An egg yolk is one of the few foods which contain vitamin D, the sunshine vitamin. Eggs are low in calories with only about 75 in a large egg, yet high in protein. Egg protein is of such high quality that it is often used as the standard by which other protein is measured. Egg protein contains all the essential amino acids in a pattern that matches very closely the pattern the body needs. This is why eggs are classified with meat in the food groups and why egg protein is called complete protein.

A moderate amount of fat, about 5 grams, is found in a large egg yolk (about 2 grams saturated fat and 3 grams unsaturated fat).

One large egg contains 213 mg of Cholesterol. Cholesterol is a fat-like substance found in every living cell in the body. It is made in necessary amounts by the body and is stored in the body. It is especially concentrated in the liver, kidney, adrenal glands and brain. Cholesterol is required for the structure of cell walls, must be available for the body to produce vitamin D, is essential to the production of digestive juices, insulated nerve fibers and is the basic building block for many hormones. Cholesterol is essential for life.

History:

Both eggs and birds have been around longer than historians. Nobody really knows when the first fowl was

domesticated although Indian history places the date as early as 3200 B.C. Egyptian and Chinese records show that domestic birds were laying eggs for man in 1400 B.C. The dependability of the rooster's early morning call and the regularity with which newly-laid eggs appeared probably inspired the Chinese to describe fowls as “the domestic animal who knows time.”

It is believed that Columbus' ships carried the first of the chickens related to those now in egg production to this country. These strains originated in Asia.

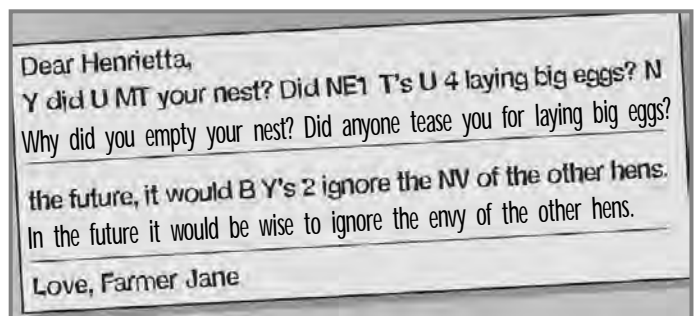
Once in a blue moon...

Occasionally “blood spots” or “meat spots” are found on an egg yolk. These tiny spots do not indicate a fertile egg. Rather, 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. Less than 1 percent of all eggs produced have blood spots.

Mass candling methods reveal most eggs with blood spots and those eggs are removed but, even with electronic spotters, it is impossible to catch all of them. As an egg ages, the yolk takes up water from the albumen to dilute the blood spot so, in actuality, a blood spot indicates that the egg is fresh. Both chemically and nutritionally, these eggs are fit to eat. The spot can be removed with the tip of a knife, if you wish.

Research: Where does the phrase “once in a blue moon” come from? What does it mean?

Page 3: Answer



Page 4:

A chicken is a bird:

One of the features that differentiate chickens from most other birds is the comb and two wattles that chickens have. The comb is the red appendage on the top of the head. The wattles are the two appendages under the beak. A few other birds have a comb or similar appendage and a few have wattles.

The chicken has two legs and two wings, a fact that influences housing and management. Domestic chickens have essentially lost the ability to fly. Heavy breeds used for meat production cannot do more than flap their wings and jump to a little higher level or move rapidly

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 page 1.

shell	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.
yolk	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.
vitelline membrane	Twisted, cord-like strands of egg white that hold the yolk in the center of the egg; its presence indicates the egg is fresh.
chalazae	Clear seal which holds the egg yolk.
air cell	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!)
membrane	The white part of the egg nearest to the shell.
thin albumen	This white part is the major source of an egg's riboflavin and protein, stands higher and spreads less than thin white.
thick albumen	Two, an inner and an outer, surround the albumen; provide a protective barrier against bacterial entry; the air cell forms between them.

and roosters do not mate.

A young chick is very small when it hatches. After eight weeks it has grown quite large and weighs about 3-1/2 pounds. These eight-week-old chickens, called broilers or fryers, are the ones we usually eat.

So what does a chicken eat?

Corn, barley, brewer's grain, soybean, limestone, vitamins and minerals are raised for chicken feed. These natural ingredients are grown

along the ground. The lighter-bodied birds can fly short distances, and some can fly over relatively high fences. The feet and shank portions of the legs have scales. The chicken, as do other birds, have a beak (or bill). Chickens, also like other birds, do not have teeth.

and harvested, then trucked to feed mills. The feed mills will create a computer-generated feed formula containing 10 to 20 percent protein. This amount of protein will allow the hen to lay high quality eggs. Healthy hens produce an egg a minimum of every
(continued on page 4)

Life cycle of chickens

The chicken life cycle has three stages: egg, chick and adult (hen or rooster). The hen lays eggs. We use almost all of the eggs a hen lays for our food. If farmers want to raise chicks, they will mate hens and roosters to get fertilized eggs. Fertilized eggs are used to produce chicks. Hens will lay eggs whether or not they have mated with a rooster. Unfertilized eggs result when hens

Page 5 Answers

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

Number of eggs	Jumbo	Extra Large	Large	Medium	Small	Peewee
1	2.5	2.25	2	1.75	1.5	1.25
2	5	4.5	4	3.5	3	2.5
3	7.5	6.75	6	5.25	4.5	3.75
4	10	9.0	8	7	6	5
5	12.5	11.25	10	8.75	7.5	6.25
6	15	13.5	12	10.5	9	7.5

Hint: Dividing by 12 will give you the weight of one egg.

