

# Chicks in the Classroom



**South Dakota 4-H: Science of Agriculture**



**SOUTH DAKOTA STATE  
UNIVERSITY EXTENSION**

**Lessons for:  
Kindergarten-2nd Grade  
and  
3rd-4th Grade**

# ACKNOWLEDGEMENTS

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# Chicks in the Classroom

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# Introduction to Chicks in the Classroom

## Overview

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Chicks in the Classroom guides youth in exploring the science of chicken embryology as they follow the development of chicken eggs. Through the techniques of candling, youth will be able to observe the development and changes happening within the egg itself. The youth will experience the hatching process and monitor the first few days of the chick's life. Youth will also learn about the breeds of chickens that are commonly raised and egg production.

Chicks in the Classroom can be facilitated in multiple ways. Some common ways are partnerships between a 4-H program and classroom or afterschool program, or a classroom facilitating the program on its own. Depending on how the program is facilitated the distribution of duties will look different.

## Introduction to Embryology

Embryology is the study of how embryos grow and develop. Embryos are the earliest stage of development for a multi cell organism such as a plant or animal. It is the stage between the first cell division until birth, hatching, or germination. Just like a seed contains the embryo of a plant, a fertilized chicken egg contains the embryo of a baby chicken. Through chicken embryology youth are learning how a chicken develops in an egg.

Eggs are hatched in two different ways – by a broody hen or in an incubator. A broody hen is a hen that by instinct stays on her nest. In today's world of egg and chicken production very few chicks are hatched by hens. It would be impossible to raise the millions and millions of new chicks needed each year by hatching a few eggs at time under hens. Instead, farmers use electric incubators and can hatch thousands of eggs at a time. Similarly, an incubator will be used to hatch the baby chicks in the classroom.

## Introduction to Incubation

The development of the chicken embryo does not begin until incubation begins. In nature and on some farms, chickens sit on their eggs providing them with the heat and humidity required to begin this development. However, in settings where the mother hen is not available, an incubator can simulate this process and allows the embryo to develop.

An incubator is a box that provides and maintains a favorable environment for hatching fertile eggs. However, even under perfect conditions not all eggs will hatch. Hatching rates depend on the factors of temperature, humidity, egg position and air exchange being precise and maintained. It should take 21 days for chicks to hatch, but variables may impact hatch times.

There are four factors that are important to ensure the success of hatching fertile eggs in an incubator:

- (1) Temperature: Temperature is the most important of these factors. If using a forced air incubator the temperature should be 99.5°F. However, if using a still air incubator, then the temperature needs to be between 101° and 103°F with the bulb at the top of the eggs.
- (2) Humidity: Humidity is the measure of water in the air. The humidity of the incubator does vary by model type for forced air incubators, so instructors should read the instruction manual for their incubator. Follow the instructions that come with your incubator; however if there are no instructions a good rule of thumb is 35-55% for the first 18 days and then increased to 60-80%. Humidity is crucial to the hatching process.
- (3) Ventilation: Ventilation is movement of fresh air through the incubator. Eggs are very porous and allow oxygen in and carbon dioxide out, so it is important that the eggs have access to fresh air.
- (4) Egg Turning: Turning each egg several times daily prevents the embryo from sticking to the shell and ensures proper chick development. Automatic egg turners can be used with each incubator to make it easier for the educator and class. If the classroom does not use an automatic egg turner, then the eggs will need to be turned twice during the day so that the embryo doesn't get stuck to the shell. To help track rotation, a graphite pencil can be used to mark an X on one side of the egg. Hands should be washed before handling the eggs as the oils in the skin can reduce air exchange.

## Introduction to Candling

Candling is the act of shining a light into an egg to examine what is happening inside of it. This is best done in a dark room. The light is shone into the egg through the air cell (broad end of egg). The light allows blood vessels running

through the egg to be observed as well as other signs of embryo development. Through these observations, egg viability is determined. Over time, the air cell will grow larger; the blood vessels will disappear as they become part of the chick's body; and movement of the chick will be noted. Note: not all eggs will be viable.

