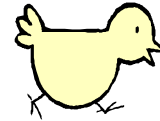


# From an Egg -----to a Chick



## Objectives

1. Students will learn the parts of the egg.
2. Students will learn the changes that occur in the development of a chick.

## Grade Level

1-3

4-6

## TEKS:

R- 1.1B,D,E;1.11A,B;1.17G;1.21B  
 R- 2.1B,D,E;2.7B;2.8A,B;2.10B;2.12D,E;  
 2.15C;2.17B  
 R- 3.1B,D,E;3.7B;3.8A;3.17C  
 S- 1.5A;1.6A,B;1.9A,B  
 S- 2.5A; 2.9A,B  
 S- 3.1A; 3.2A-E;3.9A  
 SS- 1.9A,B;1.18B  
 SS- 2.8A,C;2.10A,C;2.17C,D,E;2.18B  
 SS- 3.6A,3.16C,D,E,F

R- 4.10K;4.16B  
 R- 5.9A,E;5.10K;5.13C,D,E;5.16B;  
 5.21C  
 R- 6.9A,E;6.10K;6.13C,D,E;6.16B;  
 6.20C,D  
 S- 4.1A; 4.2A-E;4.8A,  
 S- 5.1A; 5.2A-E;5.9A;  
 SS- 4.6B;4.9B;4.13A,B;4.14B;4.22C  
 SS- 5.25C  
 SS- 6.21A,C

## TAKS:

### GRADE

### OBJECTIVES

Reading	3, 4, 5, 6	1, 4
Writing	4	2
Science	5	1, 2
Math	1, 2, 3, 4, 5, 6	2, 4

## Assessment Summary:

- Objective 1: Students will fill in the blanks on "Parts of an Egg" diagram.
- Objective 2: Students will write descriptive sentences or paragraphs after observing outer and inner parts of an egg.

## Background

Information: Included in Lesson

Materials: Eggs from grocery store  
 Fertile eggs  
 (County Extension Agent has  
 access to equipment, supplies and  
 instructions for incubating eggs)

paper plates  
 toothpicks  
 moist towelettes

Equipment: Hand lenses, Incubator

# From an Egg ---- to a Chick

## Procedure

### 1. Introduce new vocabulary:

#### Grades 1-3

Embryo	Albumen
Shell	Yolk
Air Cell	Chalazae

#### Grades 4-6

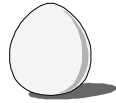
Membranes	Clutch
Fertilize	Pipping
Germinal disc	

## Activities

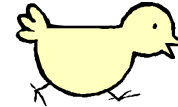
2. Make a memory game with the vocabulary words and their definitions. Use each word in a sentence.
3. Complete "Egg to Chick Punctuation."
4. Complete "The Parts of an Egg" by reading and answering the questions.
5. Obtain fertile eggs and hatch chicks in an incubator. Incubating eggs adds much to the students' experiences in this lesson. Your county Extension Agent has a portable incubator and access to fertilized eggs for use in the classroom and instructions.
6. In groups of two, have students observe outside of grocery store egg using hand lenses. Pairs of students crack egg into paper plate and observe inside parts of egg. Compare them to "Examining the Parts of an Egg" resource sheet. Have students write descriptive sentences or paragraphs about their observations.  
  
Fill in the names in the blanks on "Parts of an Egg" diagram. Use advanced "Parts of an Egg" diagram for older students or as an extension activity.
7. Go to the website <http://ag.ansc.purdue.edu/poultry/clipart.htm#Eggs> and have students examine the stages of embryo development. Compare the pictures on the website with the diagrams in "Changes in Development of the Chick Embryo" and determine as closely as possible the number of days of development.
8. Perform experiment "More White or More Yolk."

