

SC Farm Bureau
Ag in the Classroom
Post Office Box 754
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April 2022 Book of the Month

Hatching Chicks in Room 6

By: Caroline Arnold

A visit to Mrs. Best's classroom is always inspiring! Follow a classroom of real kindergartners as they participate in a popular activity: hatching chicks. Astonishing photographs 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.

The Life Cycles in Room 6 series follows Mrs. Best's real kindergarten class as they help things grow. This photo-illustrated series engages readers with hands-on science in the classroom and beyond.¹



Did You Know? (Ag Facts) ²

1. Many chicken eggs are white, but eggshells can also be brown, green, blue, or speckled. The color depends on the type of chicken. You can tell what color of egg a hen will lay by looking at the color of her skin on her earlobe.
2. There are more than one hundred types, or breeds, of chickens. Each breed has its own colors and patterns of feathers.
3. SC ranks 17th in the nation for egg production and 13th in the nation for broiler production.

Discussion Questions

- How does an egg get from the farm to the grocery store?
- What surprised you about egg production?

Lesson Plans Available Online at

scfb.org/book-of-the-month

Grade Level(s): 2-5

Purpose: Students will investigate embryo development in chicken eggs as well as explore the journey of an egg from the farm to the table.

Vocabulary:

- **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
- **Embryology:** the study of embryos (unborn human or animal in the earliest stages of growth when its basic structures are being formed) and their 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
- **Rooster:** an adult male chicken of breeding age

Background Agricultural Connections: ²

Embryology is the science that deals with the growth and development of an embryo. All birds lay eggs, which provide protection and nutrition for the developing embryo. Most people are familiar with chicken eggs because they are commonly found in our kitchens. Watching a fertile chicken egg develop can be an effective way to study embryology, investigate how organisms change and develop over time, and increase excitement and teamwork in the classroom.

Chickens are important farm animals for the production of meat and eggs. The breeds of chickens used for egg production have been developed through careful selection and crossbreeding to increase the number of eggs a hen will lay in a year. Hens that have not mated with a rooster will still lay eggs. These eggs have not been fertilized. They are not fertile and will not become embryos. Eggs sold in the grocery store are infertile.

A **rooster** mates with and fertilizes a hen's egg before the **hen** lays the familiar hard-shelled egg. Under the right conditions, each fertilized egg will grow to be a chick. The yolk and albumen (the white of the egg) provide food for the growing embryo. The albumen also provides the embryo with protection against shock, cushioning the developing embryo in a water sac. The blunt end of the egg contains the air cell. Just before the chick breaks out of its shell, it takes its first breath of air from this air cell.

The egg provides much of what the developing embryo needs—food to grow, cushion from shock, and air to breathe. In mammals, the embryo develops inside of the mother's body, which

provides nourishment and protection. If birds grew heavy during pregnancy like mammals, it could inhibit their ability to fly. The main disadvantage to laying eggs is that they're good to eat and vulnerable to prey. Although the egg provides energy and protection, the parent (the hen in the case of chickens) is still needed to keep the eggs warm and protect them from predators.

Eggs can be incubated in two different ways—by a broody hen or by an incubator. In the classroom, the incubator is the preferred method. There are two main types of incubators, still-air and forced-draft. Both types can be used in a classroom setting, although the forced-draft type is most common. Successful egg hatching requires maintaining optimal temperature, humidity, and ventilation, as well as regular egg rotation. These conditions can easily be met with proper use of an incubator.

Candling eggs is a simple and effective way to show students that there is life inside the eggshell. In a dark room, shining a bright light through the shell of a fertile egg will silhouette the developing embryo. After four days a heartbeat can be observed, and just a few days later the wings, legs, and a beak can be distinguished.

Eggs 101⁴

Materials:

- [Eggs 101 video](#)
- Eggs 101 review sheet
- An Egg's Journey sheet

Procedures:

1. Poll the class to see if anyone ate eggs for breakfast. Pose the question – “Do you know how eggs get from the farm to table?”
2. Read “An Egg's Journey” sheet together as a class. Use the poster to explain the farm-to-table journey of an egg.
3. Watch Eggs 101 video. Have students answer questions as video plays and then discuss as a class at the end.

Candling an Egg³

Materials:

- Fertile eggs
 - Information on sourcing fertile eggs can be found in the [Hatching Science Center](#)
- Modeling clay
- 1 high-intensity LED flashlight (e.g., 6" Mini Maglite)
- [A Chick Hatches—Embryo Development Wheel](#) activity sheet, 1 per student
- Scissors
- Glue
- Crayons or colored pencils
- Large paper plates, 2 per student
- Metal craft brads, 1 per student

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 backyardchickens.com.



