



# The Book Planter



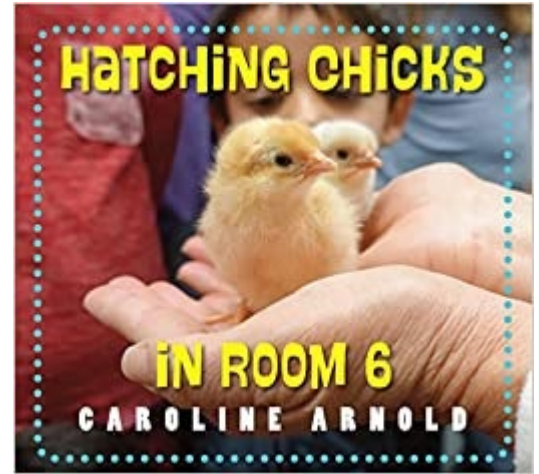
## Ag in the Classroom

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September 2021: *Hatching Chicks in Room 6*

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A visit to Mrs. Best's classroom is always inspiring! Follow a classroom of real kindergarteners as they participate in a popular activity: hatching chicks. This book is full of photographs that show the life cycle of a chicken, from incubating eggs, watching them hatch, and raising the chicks until they are old enough to return to the chicken coop. Students learn the joys of hatching chicks from egg to coop in this close-up look at how chickens grow.



### Chicken Ag Facts<sup>1</sup>

- Many chicken eggs are white, but eggshells can also be brown, green, blue, or speckled. The color depends on the type of chicken.<sup>1</sup> You can tell what color of egg a hen will lay by looking at the color of her skin on her earlobe.<sup>2</sup>
- There are more than one hundred types, or breeds, of chickens. Each breed has its own colors and patterns of feathers.<sup>1</sup>
- North Carolina ranks 8<sup>th</sup> in the U.S. for egg production.<sup>3</sup>
- North Carolina is home to more than 14 million laying hens.<sup>3</sup>

### Vocabulary<sup>1</sup>

**Air sac:** the air space at the large end of an egg.

**Albumen:** the white part of an egg.

**Beak:** the hard covering over a bird's mouth.

**Blood vessel:** a tube that brings food to an embryo.

**Breed:** a particular type of animal or plant.

**Brood box:** a container that keeps new chicks warm.

**Candling:** shining a light through an eggshell.

**Chick:** a young chicken.

**Clutch:** a group of chicks that hatch together.

**Comb:** the flap of skin at the top of a chicken's head. Like the wattle, it helps keep the chicken warm or cool.

**Down:** a new chick's fluffy feathers.

**Egg tooth:** the hard knob at the end of a chick's beak.

**Embryo:** an animal in the earliest stages of development.

**Hatch:** when a chick breaks open its egg.

**Hen:** an adult female chicken.

**Incubator:** a device that keeps eggs warm and moist for hatching.

**Membrane:** the thin skin that lines an eggshell.

**Pip:** the first hole a chick makes in its shell; also, the process of making the first hole in the shell.

**Rooster:** an adult male chicken.

**Wattle:** the flap of skin under a chicken's chin. Like the comb, it helps keep the chicken warm or cool.

**Yolk:** the yellow part of an egg.

### **Activity 1: Egg Anatomy<sup>2</sup>**

#### Materials:

- 1 egg per group (unfertilized eggs from the grocery store)
- Shallow container, 1 per group
- Toothpicks, 1 per student

#### Procedures:

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 students that chicken embryos need food, water, air, and the proper temperatures 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. (If you read *Hatching Chicks in Room 6* already, the students should have an understanding of this.)
3. Use *Hatching Chicks in Room 6* and *Parts of an Egg PowerPoint (Links)* to explain the parts of an egg.
4. Divide the students into groups. Carefully break open one unfertilized egg (grocery store) per group into a shallow container.
5. Using the *Parts of an Egg Diagram (Links)* 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. Ask students to fill out the *Parts of an Egg Activity Sheet (Links)* by cutting and pasting each egg part where it belongs.