## Embryology Websites of Interest

<http://ag.ansc.purdue.edu/poultry/clipart.htm#Eggs>  
[www.ext.vt.edu/resources/4h/virtualfarm](http://www.ext.vt.edu/resources/4h/virtualfarm)  
<http://poultryweb.tamu.edu>

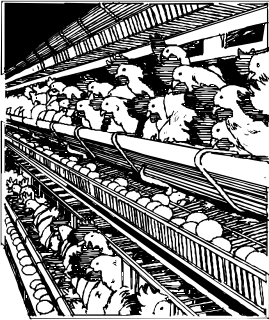


## From an Egg----to a Chick



Many people wonder how and why eggs develop into chicks. You might wonder why eggs from the supermarket don't grow and hatch when incubated. The male chicken or rooster makes the difference.

The rooster must be present for an egg to be fertilized. Most eggs that you buy at the supermarket are from hens that are raised without a rooster being present. Roosters are not necessary at egg farms where eggs are produced for consumption. Eggs for incubation are grown at special farms called breeder farms where roosters are present with the hens.



Looking at the egg from the outside we see the shell, which is a hard, protective covering made of calcium carbonate. The shell is porous. (There are about 7,000 pores in a chicken eggshell.) This allows the transfer of gases through the shell. Carbon dioxide and moisture are given off through the pores and are replaced by atmospheric gases, including oxygen.

Immediately beneath the shell are two membranes, the outer and inner shell membranes. These membranes protect the contents of the egg from bacteria and prevent moisture from leaving the egg too quickly.

Because the body temperature of a hen is approximately 106° F, eggs are very warm at the time they are laid. The temperature of the air is usually much lower than 106° F, and the egg cools to the temperature of its surroundings. As cooling takes place, the contents of the egg contract more than does the shell of the egg. This creates a vacuum and air is drawn through the pores of the egg.

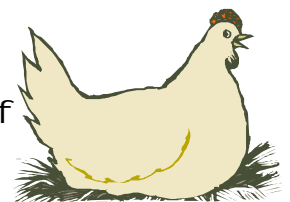
As a result, an air cell forms at the large end of the egg. While the embryo is growing, the shell membranes surround and contain the white or albumen of the egg. The albumen provides the liquid medium in which the embryo develops, and it also contains a large amount of the protein necessary for proper development.

In a fresh egg, we can see white cords attached to the yolk sac. These two cords, called chalazae, are made of twisted strands of mucin fibers that are a special form of protein. The chalazae hold the yolk in the center of the egg.

The yolk is the source of food for the embryo and contains all the fat in the egg. The small white spot on the yolk is called the germinal disc. The germinal disc is where the female's genetic material is found. When an egg is fertilized the germinal disc divides and develops into an embryo.

### Naturally

In nature, the female bird selects the nest site and lays a clutch of eggs (usually 8 to 13 eggs), one egg per day. Once she has a clutch of eggs, she begins sitting on the eggs full time, leaving only for food and water.



The hen's body temperature is 105° F to 106° F. When the hen sits on the eggs, she heats the eggs to 100° F to 101° F. The hen turns the eggs on a regular basis by using her beak to scoop under the egg and roll it toward her. The humidity comes from the environment, the hen's body, and any moisture she transfers back to the nest on her feathers. Brooding hens often leave their nests to feed at dawn or dusk when the dew is present on the grass.

The development of the chick begins in the single cell formed by the union of two parental cells, egg and sperm, in the process known as **fertilization**. In birds, fertilization occurs about 24 hours before the egg is laid.

The newly formed single cell begins to divide into 2, then 4, 8, 16, 32 and so on. At the time of laying, hundreds of cells are grouped in a small, whitish spot (the germinal disc) that is easily seen on the surface of the yolk.

When the egg is laid and cools, division of the cells ceases. After the egg is laid, cooling the egg does not result in the death of the embryo. It may resume its development after several days of rest if it is again heated by the hen or in an incubator.

### Functions of the Embryonic Membranes

Special temporary organs or embryonic membranes form within the egg, both to protect the embryo and to provide for its nutrition, respiration, and excretion. These organs include the yolk sac, amnion, and allantois.

