

Lesson One

The Inside Story

Subject Area

Science/ Language Arts

Objective

Identify and name the parts and functions of an egg

4-H Life Skills

Learning to Learn, Leading Self and Others, Relating to Others,
Communicating with Others

Suggested Grade Level

4–5

Background

Vocabulary

1. **Shell**—The outside protective layer of the egg. Most chickens lay eggs with brown shells. But some shells may be white or other colors, depending upon the breed of hen. We think of chickens laying white eggs because that is what we see in the market. Shell color does not affect the nutritional value, quality, or flavor of eggs. There are tiny pores, or holes, in the shell. These holes allow gasses and moisture to get in and out of the egg.
2. **Shell Membranes**—There are two thin membranes inside the shell, the inner and outer shell membranes. These generally adhere, or stick, to the inside of the shell when a raw egg is cracked open. In addition to the shell, these membranes cover and protect the developing embryo until hatching time.
3. **Air Cell**—The air cell is usually found at the large end of an egg, between the inner and outer shell membranes. Look inside the shell of a raw egg; the shell membranes trap air against the shell. As eggs age, the air cell enlarges because moisture is escaping through the pores in the shell and is replaced by air. This is why fresh eggs sink while older eggs float when put in water.
4. **Albumen**—The clear white of an egg that makes up over half of the egg's weight. This semi-solid material is mostly water and protein, and is found in four layers: inner thick, inner thin, outer thick, outer thin. A very fresh egg has lots of thick albumen and will remain firm. Variations in storage temperature and aging can cause the albumen to thin. The albumen provides food and water for the growing embryo.
5. **Chalazae** (kuh-LAY-zee)—The thick strands of inner thick albumen at each end of the yolk. These strands anchor the yolk in the center of the egg to keep it from touching the shell. They also serve as a rotating axis to keep the germ cell (developing embryo) on the top of the yolk next to the heat of the hen's body. Often the chalazae are more prominent in fresh, high-quality eggs.
6. **Yolk**—The yellow of the egg that comprises about one-third of the egg's weight. Yolks can vary in color from light to dark yellow due to the hen's diet; however, all are equally nutritious. The yolk is the first part of the egg that is formed inside the hen. There is a membrane covering the yolk that may break when cracking an egg. The yolk provides food for the growing embryo.

- 7. Germ (Blastodisk)**—The white spot on the yolk where an embryo can begin to develop if the egg has been fertilized and incubated.
- 8. U.S.D.A.**—The United States Department of Agriculture, which determines the standards for grading eggs. The most common grades are AA and A, with B and Inedible less common. Eggs graded AA will have yolks and albumens that stand taller and firmer than those graded A. B-graded eggs have many problems with the shell or contents. Inedible grades have large blood spots. However, all grades have the same nutritional value.

Facts About Eggs

Hens that have been mated to a rooster lay mostly fertilized eggs. This is the way chickens reproduce. Inside each fertilized egg is an embryo that will grow to be a chick. The yolk and albumen of the egg provide food for the growing embryo. The albumen, or white of the egg, also provides the embryo with protection against shock, because it's like a watery sac. The blunt end of the egg contains the air cell. Just before the embryo breaks out of its shell, it takes its first breath of air from this air cell.

Hens that have not been mated to a rooster will still lay eggs. Because these eggs have not been fertilized, they will not hatch. Eggs sold in the grocery store are nearly always infertile.

