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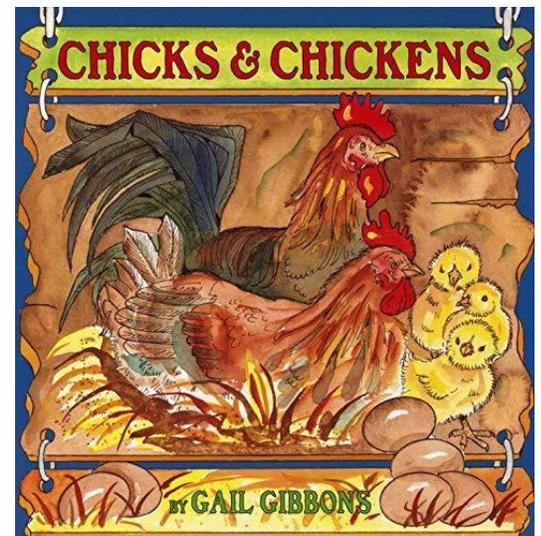
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*Chicks & Chickens*

By: Gail Gibbons

With bright watercolor illustrations and simple, clear language, nonfiction master Gail Gibbons shows young readers everything there is to know about chickens. See what different breeds of chickens look like, discover how eggs are laid and hatched, and learn how big and little farms take care of their birds. Key vocabulary words about chicken behavior and anatomy are introduced throughout *Chicks and Chickens*, and new words are reinforced in accessible language for young readers. <sup>1</sup>



#### Did You Know? (Ag Facts) <sup>2</sup>

- Chicken eggs are a good source of lutein, which promotes eye health in humans.
- A hen turns her eggs approximately 50 times a day to keep the embryo from sticking to the side of the shell.
- The color of a chicken egg is determined by the breed of chicken and in some cases can be the same color as their earlobes.
- A female chicken can lay her first eggs at 5 months of age.

#### Discussion Questions

- What do you know about chickens?
- Where do chickens live?
- How long does it take an egg to hatch?
- What color can a chicken egg be?

## Grade Level(s): 2-5

**Purpose:** Students will identify different breeds of chickens, examine basic needs of a growing chick during egg incubation, and determine the stages of a chicken's life cycle.

### Vocabulary:

- **breed:** group of animals that share many of the same physical features; in chickens it can be combs, skin colors, feather colors and patterns
- **brood:** a group of newly hatched chicks
- **chick:** a young chicken, newly hatched
- **hen:** an adult female chicken of breeding age
- **incubation:** process of warming the chick eggs before they hatch for about three weeks
- **poultry:** domesticated fowl such as chickens, turkeys, ducks, and geese
- **rooster:** an adult male chicken of breeding age

### Background Agricultural Connections: <sup>2</sup>

Chickens are thought to have come from wild fowl found in Southeast Asia; however, today chickens are raised on farms for their meat and eggs. There are over 113 different **breeds**, each with different genetic strengths and characteristics. *Layer* is a term used for a breed of chicken that is a very good egg producer. A laying **hen** can produce 1 egg per day after she reaches maturity. *Broiler* is a term used for a breed of chicken that is raised for their meat. Broilers grow quickly and are heavy with a lot of muscle. Some breeds of chickens are not particularly good egg or meat producers, but are raised as pets, as a hobby, or for shows. These are known as *ornamental* breeds. Raising chickens for eggs, meat, or as a hobby is not new, it has been acknowledged that chickens were raised by people beginning over 4,000 years ago.

Refer to the book, *Chicks and Chickens* by Gail Gibbons to learn some of the terminology used in the **poultry** industry. *Chicks and Chickens* is a children's non-fiction text that describes the different breeds of chickens, their physical traits, and depicts the life cycle of chickens from an embryo to an adult. The text also looks at how their bodies function, how they live, and their domestication by humans. Students will be exposed to how quickly a young **chick** grows into a **rooster** or hen for producing the 8 billion chickens consumed in the United States per year and the 250 eggs eaten yearly per person. Each stage of the life cycle is explained and identified with different physical features for all three; the rooster, the hen, and the chick. Descriptive pictures of the chickens' digestive and reproductive systems, drawings of eggs in different stages of development, and many interesting facts make this text a colorful and clear account of the domesticated chicken.