### **Activity 2: Air Transfer<sup>2</sup>**

#### Materials:

- Dyed, hard-boiled eggs, 1 per group (1 cup hot water, 20 drops of 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:

1. Provide each group with a hand lens and a hard-boiled egg that has been sitting in dye 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 the 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 the 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.

### **Activity 3: Candling an Egg<sup>4</sup>**

#### Materials:

- Fertile eggs (information on sourcing fertile eggs can be found here: <https://www.agclassroom.org/hatching/>)
- Modeling Clay
- 1 high-intensity LED flashlight (e.g., 6" Mini Maglite)

#### Procedures:

1. If you have eggs with white shells, they can be candled around the fourth day of the incubation cycle. Dark-shelled eggs may be difficult to see through and will give better results after about a week. Dirt on the shells can be brushed away. Do not wash the eggs with water. Washing destroys the protective coating that prevents bacteria from entering the shell.
2. It is not necessary to purchase an expensive egg candler.. An effective candler can be made using a high-intensity LED flashlight and modeling clay. Wrap the clay around the top of the flashlight to create a nest for the egg. The clay will seal between the flashlight and the egg and will focus the light through the egg.
3. Carefully hold an egg's wide end in the center of the opening directly over the beam of light (so that the entire oval is illuminated). You may need to dim or turn

off any outside lighting to candle the eggs. Remember to be extremely careful with the eggs; even small cracks can inhibit successful hatching.

4. In a fertile egg, there will be a fine network of veins running out from a dark center. Eggs with no visible embryonic development are infertile, while an egg with a few small blood spots is a fertilized egg in which the embryo has died. Photos and videos of candling eggs at different stages of incubation can be viewed at: <https://www.backyardchickens.com/threads/chicks-are-here-egg-candling-pics-progression-though-incubation.261876/>



5. Discuss the changes that the embryo will go through and the nature of living things using the following questions:
  - a. Which is the living thing, the eggshell or the embryo? Why is the embryo alive? What are the characteristics of a living thing?
  - b. What does the egg need from the hen? Could the egg hatch on its own without the help of a hen or human (like in the incubator)? How is this similar to a child's reliance on their parents? Do plants require a parent to take care of them?
  - c. How are plants and animals similar? How are they different? How do plants and animals differ from rocks and other non-living things?
6. Ask students to list things in a chart that will need to be done in order to hatch the chicks and/or take care of them after they hatch. (They may use details and information from the book, *Hatching Chicks in Room 6*. Answers can include: put water in the incubator, watch the temperature in the incubator, rotate the eggs, provide clean water, provide food, keep them warm.) Explain to students that these are the things a hen would do to care for her eggs.
7. Have the students list the needs of a baby or child. How does an adult know how to care for a baby or child? Explain to the students that people, animals, and plants are all living things that use energy to grow, develop and reproduce.

#### **Activity 4: Inside the Egg, Embryo Development Wheel<sup>4</sup>**

##### Materials:

- Scissors

- Glue
- Crayons or Colored Pencils
- Large paper plates, 2 per student
- Metal craft brads (metal fasteners), 1 per student

#### Procedures:

1. Give each student a copy of the Embryo Development Wheel (Links) and two paper plates.
2. Instruct them to color the activity sheet and cut along the dashed lines as indicated on the page.
3. Next, students should glue the square titled “A Chick Hatches” with the picture of a fully developed chick in the center of one of the paper plates. Tell the students to write their names below the square. This will be the development wheel cover.
4. Instruct the students to put the remaining stages of development in numerical order according to the day (indicated by the number in the egg on the upper left side). Then, paste the stages of development in order around the edge of the second paper plate.
5. Have the students cut a three-sided window just below their name on the previous plate (the development wheel cover). Lay this plate over the top of the one that has the development stages pasted around the outer edge. The cut-out window should be large enough that one development stage picture can be seen through it.
6. Finally, place a metal brad through the center of both paper plates so that a rotating storyteller is formed. Divide the students into pairs and have them share their development story wheels.