Materials

1. Chicken eggs
2. Worksheets A, B, C, D, E, and F
3. Transparency A
4. Raw egg in a shell
5. Tin or black pie plate

Procedure

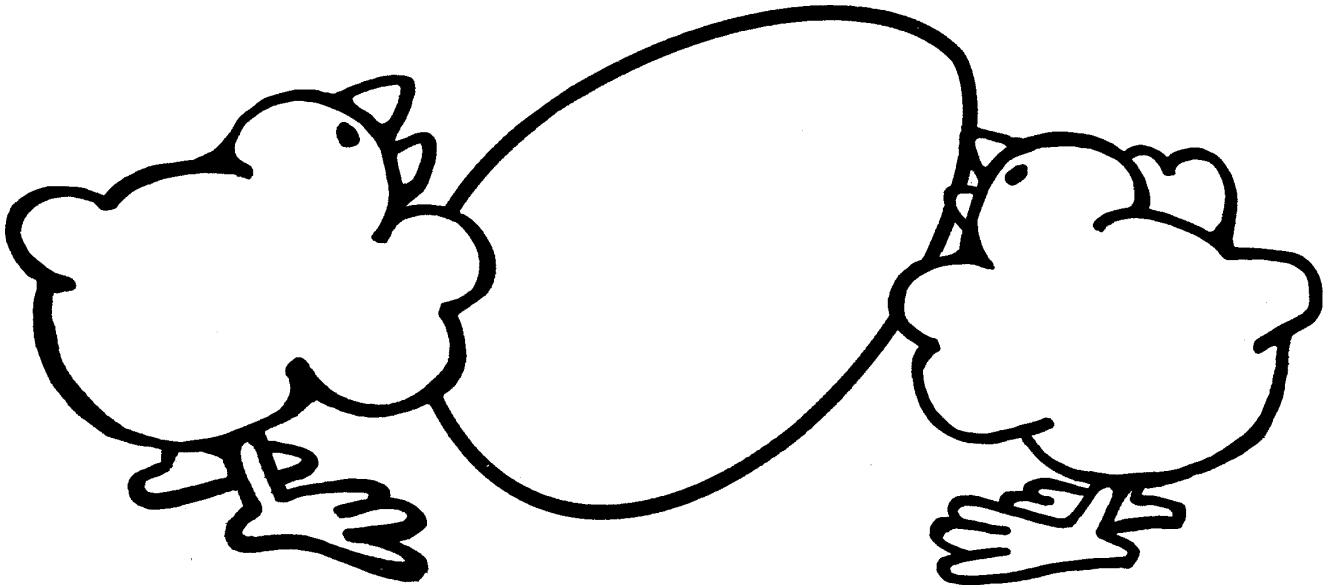
1. Crack the raw egg into a pie tin and place the two shell halves beside it.
2. Have students try to identify parts of the egg and shell. At this time do not identify the parts for the students.
3. To introduce the parts of an egg, label and discuss these parts and functions on Transparency A. Have the students complete Worksheet A with you.
4. Have students look at the raw egg and shell again. See if any students can now identify the learned parts. Look for the air cell, yolk, and membranes.
5. Have students identify, locate, and describe each part of the raw egg on Worksheet A.
6. Have students complete Worksheet B together.
7. Check Worksheet B together.
8. Duplicate Worksheets C and D on heavy paper. Cut out, shuffle, and distribute the eggs, one per student. If a student receives an egg shape with a definition, he/she needs to match with the student who has the egg shape with the term.

If a student has a term, he or she needs to find the matching definition. Give the students a certain amount of time to find their partners without talking. Have them use body and eye signals. When students match they are to stand by each other and raise their hands. If more than 16 are playing, duplicate more eggs or play in two shifts.