### Chickens in the Agricultural Industry

Chickens are essential to the agriculture industry in that Americans consume its meat more than any other meat-producing animal. Whether chickens are raised on large farms inside of chicken houses or small farms as free range chickens their history with humans has been one of a large food source priced less expensive to produce and purchase compared to pork and beef. Chickens ability to produce both meat and eggs make them more diversified than other farm animals.

The leading producing states of meat chickens in the United States include Georgia, Alabama, Arkansas, and North Carolina. In Iowa, Ohio, Indiana and Pennsylvania the largest numbers of chicken eggs are produced. Both broilers and layers are known to be omnivores with a diet consisting of grain, seeds, and insects. Chickens raised on large farms in chicken houses eat a prescribed diet of chicken feed and water. Chicken feed is a mixture of corn, grains, meat, fish, vitamins and minerals.

### **Chicken Genetics**

As you learn more about and compare breeds of chickens, you will notice many different characteristics which are a result of genetic variation within the domestic chicken species. Skin color, feather color, feather patterns and textures, body size, and egg shell color are all characteristics you can see. These are known as *phenotypes*. Some genetic characteristics you cannot see by simply looking at a chicken, but you can measure these traits by keeping good records. Examples include rate of growth and egg production. These characteristics are particularly important to poultry farmers. Farmers research the genetic characteristics of chicken breeds and choose the best breed or breeds for their farm. For a more in-depth lesson on genetics and Punnet Squares, see [Peas in a Pod](#).

### **Life Cycle of the Chicken**

The life cycle of a chick begins in an egg. Eggs that are produced for eating are not fertilized and will never form into a chick. Eggs that have been fertilized have the potential of developing into a chick if the environment is correct. Eggs can be hatched in an **incubator** or by a hen. If the process takes place naturally, the hen will lay a clutch of 8-13 eggs, by laying one per day for 1-2 weeks. Once she starts laying on the eggs or **brooding** it takes 21 days for the chick to develop and be ready to hatch. The mother hen keeps the eggs warm and only leaves the nest briefly to feed. The hen also turns the eggs several times per day to keep the embryo from sticking to one side of the shell. For a detailed lesson plan on egg development, see [Eggology](#). The same process can take place in an incubator. The eggs are maintained at the proper heat and humidity levels and turned every few hours for the duration of the 21 days until they hatch.

Once the chick has hatched and dried, it will be covered in a soft, fuzzy down. Within a few weeks as the chick grows, it will develop it's adult feathers. In 4-6 months the chicken will be fully grown. Hens will begin producing eggs around 5-6 months of age and the cycle can begin again. Common breeds of chickens used for meat in the broiler industry grow very quickly. They can grow from hatch to harvest in as little as 8-12 weeks!

## All About Chickens <sup>2</sup>

Materials:

- *Chicks and Chickens* written by Gail Gibbons
- *Chicken Vocabulary List*

Procedures:

1. Show the students the front cover of *Chicks and Chickens* by Gail Gibbons. Begin a discussion about the physical differences and similarities from the picture which displays a rooster, hen, and a chick. Point out the size, color, and shape of each animal example. Tell the students, *they will be learning about the similarities and differences in chicken breeds, the body parts of a chicken, and their life cycle.*
2. Read pages 1-17 of *Chicks and Chickens* which will take you through the differences of roosters, hens, and chicks. These pages also display and label their body parts and identify certain breeds. Be sure to point out that roosters can be more colorful than hens within the same breed.
3. Separate the students into groups with three to four children. Give each group a *Chicken Vocabulary List* and have them brainstorm what they think the vocabulary words represent. Each group can be given a different list of vocabulary words. Have students define what they think the words mean and record the meaning in the space provided on the lists. If time permits they can also draw a picture to represent the meaning for each word.
4. Once all of the groups are done have each group report the words with their definitions. As they define a word that was labeled as a body part on the chicken seen in *Chicks and Chickens*, point this out in the book. The lists of vocabulary terms are grouped together focusing on certain topics. Point out that list #1 are types of chickens, list #2 are physical features found in chickens, list #3 are parts of the digestive system, list #4 are chicken behaviors, and list #5 are chicken housing needs.
5. Next, have each group write three sentences using a vocabulary word from their list in a sentence. These sentences can be assessed for definition accuracy as well as conventions.