#### **Links**

- *Parts of an Egg PowerPoint (Activity 1)*  
[https://cdn.agclassroom.org/media/uploads/2015/02/25/parts\\_of\\_an\\_egg.pptx](https://cdn.agclassroom.org/media/uploads/2015/02/25/parts_of_an_egg.pptx)
- *Parts of an Egg Diagram (Activity 1)*  
[https://cdn.agclassroom.org/media/uploads/2015/02/24/Eggology\\_partsofegg\\_diagram.pdf](https://cdn.agclassroom.org/media/uploads/2015/02/24/Eggology_partsofegg_diagram.pdf)
- *Parts of an Egg Activity Sheet (Activity 1)*  
[https://cdn.agclassroom.org/media/uploads/2015/02/24/Eggology\\_partsofegg\\_activitysheet.pdf](https://cdn.agclassroom.org/media/uploads/2015/02/24/Eggology_partsofegg_activitysheet.pdf)
- Hatching Science Center (website for classroom egg hatching)  
<https://www.agclassroom.org/hatching/>
- Candling Eggs (Photos and Videos)  
<https://www.backyardchickens.com/threads/chicks-are-here-egg-candling-pics-progression-though-incubation.261876/>
- *Embryo Development Wheel (Activity 4)*

[https://cdn.agclassroom.org/media/uploads/2017/01/11/A\\_Chick\\_Hatches-Embryo\\_Development\\_Whee\\_Activity\\_Sheet.pdf](https://cdn.agclassroom.org/media/uploads/2017/01/11/A_Chick_Hatches-Embryo_Development_Whee_Activity_Sheet.pdf)

- American Egg Board/The Incredible Egg K-12 Resources  
<https://www.incredibleegg.org/professionals/k-12-schools/>

#### Sources

1. Arnold, Caroline. *Hatching Chicks in Room 6*. Charlesbridge, Watertown, MA. 2017. Print.
2. <https://www.agclassroom.org/matrix/lesson/138/>
3. <https://ncfieldfamily.org/farm/facts-stats/9-fun-facts-about-eggs/2/>
4. <https://www.agclassroom.org/matrix/lesson/544/>

#### K-5 Subject Areas

Reading, Writing, Speaking and Listening, and Science

#### NC Standard Course of Study

##### Reading

- **RL.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- **RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- **RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
- **RL.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
- **RL.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- **RI.4.5** Describe the overall structure of events, ideas, concepts, or information in a text or part of a text.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively and explain how the information contributes to an understanding of the text in which it appears.
- **RL.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question or to solve a problem efficiently.

##### Writing

- **W.K.3** Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and with guidance and support, provide a reaction to what happened.
- **W.K.6** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- **W.1.6** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- **W.2.6** Recall information from experiences or gather information from provided sources to answer a question.
- **W.3.6** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
- **W.4.6** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

- **W.5.6** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources.

### Speaking and Listening

- **SL.K.1** Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
- **SL.K.2** Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
- **SL.K.3** Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- **SL.K.4** Speak audibly and express thoughts, feelings, and ideas clearly.
- **SL.K.5** Add drawings or other visual displays to descriptions as desired to provide additional detail.
- **SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- **SL.1.2** Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
- **SL.1.5** Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
- **SL.2.1** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- **SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- **SL.2.4** Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent and complete sentences.
- **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.3.2** Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly in complete sentences at an understandable pace.
- **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.4.4** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; adjust speech as appropriate to formal and informal discourse.
- **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.5.4** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; adapt speech to a variety of contexts and tasks.