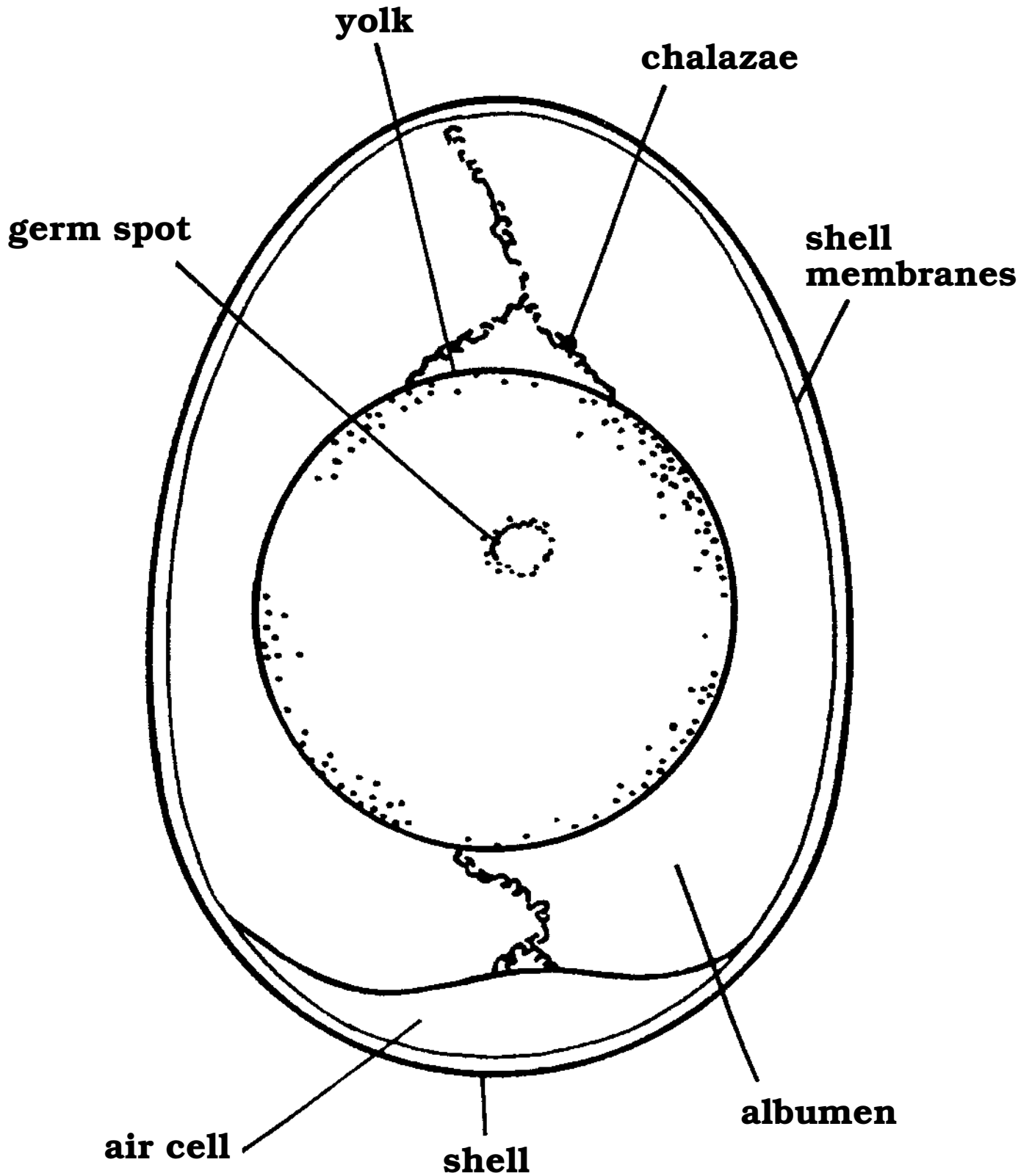
9. Have students complete Worksheet E.

Eggstra Activities

- Have the students complete Worksheet F.