The yolk sac supplies food material to the embryo. The **amnion**, by enclosing the embryo, provides protection. The **allantois** serves as a respiratory organ, gets minerals from the shell, and handles waste. These temporary organs function within the egg until the time of hatching.



### Hatching

Several changes take place during the 18th and 21st days. The chick draws what remains of the yolk into its body and gets plenty of nourishment from it. Thus, the chick really doesn't need to be fed for a few days after it hatches.

The chick's head is under its right wing with the tip of the beak pointed at the air shell. The large neck muscle contracts and forces the **egg tooth** through the air cell, and the chick takes its first breath. This is referred to as **internal pipping**. At this time, you may hear the chick peeping inside the shell.

On the twenty-first day of incubation the chick finishes its escape from the shell. The egg tooth makes the initial break in the shell. This is referred to as **external pipping**.

The hatching process can last from 4 to 12 hours before the chick breaks free from the shell. The chick, upon freeing itself from the shell, is wet and very tired. For the next several hours it will lie still and rest. A few hours later the chick, now dry and fluffy, will become extremely active and the egg tooth will dry and fall off.

### Activity 3

## EGG TO CHICK PUNCTUATION

Put a capital letter and the correct end mark on each sentence.



1. the yolk is the yellow part of an egg
2. what is another name for the white part of an egg
3. wow, the chalazae is a neat part of the egg
4. the embryo is the baby chick before it is born
5. look at the baby chick hatching
6. the egg cell is the white spot on the egg
7. the chick grows from the egg cell
8. the chalazae are white twisted cords that hold the yolk in place
9. how long does it take for a baby chick to develop inside the egg
10. it takes 21 days for a baby chick to develop inside the egg

## Activity 4

# The Parts of an Egg

The egg has four basic parts, the shell, the air space, the albumen and the yolk.

The shell of the egg is the protective covering. It is porous, or has very tiny openings which cannot be seen by the eye. The shell is cracked opened when a baby chick hatches. Egg shells are not usually eaten by humans. The shells can be used in composting to make soil rich.

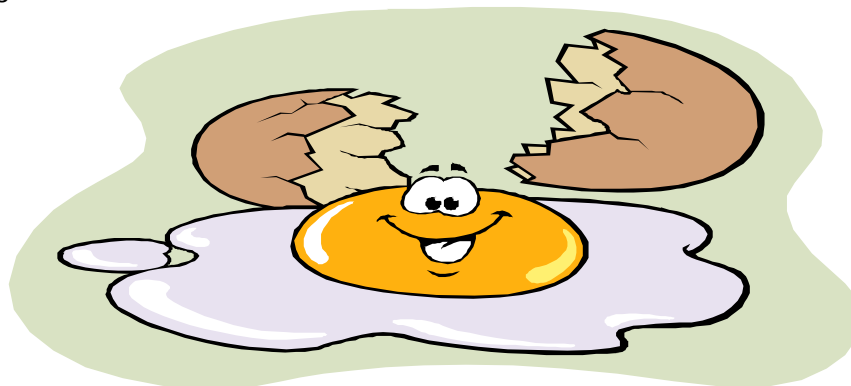
The air space is a small pocket of air in the large end of the egg between the shell and the albumen. It serves as a cushion for the baby chick or embryo.

The yolk of the egg is what we call the yellow part. The yolk has a small white spot on it called the egg cell or germinal disc. This is the part of the egg from which the baby chick develops. The yolk provides food for the baby chick while it is growing in the shell.

The albumen is the thick clear substance surrounding the yolk. It is also called the egg white. Small white strands of material are found in the albumen. These strands are called chalazae. They help suspend the yolk in the center of the shell.

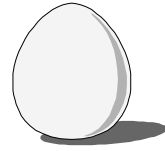
When we buy eggs at the grocery store they are usually infertile. This means baby chicks will not develop inside them and hatch.