Callout 1:
You need 3 jumbo eggs for your brownie recipe. How many ounces do you need?
7.5 oz.
Oops. No jumbo eggs in the refrigerator. All you have is peewee eggs. How many peewee eggs do you need to use?
6 peewee

Callout 2:
How many ounces of eggs do you have if you have 3 dozen peewee eggs?
45 oz.
How many pounds and ounces of eggs do you have?
2 lbs. 13 oz.

Callout 3:
How many ounces of eggs do you have if you have a half dozen jumbo eggs?
15 oz.
How many peewee eggs equal this same amount of jumbo eggs?
1 dozen

(continued from page 3)

25 hours.

The U.S.D.A. (United States Department of Agriculture) determines egg standards (GRADES) for interior and exterior quality. The most common grades are AA and A. Eggs graded AA will have yolks and albumens that stand taller and firmer than those graded A. However, both grades AA and A have the same nutritional value.

Newspaper Activities:

The metaphorical egg: Discuss the definition of these two expressions derived from the word "egg": "EGG ON YOUR FACE" and "EGGHEAD". Find 3 examples in articles, photos, comics, or ads- of these expressions in today's paper.

Protein sources: Review the examples of protein sources on page 3 of the reader. As a class, come up with three additional sources. Find mention of any of these examples in today's paper.

Cholesterol versus Fat: Review page 7 of the reader, then look in today's newspaper for any articles or ads that mention this issue. Don't forget the comics. Compare the information in the paper with that in the reader.

Activity:

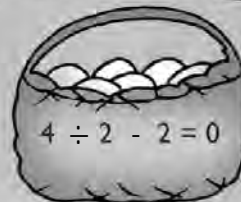
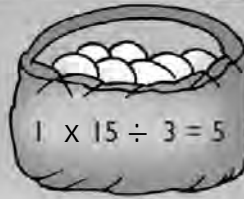
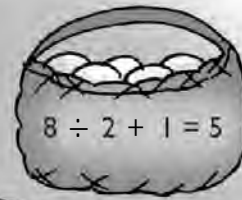
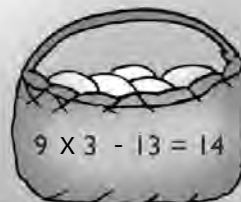
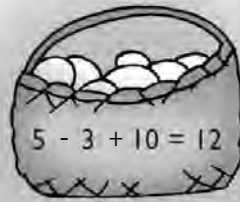
Bring a cookbook to class. Have students name food or food dishes (preferably something they ate recently, i.e. cake, French toast, mayonnaise, marshmallows, omelettes, etc.). Look up the recipes to see how many items contain eggs.

FUN FACT

Egg Fact: Proportionally an egg is 11% shell; 58% albumen (white); and 31% yolk (yellow).

Page 8 Answers

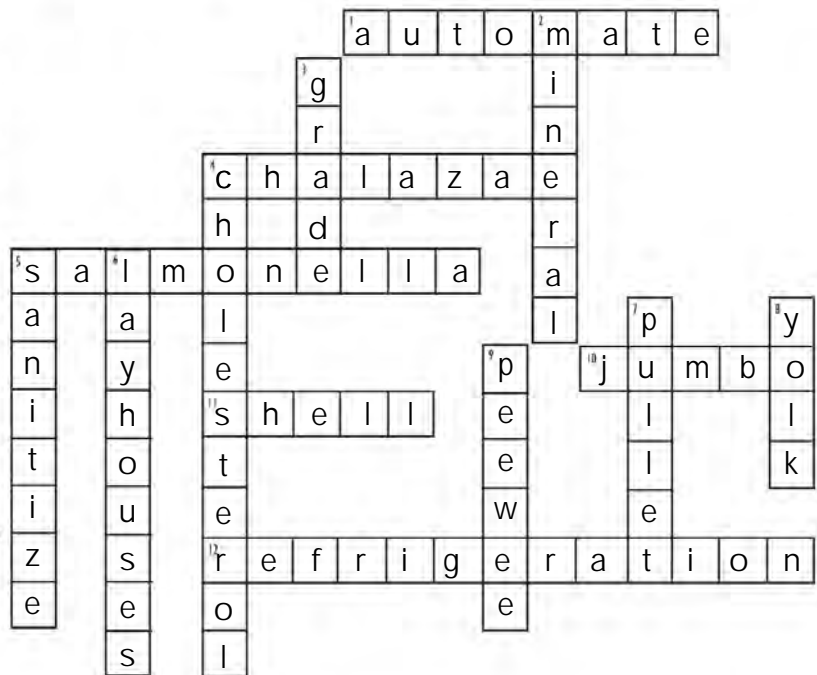
Each of the baskets below contains numbers. Use +, -, x, or ÷ between each number to get the correct answer.



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 homes are called this. (page 6)
- 7. A young hen under five 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)