## Egg Anatomy & Air Transfer <sup>3</sup>

Materials:

- *Parts of an Egg* PowerPoint
- Unfertilized (grocery store) eggs, 1 per group
- Shallow containers, 1 per group
- Toothpicks, 1 per student
- *Parts of an Egg Diagram*, 1 per group
- *Parts of an Egg Book*, 3 pages per student
- Dyed, hard-boiled eggs, 1 per group (1 cup hot water, 20 drops food coloring; allow eggs to sit in dye overnight)
- Hand lenses, 1 per group
- Raw eggs, 1 per group
- Containers of warm water, 1 per group

## Procedures:

### *Day One*

1. Ask the students to list what animals need to survive. Discuss the fact that animals need food, water, shelter, and air.
2. Ask the students if they think chicks have the same basic needs developing inside the egg compared to after they hatch. Tell the students that chicken embryos need food, water, air, and the proper temperature and humidity to develop into a healthy chick that is ready to hatch out of the egg. Explain that it is important to know the parts of an egg and their functions in order to understand how a chicken embryo's basic needs are met inside the egg.
3. Use the *Parts of an Egg* PowerPoint to explain the function of each part of the egg.
4. Divide the students into groups. Carefully break open one unfertilized (grocery store) egg per group into a shallow container.
5. Using the *Parts of an Egg Diagram* and toothpicks, have the students locate each part of the egg. You may need to use spoons to gently flip the yolk if the germinal disc is not visible.
6. Have the students create a *Parts of an Egg Book* by cutting out each egg.
7. Cut every egg, except the back cover, apart on the crack line.
8. Match each egg part with its corresponding function. Use two brads to connect the pages to the back cover.

### *Day Two*

1. Provide each group with a hand lens and a hard-boiled egg that has been sitting in dye (1 cup hot water, 20 drops food coloring) overnight. Ask the students to look carefully at the shell of the egg. Discuss their observations. Point out the tiny pores on the eggshell. There are more than 7,000 pores on an eggshell that allow oxygen to pass into the egg and carbon dioxide to pass out.
2. Have the students compare the pores at the large end of the egg with the pores on the rest of the egg. Discuss their comparisons. The pores at the large end, where the air cell is located, are larger and more numerous than pores on other parts of the egg. This allows oxygen to enter the air cell easily. Just before hatching, the chick will puncture the air cell and use the oxygen stored there to breathe until it pecks through the shell.
3. Ask the students what they think they will see when the eggshells are peeled off the eggs. Have students peel the eggs. Ask the students to explain why there are small dots of color on the inside of the shell and the white of the egg. Explain that, like the food coloring, oxygen enters the egg through the shell's tiny pores. Point out that the dots of food coloring are larger and more numerous where the air cell is located.
4. Place a raw egg in warm water. You will see tiny air bubbles rise to the surface of the water. Air is escaping through the pores in the shell. Explain that carbon dioxide escapes the egg through the pores.

## Extension Activities:

- **Farmers Market Tour:** Arrange a tour of your community's farmers market in the fall or spring to observe the variety of food items farmers have produced. Assign students to talk with the farmers to learn more about what they do. If a real tour is not possible, have

students do a virtual tour online or invite local farmers to talk about their role and the work they do in your community.

- Visit the [\*Interactive Map Project\*](#) website and view the map representing [Egg Production](#) in the United States. Identify the state that produces the most eggs, then find where your state ranks for egg production.
- Visit the [4-H Embryology Project](#) for more information. Contact your local Cooperative Extension Service or 4-H office in your county. They may provide you with the materials needed to hatch chicken eggs in your classroom.

#### **Suggested Companion Resources:**

- [Chickens on the Farm](#) (Book)
- [Chicks & Chickens](#) (Book)
- [Daisy Comes Home](#) (Book)
- [Farm Animals: Chickens](#) (Book)
- [From Egg to Chicken](#) (Book)
- [Hatching Chicks in Room 6](#) (Book)
- [One Egg](#) (Book)
- [Sonya's Chickens](#) (Book)
- [The Hen Who Sailed Around the World](#) (Book)
- [Tillie Lays an Egg](#) (Book)
- [Zinnia and Dot](#) (Book)
- [About...Books](#) (Kit)
- [Chicken Genetics Matching Cards](#) (Kit)
- [Countdown to Hatch](#) (Kit)
- [Hen House Prototype](#) (Kit)
- [Animal Facts](#) (Poster, Map, Infographic)
- [Livestock Cards](#) (Poster, Map, Infographic)
- [Chicken Embryo Development](#) (Multimedia)
- [Eggs 101: An Egg's Journey from the Farm to Our Tables](#) (Multimedia)
- [Hatching Science: 21 Days of Discovery Video](#) (Multimedia)
- [Virtual Egg Farm Field Trips](#) (Multimedia)
- [Ag Today](#) (Booklets & Readers)
- [Hatching Classroom Projects](#) (Teacher Reference)
- [Hatching Science Center](#) (Website)