The poultry producer must keep close watch on his chickens to be certain they are free from disease and are producing healthy eggs and chicks. If the eggs are to hatch baby chicks, the poultry producer will follow the laying and hatching process closely. He will depend on the workers in the poultry farm to monitor the hens, making sure the hens are comfortable, well fed, free from disease, and safe from animals which can harm or kill the hens. Other workers who might assist the poultry producer are the veterinarian, county extension agents, and poultry producer organizations.



## Activity 4

### THE PARTS OF AN EGG



1.-4. What are the 4 main parts of an egg?

\_\_\_\_\_

5. Which part is the food for the unborn chick? \_\_\_\_\_

6. The \_\_\_\_\_ is the white spot on the yolk that grows into a chick.

7. The \_\_\_\_\_ hold the yolk in place.

8. What is the function of the air space? \_\_\_\_\_  
\_\_\_\_\_

9. In this passage, infertile means \_\_\_\_\_.

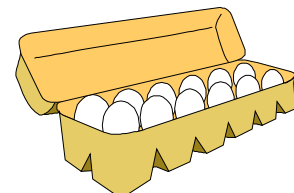
☐ an egg will develop into a baby chick

☐ an egg will not develop into a baby chick

10. The eggs at the grocery store are usually infertile.

☐ true

☐ false



## Activity 6

# Examining the Parts of an Egg

We have all cracked a raw egg and felt its sticky white part. We have all seen the yellow part of a boiled or fried egg. We may have even ordered our eggs fried sunny side up with the yolk cooked very slightly.

Let's take a look at an egg and identify the parts.

Before cracking the egg notice the tiny openings or pores in the shell. These pores allow air and moisture to pass through the shell.

Crack the shell and gently empty the contents on to a paper plate. Use the diagram to find and identify the parts of the egg.