5. Discuss the changes that the embryo will go through and the nature of living things using the following questions:
 - Which is the living thing-the eggshell or the embryo? Why is the embryo alive? What are the characteristics of a living thing?
 - 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?
 - 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 the students to list things that will need to be done in order to hatch the chicks and/or take care of them after they hatch (*put water in the incubator, watch the temperature in the incubator, rotate the eggs, provide clean water, provide food, keep them warm*). Explain to the 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.
8. Give each student a copy of the activity sheet A Chick Hatches—Embryo Development Wheel and two paper plates.
9. Instruct them to color the activity sheet and cut along the dashed lines as indicated on the page.
10. 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.
11. 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.

12. Have the students cut a three-sided window just below their name on the previous plate (the development wheel cover). Lay this plate over 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.
13. 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.

Extension Activities:

- Give the students a writing prompt that involves a baby chick in its first day of its life cycle. For example: Today, I hatched from my shell and my day was filled with _____.
- 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.
- Read the book [Chicks and Chickens](#) written by Gail Gibbons to your class.
- Use the hands-on activities in the lesson plan [From Chicken Little to Chicken Big](#) to explore the production of chicken and eggs for food and teach students about the life cycle and genetics of chickens.

Suggested Companion Resources:

- [The Life Cycle of a Chicken](#)
- [Chick Life Cycle](#)
- [Chicks & Chickens](#)
- [Daisy Comes Home](#)
- [Farm Animals: Chickens](#)
- [Hatching Chicks in Room 6](#)
- [Inside An Egg](#)
- [One Egg](#)
- [One Hen: How One Small Loan Made a Big Difference](#)
- [Sonya's Chickens](#)
- [The Chicken-Chasing Queen of Lamar County](#)
- [Tillie Lays an Egg](#)
- [Zinnia and Dot](#)
- [Poultry Reader](#)
- [Chicken Genetics Matching Cards](#)
- [Countdown to Hatch](#)
- [Livestock Cards](#)
- [Chick Embryology YouTube Playlist](#)
- [Chicken Embryo Development](#)
- [Eggs 101: An Egg's Journey from the Farm to Our Tables](#)
- [Hatching Science: 21 Days of Discovery Video](#)
- [Virtual Chicken](#)
- [Virtual Egg Farm Field Trips](#)
- [Hatching Classroom Projects](#)

- Hatching Science Center

Sources/Credits:

1. Arnold, Caroline. *Hatching Chicks in Room 6*, Charlesbridge, 2017.
2. NC Ag in the Classroom
3. Utah Ag in the Classroom
4. American Egg Board

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.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.
- 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.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.
- 5.RI.5.1 Quote accurately from a text to analyze meaning in and beyond the text.
- 5.RI.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.

Science (2021 standards):

- 2-LS4-1. Make observations of plants and animals to compare patterns of diversity within different habitats.
- 3-LS1-1. Develop and use models to describe how organisms change in predictable patterns during their unique and diverse life cycles.
- 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms.
- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive.
- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction
- 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

AN EGG'S JOURNEY

From the Farm to Your Table

Where do eggs come from? Chickens, of course.
But here's how they get from the farm to your breakfast table!

1



Laying and Collecting

Female chickens called hens lay eggs. Egg farmers, who take special care of their hens and feed them a balanced diet, collect the fresh eggs with machines called gathering belts.

2



Washing

Why wash an egg?
To make sure it's clean, of course!
Egg washing removes germs and dirt, just like washing your hands.

3



Candling and Grading

Eggs don't go to school, but they still get grades. Every egg is checked carefully—inside and out.

4



Sorting and Packing

Right before the eggs are put into cartons large side up, they are organized according to size.

5



Shipping

Eggs travel in refrigerated trucks. Most eggs reach the supermarket just one day after being laid!

6



Enjoying

Eggs provide the high-quality protein needed at breakfast to give you the energy to be incredible all day!

incredible!



Name _____ Class _____ Date _____

Overview: A brief explanation of the laying, cleaning and packaging steps eggs take before reaching grocery stores and restaurants nationwide.

Fill in the Blank

1. Egg production begins in the _____.
2. Healthy hens have constant access to _____ and _____.
3. Some eggs have _____ shells and some eggs have _____ shells.
4. After eggs are collected and washed, they are _____ and _____.
5. Packaged eggs are shipped to _____ or _____.

True or False

1. Egg production begins with healthy, well-cared for hens.

2. Fresh eggs are always collected automatically.

3. Farmers are not able to look inside eggs without cracking them.

4. Sometimes eggs are spot-checked by the United States Department of Agriculture (USDA).

5. Eggs are immediately refrigerated after they are packed into egg cartons.

Extension: What questions do you have about barns, hens, eggs, environmental management and the kinds of "eggsperts" involved in the production of eggs in the United States.