#### **Sources/Credits:**

1. Gibbons, Gail. *Chicks & Chickens*, Holiday House, 2003.
2. NC Ag in the Classroom
3. Utah Ag in the Classroom

Suggested SC Standards Met:

English/Language Arts:

- 2.RI.5.1 Ask and answer literal and inferential questions to demonstrate understanding of a text; use specific details to make inferences and draw conclusions in texts heard or read.
- 2.RI.5.2 Make predictions before and during reading; confirm or modify thinking.

- 2.RI.6.1 Retell the central idea and key details from multi-paragraph texts; summarize the text by stating the topic of each paragraph heard, read, or viewed.
- 2.RI.7.1 Compare and contrast topics, ideas, or concepts across texts in a thematic, author, or genre study heard, read, or viewed.
- 3.RI.5.1 Ask and answer literal and inferential questions to determine meaning; refer explicitly to the text to support inferences and conclusions.
- 3.RI.6.1 Summarize multi-paragraph texts using key details to support the central idea.
- 3.RI.7.1 Compare and contrast diverse texts on the same topic, idea, or concept.
- 4.RI.5.1 Ask and answer inferential questions to analyze meaning beyond the text; refer to details and examples within a text to support inferences and conclusions.
- 4.RI. 9.1 Use definitions, examples, and restatements to determine the meaning of words or phrases.
- 5.RI. 5.1 Quote accurately from a text to analyze meaning in and beyond the text.
- 5.RI. 8.1 Analyze how the author uses words and phrases to shape and clarify meaning.

Science:

- 2.L.5B Animals (including humans) require air, water, food, and shelter to survive in environments where these needs can be met. There are distinct environments in the world that support different types of animals. Environments can change slowly or quickly. Animals respond to these changes in different ways.
- 3.L.5A The characteristics of an environment (including physical characteristics, temperature, availability of resources, or the kinds and numbers of organisms present) influence the diversity of organisms that live there. Organisms can survive only in environments where their basic needs are met. All organisms need energy to live and grow. This energy is obtained from food. The role an organism serves in an ecosystem can be described by the way in which it gets its energy.
- 4.L.5: The student will demonstrate an understanding of how the structural characteristics and traits of plants and animals allow them to survive, grow, and reproduce.

# Chicken Vocabulary List

## Group #1

**Chick**

**Hen**

**Rooster**

**Pullet**

**Cockerel**



# Chicken Vocabulary List

## Group #2

**Down**

**Feathers**

**Beak**

**Wattle**

**Claw**



# Chicken Vocabulary List

## Group #3

**Stomach**

**Grit**

**Gizzard**

**Preening**

**Dust Bath**



# Chicken Vocabulary List

## Group #4

**Peck**

**Scratch**

**Crowing**

**Pecking Order**

**Flock**



# Chicken Vocabulary List

## Group #5

**Breed**

**Free Range**

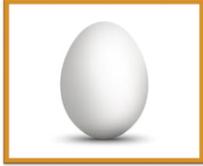
**Waterer**

**Chicken Food**

**Chicken Coop**



# Parts of an Egg



## shell

The egg's shell has more than 7,000 tiny pores that allow oxygen to pass into the egg and carbon dioxide to escape.



## membrane

The inner and outer membranes, found between the eggshell and the egg white, keep bacteria from entering the egg and help to slow evaporation of moisture from the egg.



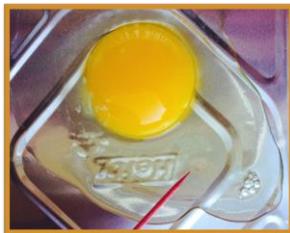
## air cell

The air cell, located between the inner and outer membranes at the large end of the egg, holds oxygen for the chick to breathe.