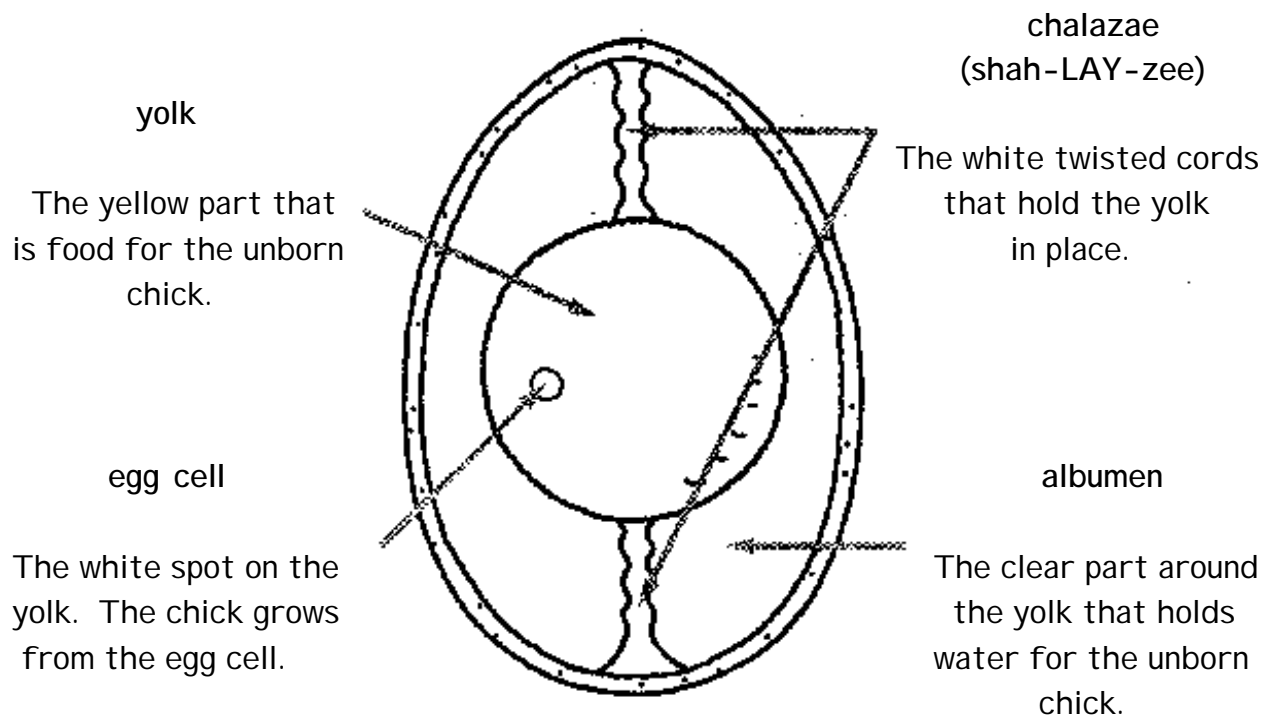


Diagram adapted from [www.kidfarm.net](http://www.kidfarm.net)



## Activity 6

# Parts of an Egg

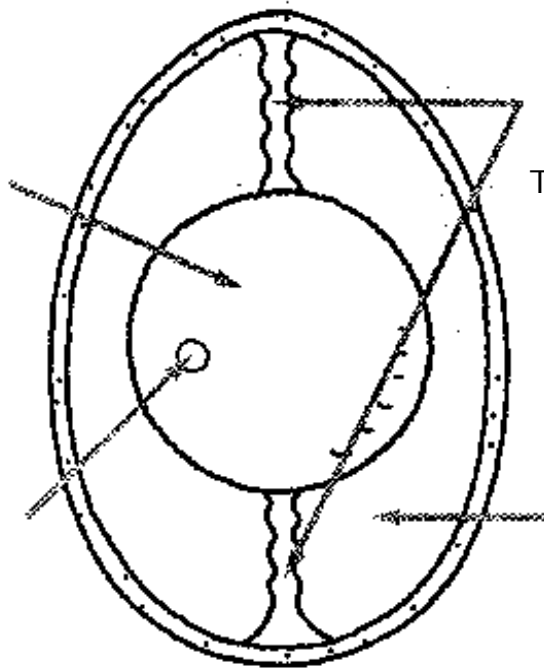
Fill in the blanks with the correct name.

\_\_\_\_\_

The yellow part that is food for the unborn chick.

\_\_\_\_\_

The white spot on the yolk. The chick grows from the egg cell.



\_\_\_\_\_

The white twisted cords that hold the yolk in place.