Overview: A brief explanation of the laying, cleaning and packaging steps eggs take before reaching grocery stores and restaurants nationwide.

Fill in the Blank

1. Egg production begins in the **(barn or hen house)**.
2. Healthy hens have constant access to **(food, water, fresh air)** and **(food, water, fresh air)**.
3. Some eggs have **(brown/white)** shells and some eggs have **(brown/white)** shells.
4. After eggs are collected and washed, they are **(candled, sorted, graded, or packaged)** and **(candled, sorted, graded, or packaged)**.
5. Packaged eggs are shipped to **(restaurants, groceries or businesses.)** or **(restaurants, groceries or businesses).**

True or False

1. Egg production begins with healthy, well-cared for hens. **True**
2. Fresh eggs are always collected automatically. **False – usually. Eggs are collected automatically in the majority of barns. In cage free, free range and pasture-raised farms, some eggs may need to be collected by hand**
3. Farmers are not able to look inside eggs without cracking them. **False – candling allows farmers to see inside eggs**
4. Sometimes eggs are spot-checked by the United States Department of Agriculture (USDA). **True**
5. Eggs are immediately refrigerated after they are packed into egg cartons. **True**

Extension: What questions do you have about barns, hens, eggs, environmental management and the kinds of "eggsperts" involved in the production of eggs in the United States?

This video supports the National Curriculum Standards for Social Studies Theme 7: Production, Distribution and Consumption: Ask and find answers to questions about the production, distribution, and consumption of goods and services in the school and community.

More details are available here: <https://www.socialstudies.org/standards/strands>.

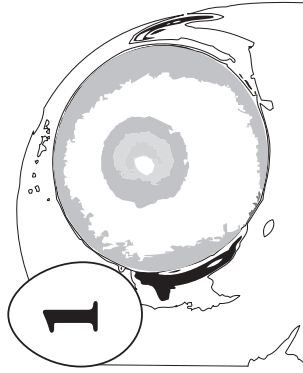
A Chick Hatches—Embryo Development Wheel

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.

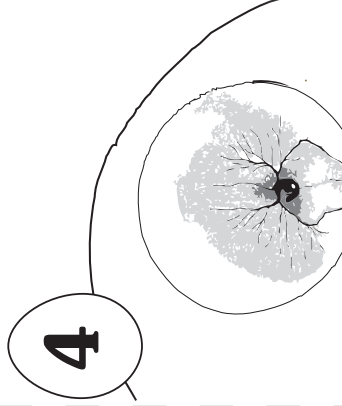


A Chick Hatches

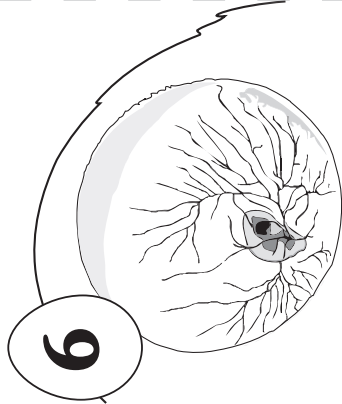
What's inside an egg?



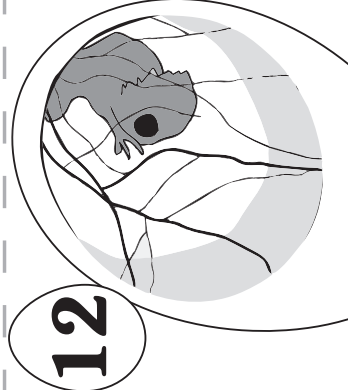
A baby chick begins as a small white patch within the yellow yolk.



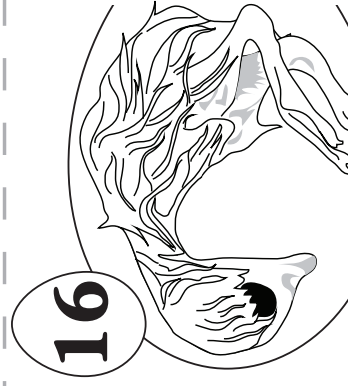
Can you see the chicken's head and heart?



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



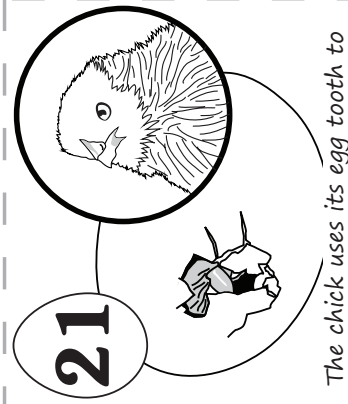
Wow! The baby chick has feathers and claws on its toes.



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.