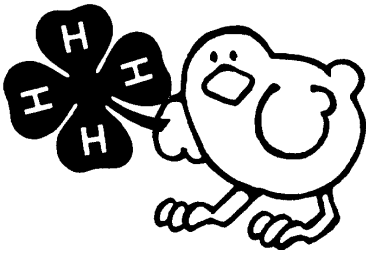


The Parts of an Egg



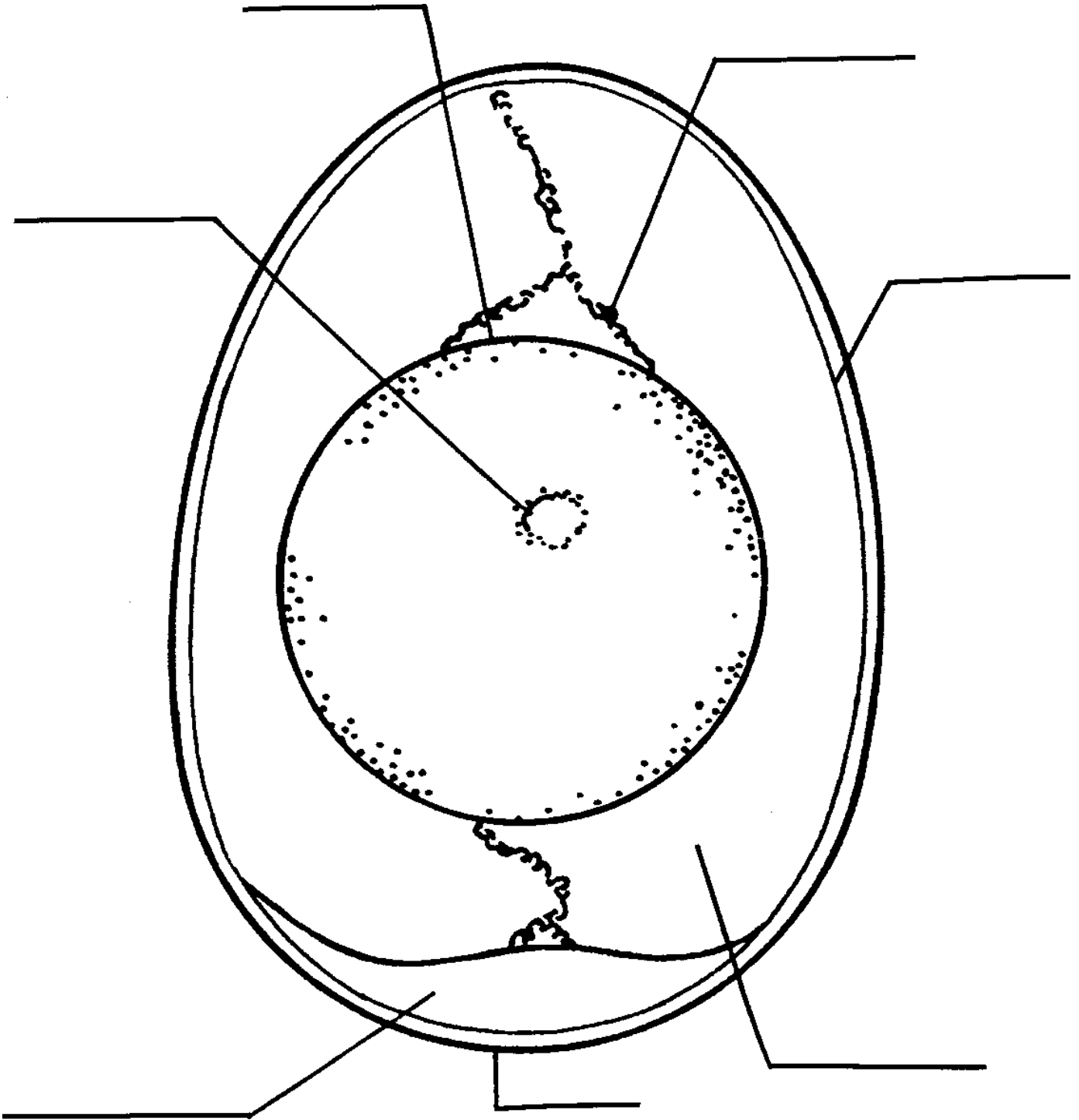
Transparency A

Adapted from *Copycat*



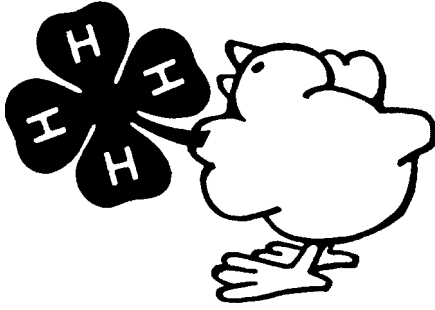
The Parts of an Egg

Name _____



Adapted from *Copycat*





Embryology Terminology

Name _____

Match the terms to the definitions by writing the correct letter in each egg shell.



Air Cell



Albumen



Chalazae



Shell



Yolk



Shell Membranes



Germ Spot



USDA



A and AA

- A.** The white of an egg. This watery substance supplies the growing embryo with food and water.
- B.** The hard protective outer covering of an egg. This has tiny pores in it to allow the passage of gas and moisture in and out of the egg.
- C.** The abbreviation for the United States Department of Agriculture.
- D.** The twisted cords at each end of the yolk. These keep the yolk from moving about and sticking to the shell.
- E.** The yellow of the egg. This is the first food source for the growing embryo.
- F.** The pocket of air at the large end of the egg.
- G.** Two common grades for eggs given by the USDA.
- H.** The “white spot” on the yolk where the embryo develops.
- I.** The two thin layers inside of the egg shell.