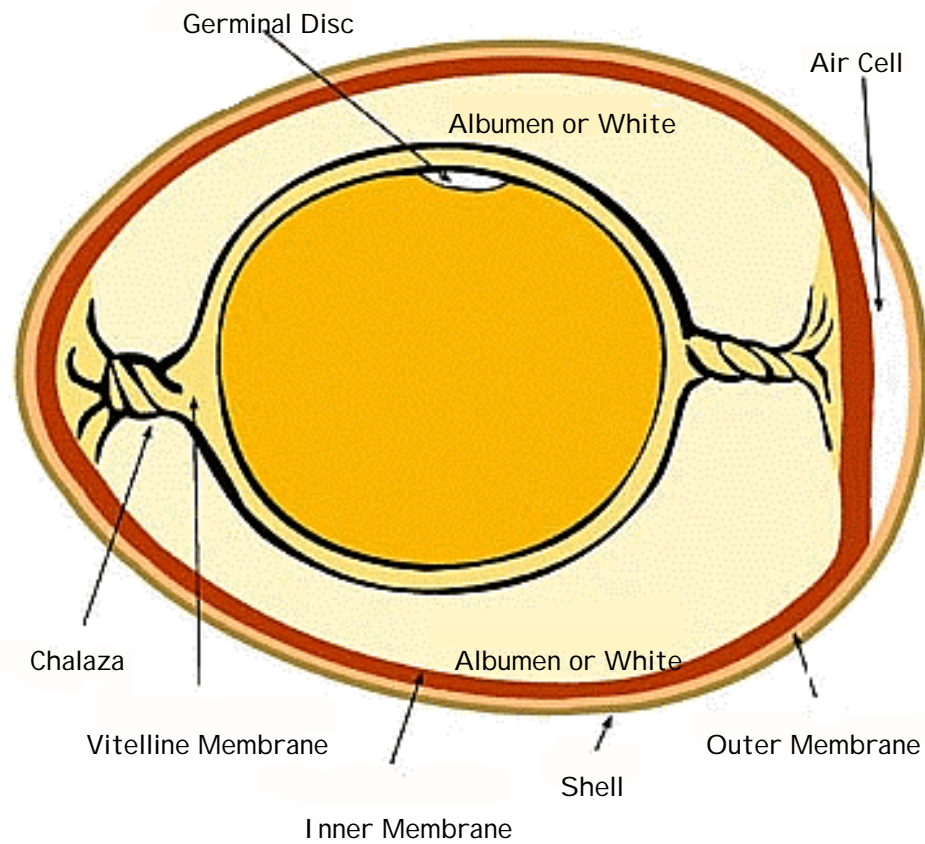
\_\_\_\_\_

The clear part around the yolk that holds water for the unborn chick.

Diagram Adapted from [www.kidfarm.net](http://www.kidfarm.net)

