Poultry

*Lesson Plan for Grade 2, Science*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Science*

*for Mississippi Farm Bureau Federation - AITC*

OVERVIEW & PURPOSE

Students will identify how the basic needs of a growing chick are met during egg incubation. Activities include identifying and diagramming the parts of an egg and hatching eggs in class.

# EDUCATIONAL STANDARDS

**Mississippi College-and-Career Readiness Standards:**

L.2.3A Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

ELA-RI.2.4 Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.

**NALOs:**

T2.K-2 a Explain how farmers/ranchers work with the lifecycle of plants and animals to harvest a crop.

# OBJECTIVES

* Students will observe the life cycle of a chicken from egg to hatching into a chick

# MATERIALS NEEDED

* Facts About Chickens PowerPoint (1)

Activity 1: Egg Anatomy

* [Parts of an Egg PowerPoint (1)](https://docs.google.com/presentation/d/1L8eYsRniGgNa1ciMBE3MhtlC0ThUHAzo/edit?usp=drive_link&ouid=109918902593538910659&rtpof=true&sd=true)
* Unfertilized (grocery store) eggs (1 per group)
* Shallow containers (1 per group)
* Toothpicks (1 per student)
* [Parts of an Egg Diagram (1 per group)](https://drive.google.com/file/d/16fKQYMSiOVl1EeWZlbwwB-Z9SU2vy-Km/view?usp=drive_link)
* [Parts of an Egg Activity Sheet (1 per student)](https://drive.google.com/file/d/1S40IqlZ9dT6eBEp-9dNY_Vd_5fUv6okj/view?usp=drive_link)
* [Parts of an Egg Book (3 pages per student)](https://drive.google.com/file/d/1TKaLbCdtI4iIyvVt9WBta7askRvrhts1/view?usp=drive_link)

Activity 2: Air Transfer

* 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)

Activity 3: Charting Temperatures and Humidity — Hatching Eggs

* Incubator with fertilized eggs (1)
* A tool for measuring air temperature (1)
* A tool for measuring relative humidity (use the *Make a Wet-Bulb Thermometer Instructions* to make your own)
* Incubation Log (1 per student)

### Essential Files (maps, charts, pictures, or documents)

* [Facts About Chickens PowerPoint](https://docs.google.com/presentation/d/1kUNjuojBsS7OoAcBmvdKS3pk0MHBms4j/edit?usp=drive_link&ouid=109918902593538910659&rtpof=true&sd=true)
* [Parts of an Egg PowerPoint](https://docs.google.com/presentation/d/1L8eYsRniGgNa1ciMBE3MhtlC0ThUHAzo/edit?usp=drive_link&ouid=109918902593538910659&rtpof=true&sd=true)
* [Parts of an Egg Diagram](https://drive.google.com/file/d/16fKQYMSiOVl1EeWZlbwwB-Z9SU2vy-Km/view?usp=drive_link)
* [Parts of an Egg Activity Sheet](https://drive.google.com/file/d/1S40IqlZ9dT6eBEp-9dNY_Vd_5fUv6okj/view?usp=drive_link)
* [Parts of an Egg Book](https://drive.google.com/file/d/1TKaLbCdtI4iIyvVt9WBta7askRvrhts1/view?usp=drive_link)
* [Make a Wet-Bulb Thermometer Instructions](https://drive.google.com/file/d/1lVpHKOQUpU-D98qb1EbL5lj8kVilICNb/view?usp=drive_link)
* [Incubation Log](https://drive.google.com/file/d/1vB_7ONAI17PlIqeg-FoVea428rd4G6ZD/view?usp=drive_link)

# Lesson Set Up:

1. Display the Facts About Chickens PowerPoint (This can be printed and given to students or displayed)
2. Do the same for the Parts of an Egg PowerPoint.
3. Predermine students into groups (3-4 per group).
4. Make sure to have grocery store bought eggs (1 per student), shallow containers (1 per student), spoons or tooth picks ready for the students to use.
5. Print the Parts of an Egg activity sheet (1 per student) and the Parts of an Egg book (1 per student).
6. Have glue, scissors, and brads ready for the students to use.

Activity 2:

1. Before the lesson, hard boil eggs (1 per student) and let each sit in 1 cup of hot water with 20 drops of food coloring overnight.
2. Have raw eggs and a bowl of warm water ready.

Activity 3:

1. Have the fertile eggs and incubator ready to put eggs in.
2. Print Incubation logs (1 per student).

# VOCABULARY

**brooding:** to sit on eggs in order to hatch them

**chick:** a young chicken

**clutch:** a brood, or the group of eggs incubated together

**embryo:** an animal in the early stages of development

**hen:** female chicken

**humidity:** the amount of moisture in the air

**incubation:** the act of keeping an organism in conditions favorable for growth and development

**rooster:** an adult male chicken

# Ag Facts:

* Hens lay one egg approximately every 28 hours.
* A rooster is not needed for a hen to produce eggs for eating. Roosters are only needed to produce fertile eggs for hatching.
* Chickens can lay eggs in varying colors including white, dark brown, light brown, and even shades of green. There is no nutritional difference between eggs of different shell colors.
* You can tell what color of egg a hen will lay by looking at the color of her skin on her earlobe.

# Background information for teachers:

A chicken **embryo** needs nutrients, water, oxygen, and the proper temperature and **humidity** to develop into a healthy **chick**. An egg contains most of what a chick needs for survival while developing within the shell. Identifying the parts of a chicken egg and their functions can help students understand how a chicken embryo survives and develops.