### Science

- **K.L.1** Compare characteristics of animals that make them alike and different from other animals and nonliving things.
- **1.L.2** Summarize the needs of living organisms for energy and growth..
- **2.L.1** Understand animal life cycles.
- **2.L.2** Remember that organisms differ from or are similar to their parents based on the characteristics of the organism.
- **3.L.2** Understand how plants survive in their environments.
- **4.L.1** Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.
- **5.L.3** Understand why organisms differ from or are similar to their parents based on the characteristics of the organism.

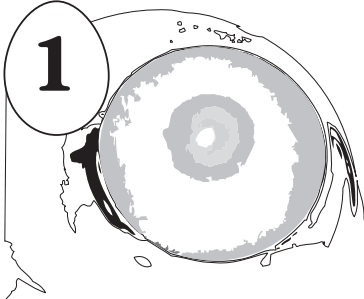
# A Chick Hatches—Embryo Development Wheel

Color the pictures. Use scissors to cut on the dotted lines. Glue the title picture, “A Chick Hatches,” in the center of a paper plate, and put that plate aside. Line up each of the remaining pictures in numerical order, starting with Day 1 and ending with Day 21. Glue them in order around the edge of a second paper plate. Place the first paper plate over top of the second paper plate, and place a metal brad through the center of both paper plates. Finally, cut a three-sided hole on the bottom edge of the top plate so that you can see one step of development at a time as you rotate the bottom plate. Now you can tell the story of a chick hatching from an egg.



## A Chick Hatches

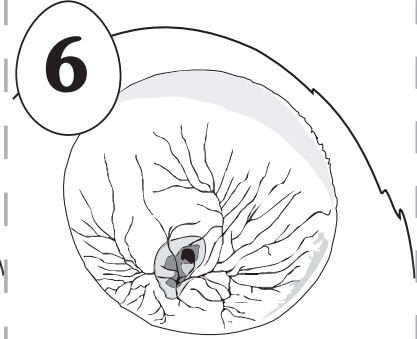
What's inside an egg?



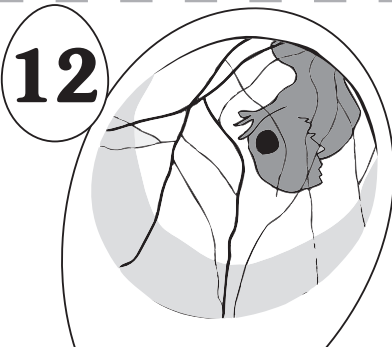
A baby chick begins as a small white patch within the yellow yolk.



Can you see the chicken's head and heart?



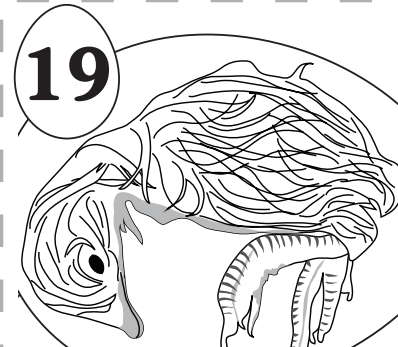
Now there are two wings, two legs, and a beak!



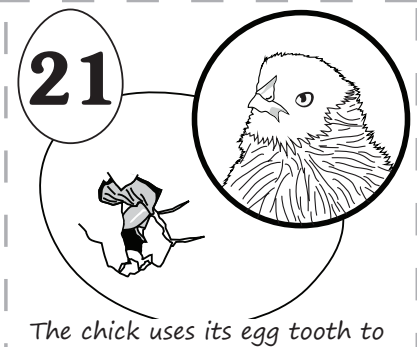
Wow! The baby chick has feathers and claws on its toes.



The baby chick will be born soon because it is getting too big and running out of food.