Activity 6  
Advanced

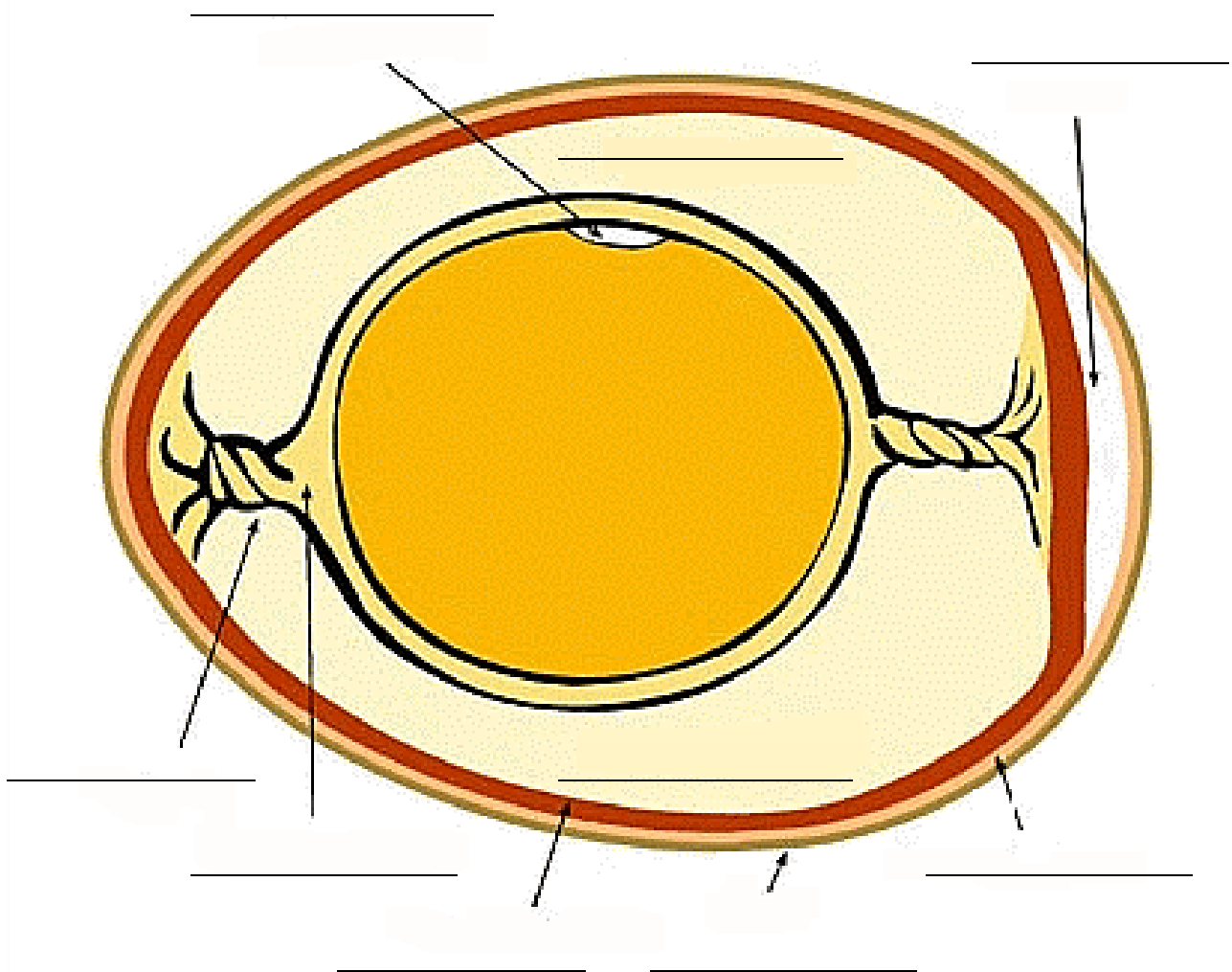
## Parts of the Egg



Activity 6  
Advanced

## Parts of the Egg

Have students label the parts of the egg.

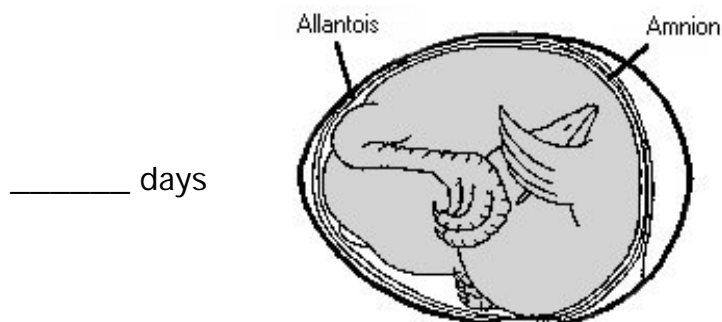
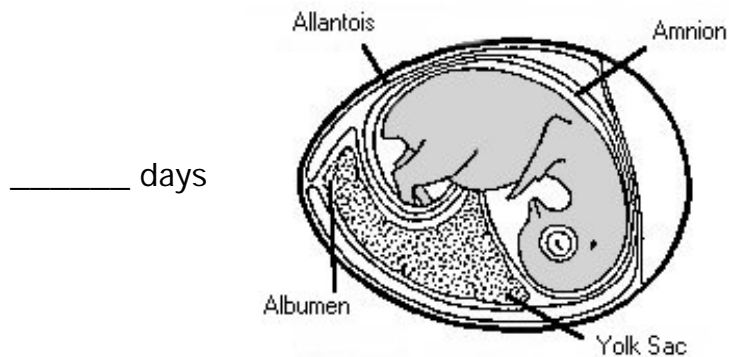
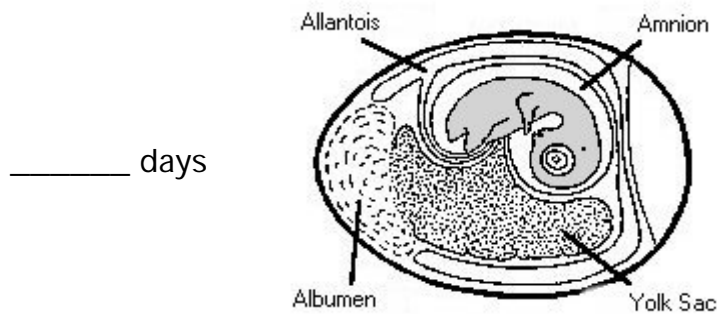
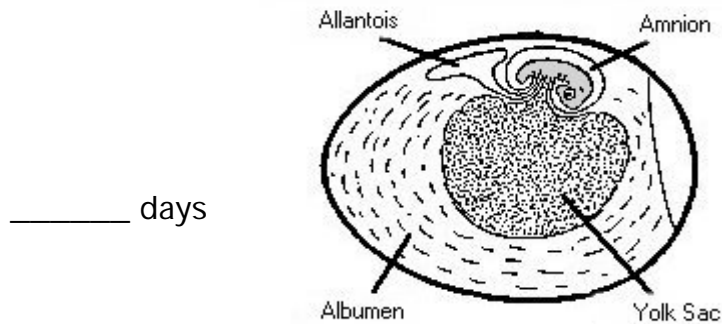