The egg’s shell has more than 7,000 tiny pores that allow oxygen to pass into the egg and carbon dioxide to pass out. 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. The air cell, located between the inner and outer membranes at the large end of the egg, holds oxygen for the chick to breathe. The pores in the eggshell are larger and more numerous at the large end of the egg. This allows oxygen to enter the air cell easily. Just before hatching, the chick uses its egg tooth to puncture the air cell, which will provide about six hours of oxygen for the chick while it pecks its way out of the shell. The albumen (al **byoo** min), or the egg white, cushions the egg yolk floating within it and is the main source of protein and water for the embryo. The yolk provides food for the embryo. It is made up of fats, carbohydrates, proteins, vitamins, and minerals. The chalazae (kuh **ley** zee) are cords on two sides of the yolk that keep the yolk floating in the center of the albumen. Chalaza (kuh **ley** zuh) is the singular form. The germinal disc is the white spot on the yolk. This is where the female’s genetic material is found. When the egg is fertilized, the germinal disc becomes known as the blastoderm. This is what develops into a chick during **incubation**. As the embryo develops, blood vessels attach to the yolk to access nutrition and to the inner membrane to access oxygen and release carbon dioxide.

Typically, the mother **hen** lays one egg per day until she has completed a **clutch** of about 8–13 eggs. If the eggs have been fertilized by a **rooster**, chicks may grow and develop inside given the right conditions. Once she has a full clutch, the mother hen begins **brooding**, only leaving the nest at dawn or dusk to feed. Because the hen’s body temperature is generally 105–106°F, she is able to heat the eggs to 100–101°F by sitting on them. Incubators can substitute for the warmth of a hen, but must maintain the proper temperature; the incubator should hold 99–102°F.

Maintaining the correct humidity ensures that the air cell does not become too big or too small. The drier the outside air, the faster the fluid inside the egg evaporates and the faster the air cell grows. This causes the inner membrane to dry out and stick to the chick, which prevents the chick from turning inside the shell. If the humidity is too high, the chick may drown in excess fluid after it breaks into the air cell. Humidity can be measured using a wet-bulb thermometer. Relative humidity should be 50–55% for the first 18 days and then 65% for the last 3 days. Humidity can be maintained by adding the correct amount of water to the water tray that is included in most incubators; if an incubator does not have a built-in tray, simply place a shallow pan of water in the bottom.

It is important for the eggs to be turned so that the embryo does not adhere to the wall of the egg. The hen turns the eggs by using her beak to scoop under the egg and roll it. If an incubator is not equipped with an automated egg turner, the eggs must be turned manually. Eggs should be turned at least three times a day for the first 18 days.

# LEARNING PROCEDURES

Interest Approach:

1. Develop student interest and curiosity by using the *Facts About Chickens* PowerPoint to teach your students some basic facts about chickens and eggs. Pictures can be projected from a computer or printed.

### Procedures

Activity 1: Egg Anatomy

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.
3. 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.
4. Use the *Parts of an Egg* PowerPoint to explain the function of each part of the egg.
5. Divide the students into groups. Carefully break open one unfertilized (grocery store) egg per group into a shallow container.
6. 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.
7. Ask the students to fill out the *Parts of an Egg* activity sheet by cutting and pasting each egg part where it belongs.
8. Have the students create a *Parts of an Egg Book* by cutting out each egg.
9. Cut every egg, except the back cover, apart on the crack line.
10. Match each egg part with its corresponding function. Use two brads to connect the pages to the back cover.



Activity 2: Air Transfer

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.

Activity 3: Charting Temperature and Humidity — Hatching Eggs

1. Obtain fertile eggs and an incubator to incubate and hatch eggs in your classroom.
2. Explain to the students that maintaining the proper temperature and humidity of the incubator and turning the egg at least three times a day for the first 18 days is important to chick survival. If the temperature or humidity is too high or too low or the egg is not turned, the chick could be in danger.
3. Some incubators include automatic temperature and humidity controls, as well as automatic turners. Other incubators require temperature and humidity to be measured manually and eggs to be turned by hand. Train students on how to determine the incubator’s temperature and humidity. If a humidity reading is not available with your incubator, see the *Make a Wet-Bulb Thermometer Instructions*.
4. To help prevent problems during incubation, students will measure the temperature, relative humidity, and egg turning and record the data on their *Incubation Log*.

**Concept Elaboration and Evaluation**

After conducting these activities, review and summarize the following key concepts:

* Baby chickens are called *chicks*. Chicks develop inside an egg.
* Chicken embryos need food, water, air, and the proper temperature and humidity to develop properly inside the egg.
* Air passes in and out of an egg shell through tiny pores.

# Additional Learning Procedures

To help students review and elaborate more about poultry try using the [“Carousel”](https://drive.google.com/file/d/1voeMj4PD7xe55ILvRg54tW5HpTiCYaDr/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional texts to include:

[From Egg to Chicken](https://www.agfoundation.org/recommended-pubs/from-egg-to-chicken1)

[What’s for Lunch, Eggs](https://www.agfoundation.org/recommended-pubs/whats-for-lunch-eggs)

[Chickens (Farm Animals)](https://www.agfoundation.org/recommended-pubs/chickens1)



Source: <https://www.agclassroom.org/teacher/matrix/>

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*