Embryology Terminology

Name ANSWER KEY

Match the terms to the definitions by writing the correct letter in each egg shell.

M F

Air Cell

M A

Albumen

M D

Chalazae

M B

Shell

M E

Yolk

M I

Shell Membranes

M H

Germ Spot

M C

USDA

M G

A and AA

A. The white of an egg. This watery substance supplies the growing embryo with food and water.

B. The hard protective outer covering of an egg. This has tiny pores in it to allow the passage of gas and moisture in and out of the egg.

C. The abbreviation for the United States Department of Agriculture.

D. The twisted cords at each end of the yolk. These keep the yolk from moving about and sticking to the shell.

E. The yellow of the egg. This is the first food source for the growing embryo.

F. The pocket of air at the large end of the egg.

G. Two common grades for eggs given by the USDA.

H. The “white spot” on the yolk where the embryo develops.

I. The two thin layers inside of the egg shell.

M B

Air Cell

USDA

Albumen

Germ Spot

Chalazae

**Shell
Membranes**

Shell

Yolk

The pocket of air in the wide part of the egg.

The watery semi-solid white of an egg. It provides the developing embryo with food and water.

The “white spot” on a yolk. If the egg is fertilized and kept warm then the embryo will begin to develop from this spot.

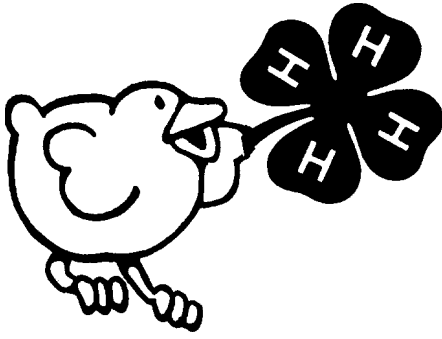
The hard protective covering of the egg. This has many tiny pores that allow air and moisture to pass in and out of the egg.

The twisted strands (cords) of albumen at each end of the yolk. These anchor the yolk in the center of the shell.

The thin layers inside the shell.

The abbreviation for United States Department of Agriculture.

The yellow of an egg. This is the primary source of food for a growing embryo.



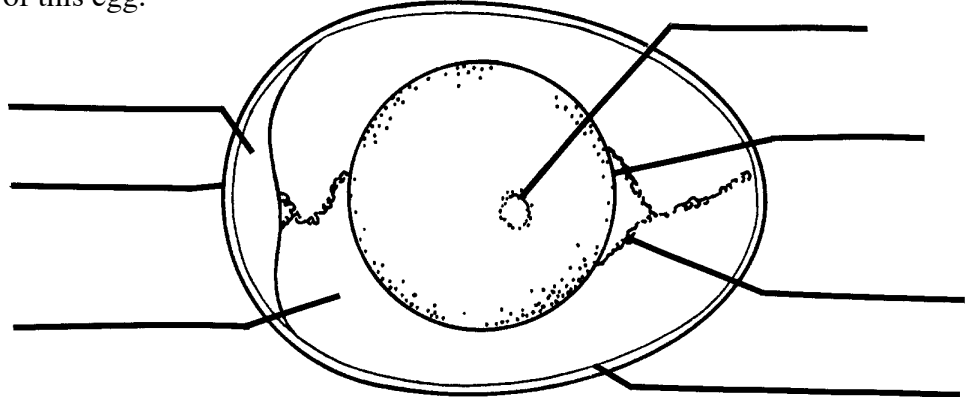
Embryology

Name _____

Eggsactly how much do you remember about eggs?

Use these terms to fill in the parts of this egg.

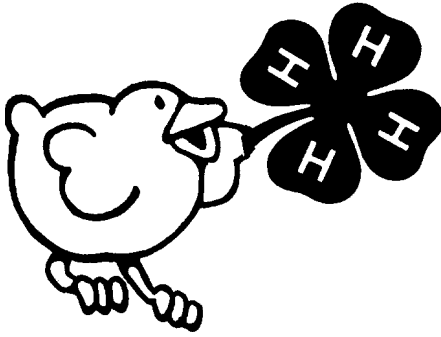
Shell Membranes
Germ Spot
Albumen
Chalazae
Shell
Yolk
Air Cell



Now fill in the words from this box to make the sentences correct.