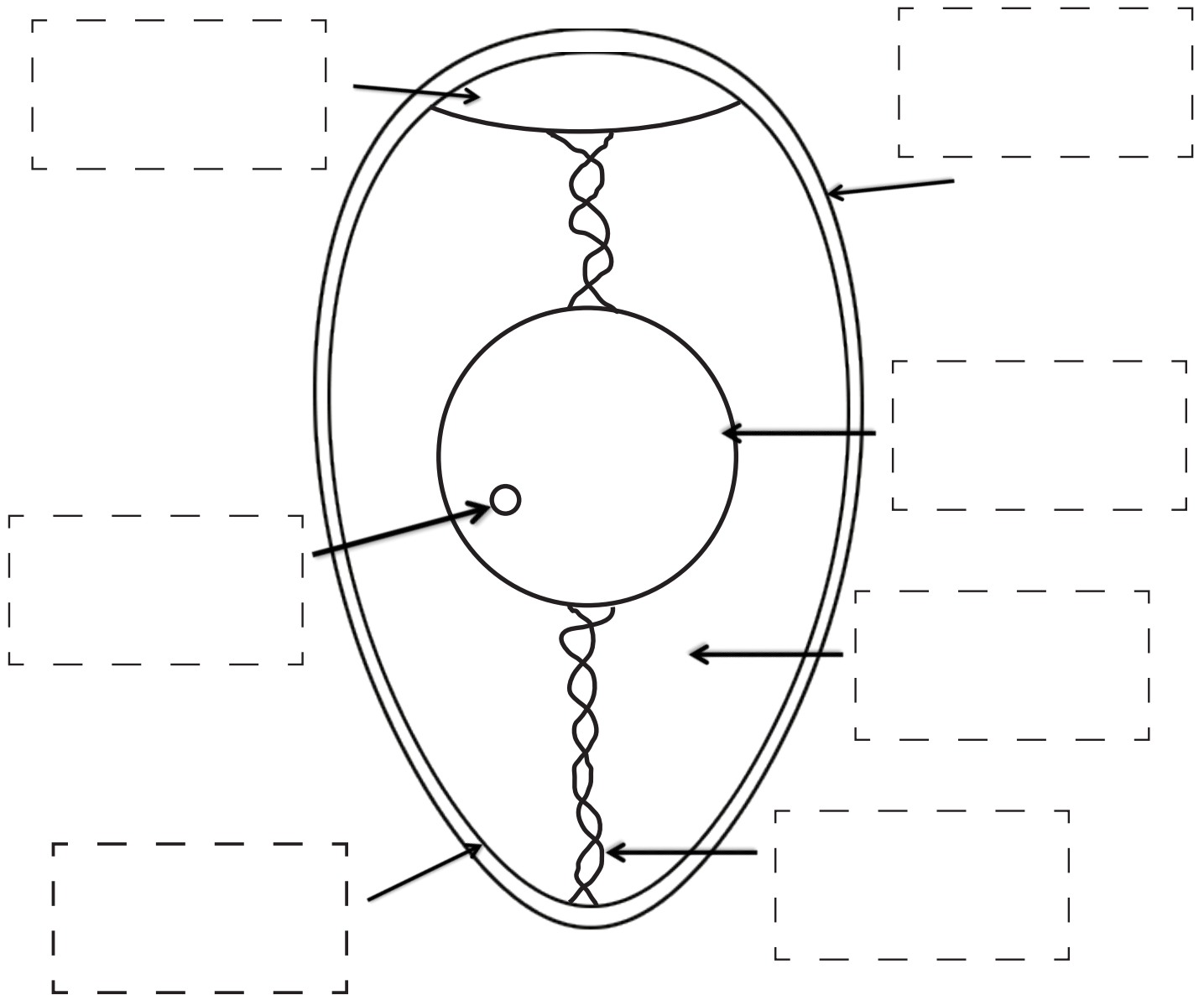
The chick begins to hatch when it breaks into its air cell and takes its first breath.



The chick uses its egg tooth to help break out of the egg. The wet chick will soon dry and have fluffy soft feathers.



# Parts of an Egg



shell	air cell	yolk
membranes	albumen	chalaza
	germinal disc	

# Parts of an Egg Diagram