## Activity 7

### Changes in the Development of the Chick Embryo

Go to the website <http://ag.ansc.purdue.edu/poultry/clipart.htm#Eggs>

Compare the diagrams below with the pictures of embryo development on the website and indicate the number of days of development for each diagram.



Activity 8

## MORE YOLK OR MORE WHITE?



Question: Does an egg have more yolk or more white?

Hypothesis: I think the egg will have more\_\_\_\_\_.

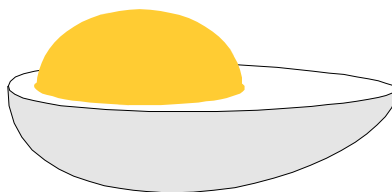
Materials: 2 raw eggs  
an egg separator  
a clear glass  
2 graduated cylinders

Procedure: Break 1 egg into the separator. Observe the amount of white and yolk. Measure the amount of white by pouring it into the graduated cylinder. Measure the amount of yolk by pouring it into the graduated cylinder. Record the readings.

Data: Measurements: yolk = \_\_\_\_mL white = \_\_\_\_mL

Observations: The egg had\_\_\_\_mL more\_\_\_\_\_.

Conclusion: There is more\_\_\_\_\_in an egg.



## ANSWER KEY

### ACTIVITY 3

#### Egg to Chick Punctuation

1. T .
2. W ?
3. W !
4. T .
5. L . or !
6. T .
7. T .
8. T .
9. H ?
10. I .

### ACTIVITY 4

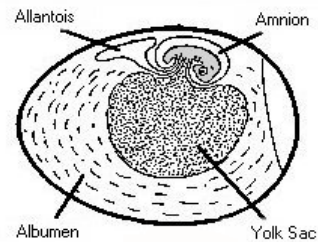
#### The Parts of an Egg

- 1.-4. (in any order) shell, air pocket, yolk, albumen
5. yolk
6. egg cell
7. chalazae
8. The air space serves as a cushion for the baby chick.
9. an egg will not develop into a baby chick
10. true

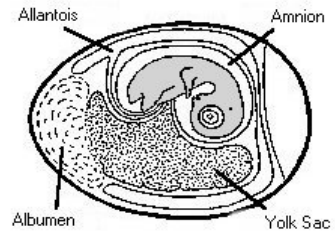
### ACTIVITY 6

#### Changes in the Development of the Chick Embryo

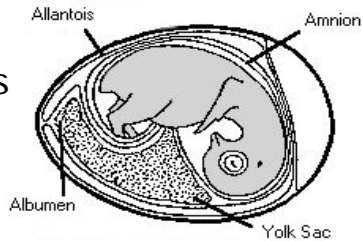
4-6 days



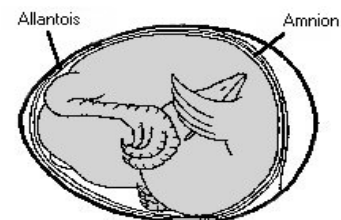
9-11 days



14-15 days



19-20 days





## RESOURCES

### *CHILDREN'S BOOKS*

Inside a Barn in the Country by Alyssa Capucilli

Thanks to Cows by Allan Fowler

The Egg--A Scholastic First Discovery Book

Cock-A-Doodle Dudley by Bill Peet

The Most Wonderful Egg in the World by Helme Heine

Chickens Aren't the Only Ones by Ruth Heller

### *TEACHERS' BOOKS*

The Amazing Milk Book by Catherine Ross and Susan Wallace