Yolk	Germ Spot	Pores	Albumen
Shells	Chalazae	Inedible	AA A B
Air	Membranes	USDA	Moisture

1. The yellow of an egg is called the _____.
2. The _____ is usually called the white of an egg.
3. The _____ on the yolk is where an embryo develops.
4. Most chicken breeds lay eggs with brown _____.
5. At each end of the yolk are _____, cords that keep the yolk from sticking to the shell.
6. Egg grades are established by the _____. Grades used for eggs are _____, _____, _____, and _____.
7. The egg shell has many tiny _____ in it to let air and _____ pass through the shell.



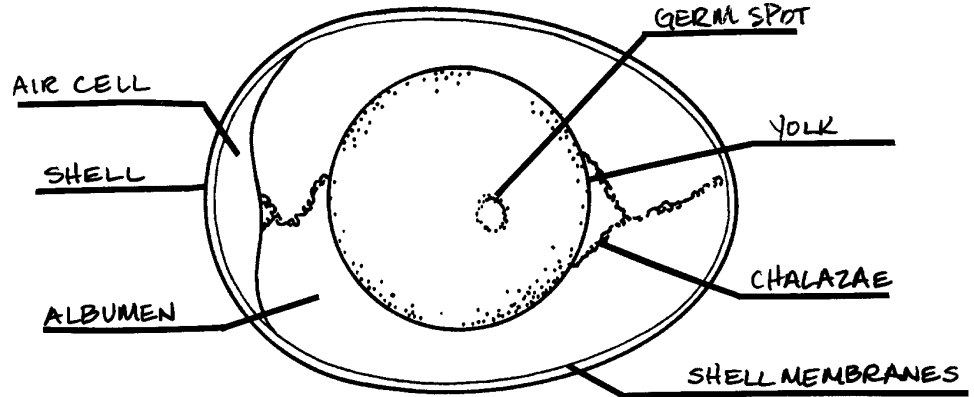
Embryology

Name ANSWER KEY

Eggsactly how much do you remember about eggs?

Use these terms to fill in the parts of this egg.

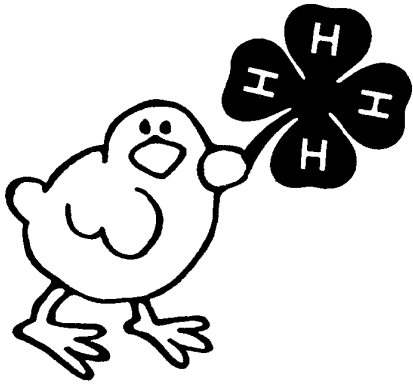
Shell Membranes
Germ Spot
Albumen
Chalazae
Shell
Yolk
Air Cell



Now fill in the words from this box to make the sentences correct.

Yolk	Germ Spot	Pores	Albumen
Shells	Chalazae	Inedible	AA A B
Air	Membranes	USDA	Moisture

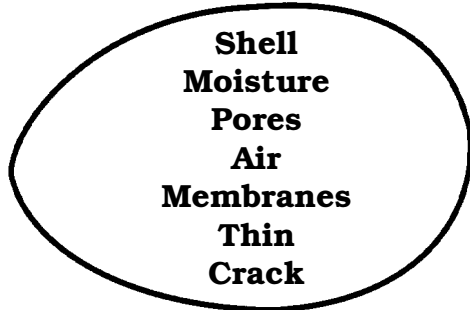
- The yellow of an egg is called the YOLK.
- The ALBUMEN is usually called the white of an egg.
- The GERM SPOT on the yolk is where an embryo develops.
- Most chicken breeds lay eggs with brown SHELLS.
- At each end of the yolk are CHALAZAE, cords that keep the yolk from sticking to the shell.
- Egg grades are established by the USDA. Grades used for eggs are AA, A, B, and INEDIBLE.
- The egg shell has many tiny PORES in it to let air and MOISTURE pass through the shell.