## albumen

The albumen, or the egg white, cushions the egg yolk floating within it and is the main source of protein and water for the embryo.



## yolk

The yolk provides food for the embryo. It is made up of fats, carbohydrates, proteins, vitamins, and minerals.



### chalazae

The chalazae are cords on two sides of the yolk that keep the yolk floating in the center of the albumen.

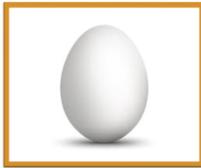


### germinal disc

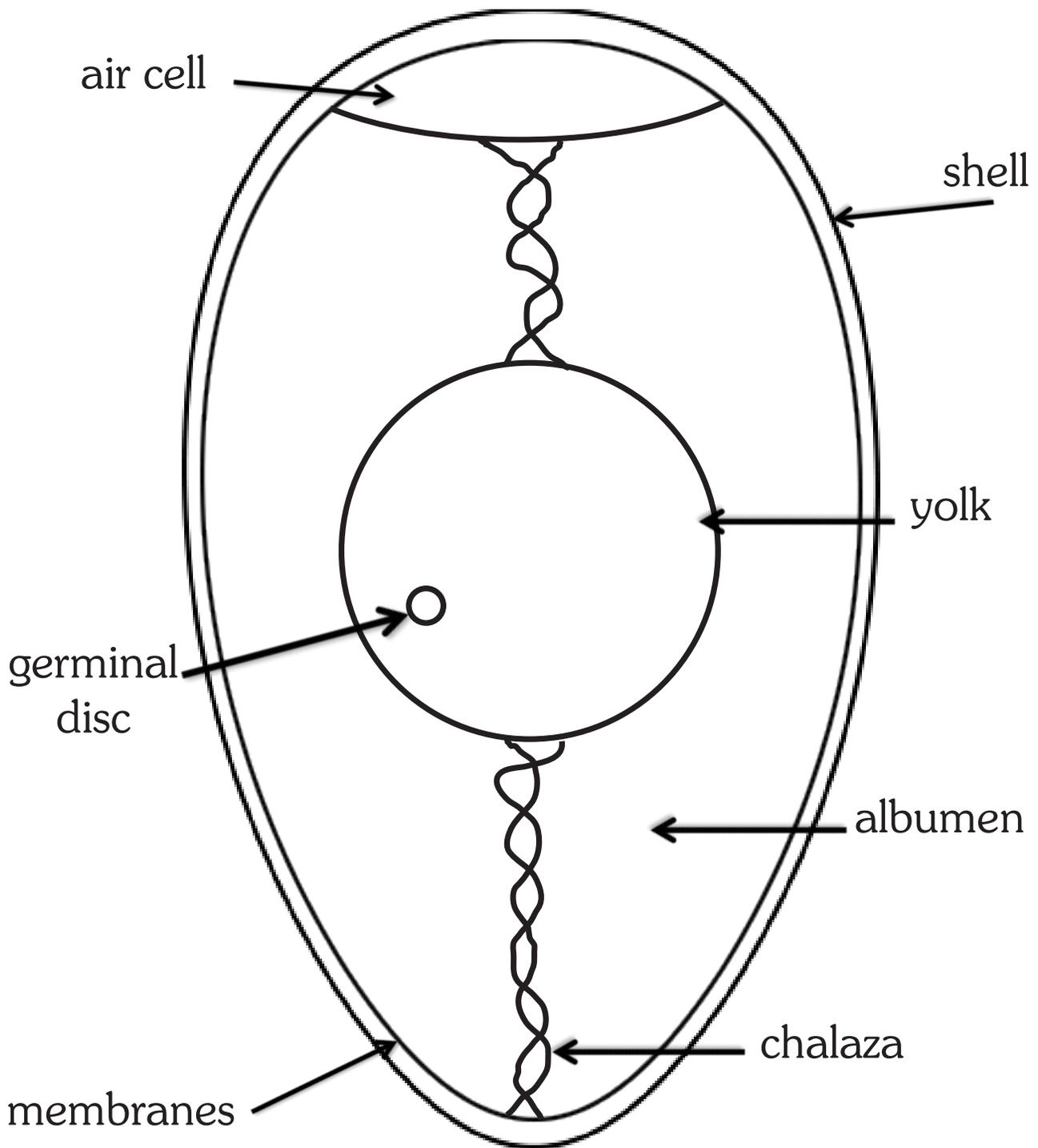
The germinal disc is the white spot on the yolk. This is where the female's genetic material is found.