Alphabetical Order

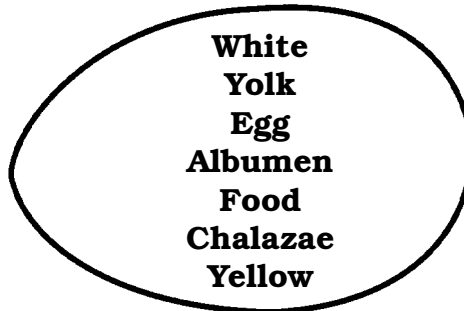
Name _____

Put each group of words in alphabetical order.

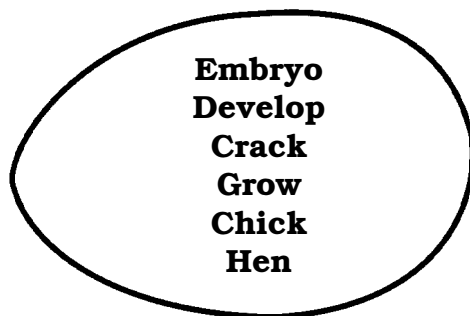


1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

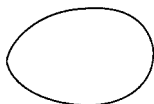
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____



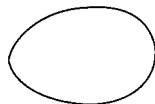
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____



Draw a crack in the egg shell if the words are in alphabetical order.



Challenge
Chalk
Chalazae



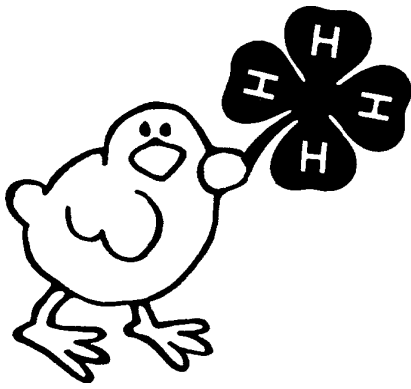
She
Shelf
Shell



Albumen
Along
Already



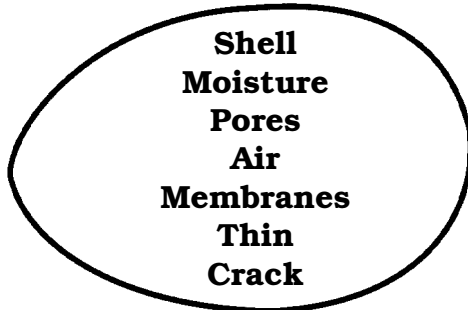
Memory
Membranes
Member



Alphabetical Order

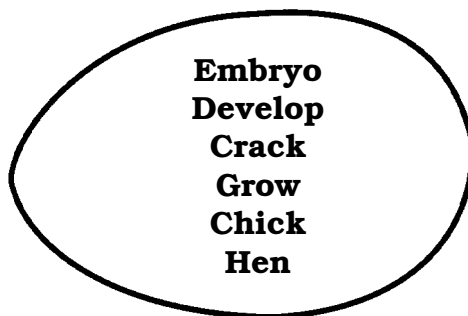
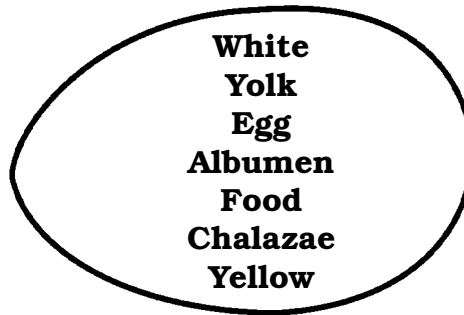
Name ANSWER KEY

Put each group of words in alphabetical order.



1. AIR _____
2. CRACK _____
3. MEMBRANES _____
4. MOISTURE _____
5. PORES _____
6. SHELL _____
7. THIN _____

1. ALBUMEN _____
2. CHALAZAE _____
3. EGG _____
4. FOOD _____
5. WHITE _____
6. YELLOW _____
7. YOLK _____



1. CHICK _____
2. CRACK _____
3. DEVELOP _____
4. EMBRYO _____
5. GROW _____
6. HEN _____

Draw a crack in the egg shell if the words are in alphabetical order.



Challenge
Chalk
Chalazae



She
Shelf
Shell



Albumen
Along
Already



Memory
Membranes
Member