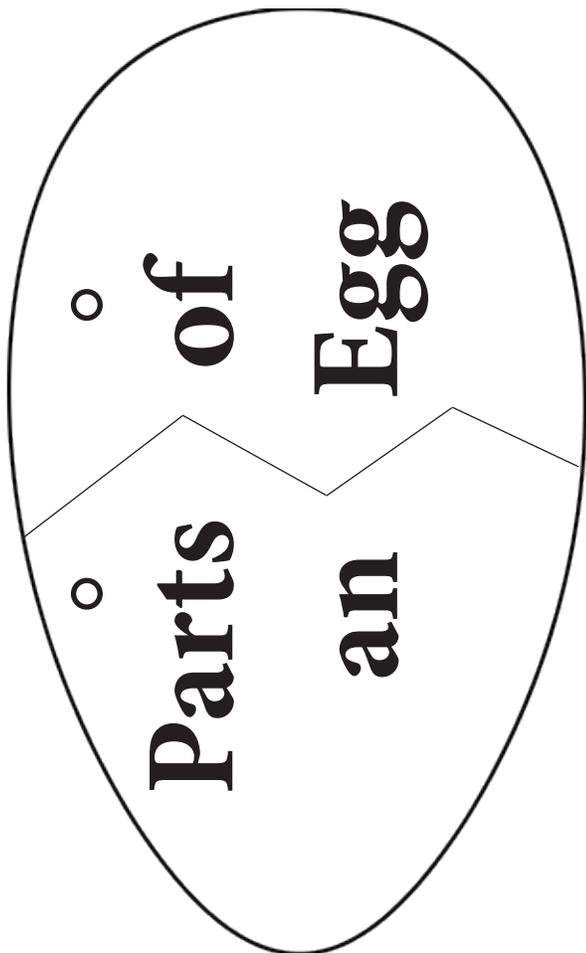
That's all, yolks!



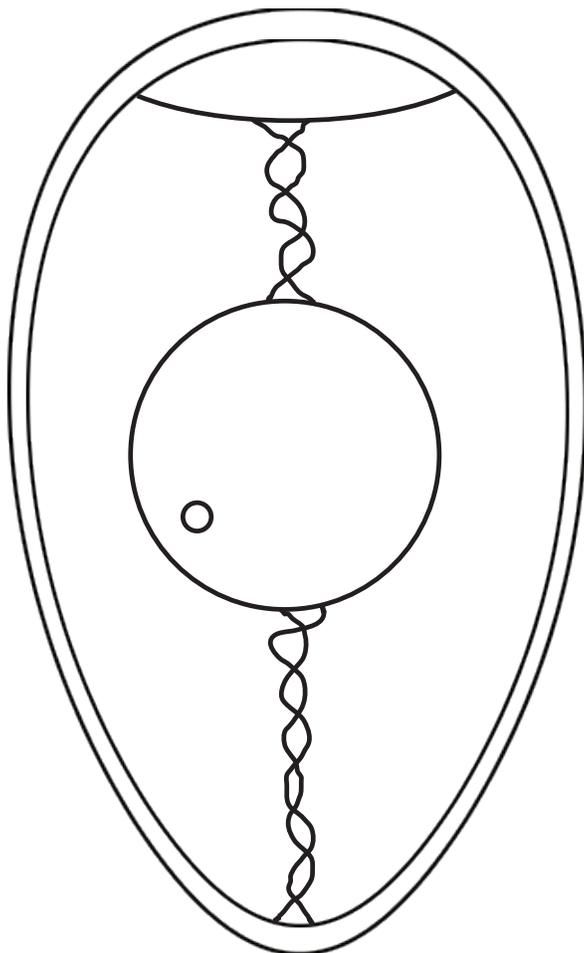
# Parts of an Egg Diagram



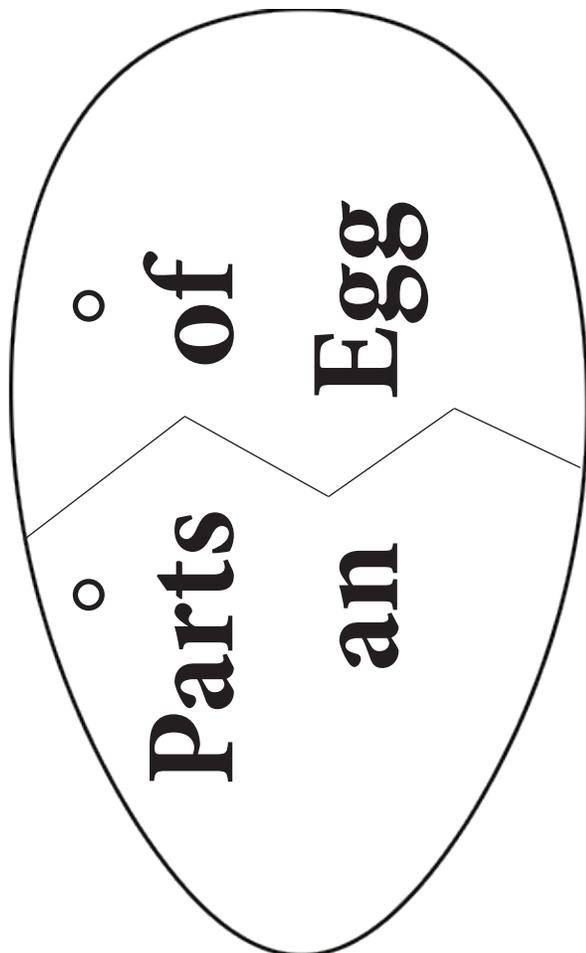
Front Cover



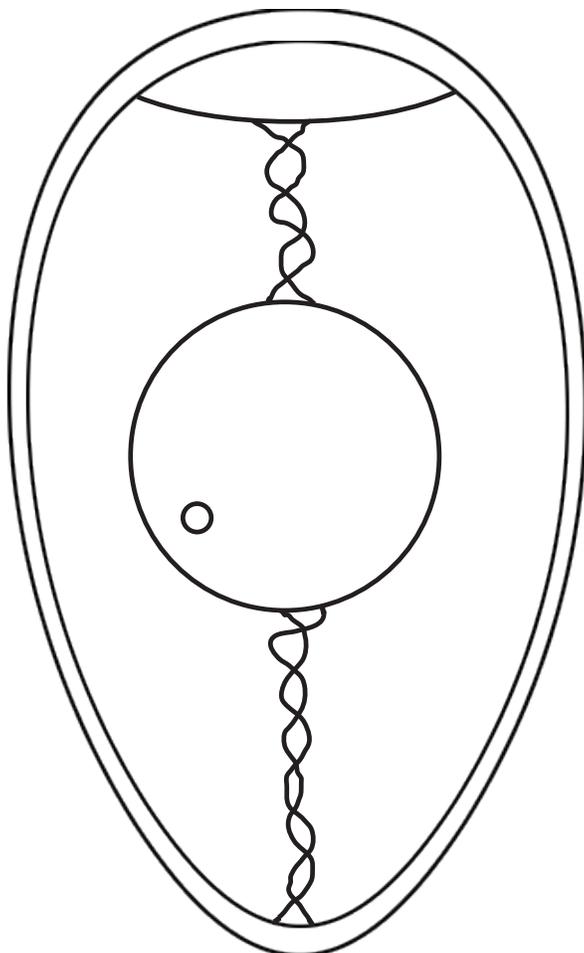
Back Cover



Front Cover



Back Cover



Located between the inner and outer membranes at the large end of the egg, this part of the egg holds oxygen for the chick to breathe.

**albumen**

These cords keep the yolk floating in the center of the albumen.

**yolk**

This part of the egg cushions the egg yolk floating within it and is the main source of protein and water for the embryo.

**chalaza**

These parts of the egg keep bacteria from entering the egg and help to slow evaporation of moisture from the egg.

**germinal disc**

This part of the egg provides food for the embryo. It is made up of fats, carbohydrates, proteins, and minerals.

**shell**

This is the white spot on the yolk. The female's genetic material is found here.

**membranes**

This part of the egg has more than 7,000 tiny pores that allow oxygen to pass into the egg and carbon dioxide to pass out.

**air cell**