Eggs can be candled as early as 3 days after being placed in the incubator; however, for this program eggs will be candled on Day 7. Be sure to limit the amount of time that eggs are out of the incubator so that they remain at a safe internal temperature. For best results, remove the eggs no more than 2 or 3 times and for only a few minutes at a time.

To get a good idea of what to look for when candling eggs, take a look at this video from Lancaster County 4-H: 'Candling Chick Eggs – Day 7': <https://www.youtube.com/watch?v=rYgJY8QTmYk>. This video also appears in Lesson 2 of both the grades K-2 and grades 3-4 curriculum. As noted in the video, a bright flashlight in a dark room works well for candling the eggs.

## **Introduction to Hatching**

On day 18 of incubation, the incubator will be put into 'lock-down' (more details can be found in the activity schedule) as the eggs are prepared for hatching. The humidity will be adjusted and eggs will no longer need to be turned. After this point, the incubator will remain closed unless to retrieve a hatched chick.

Once a chick begins to emerge from their shell, DO NOT help it out of its shell! If a chick is too weak to break out of its shell to hatch, it most likely is not strong enough to survive. These chicks may have deformities or are simply not ready to hatch. Not all of your eggs will hatch. Even eggs hatched by a broody hen only average a hatch rate of only 80% (Sonaiya & Swan, 2004).

Chicks should stay in the incubator for around 12 hours after hatching until they are completely dry and fluffy. Chicks will not require food for the first 24 hours, so there is no need to rush them to the brood box. Youth should not handle baby chicks for the first few days.

## **Introduction to Caring for Baby Chicks**

Once chicks are fully dry, they can be moved into a brood box. To move the chicks from the incubator to the brood box, gently scoop them up holding them under their chest. The brood box is simply a small container for the baby chicks that has the ability to provide them with anything they need. It can be made simply with a plastic tote or small kiddie pool.

All the essentials for a baby chick will be found in the brood box. A shallow container (less than 0.5 inches deep) for water is ideal. However, if it is slightly deeper, marbles can be placed in it to prevent chicks from drowning. When you place the chicks in the brood box for the first time, you will want to dip their beaks in the water several times per day to introduce them to it and teach them to drink. If you so choose, you may want to add electrolytes to the water. Electrolytes benefit the chicks by helping them to stay hydrated and healthy. You can purchase electrolyte powder to mix in the water at any farm store, or make a homemade version by mixing 1 cup warm water, 2 teaspoons molasses OR 2 teaspoons granulated sugar, 1/8 teaspoon salt and 1/8 teaspoon baking soda.

You will also need a shallow container for food, such as a plastic lid. Chicks instinctively peck at the ground, so a food dish that they can walk through is ideal. To ensure proper nutrition, chicks will need to be offered free choice of chick starter, a high protein small piece food. Be sure that chicks have access to feed at all times. Chick starter-grower feed is 20% protein, compared to 16% to 18% in a layer ration. This feed can be found at almost any local farm store and can be fed for the first four months.

In order to maintain an ideal temperature between 90 and 95°F, a heat source will also need to be placed in the brood box. It is recommended that a brooder heater is used rather than a heat lamp to help better maintain temperature. The chick behavior is a key indication of if it is too cold or too warm in the brooder as they instinctively try to maintain their body temperature. If chicks are huddled closely together near the heat source, lower the heat source or increase the temperature. If the chicks are avoiding standing near the heat source, raise the heat source or decrease the temperature.

The brood box also needs to have some sort of bedding. The bedding not only allows for keeping a cleaner environment for the chicks, but it also prevents them from slipping. Bedding can be wood chips, a towel, sand, or something similar. If using a loose material like wood chips or sand you will want to use enough to coat the bottom of the brood box with 2 inches of material. Newspaper or puppy pads can also be used, but it has a tendency to be smellier than other options. The bedding will need to be changed once per day in order to keep the environment clean.

## **Lesson Overview: Kindergarten – 2nd**

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### **Lesson 1: Eggs (30 min)**

In this lesson, youth will explore the various parts of an egg as they begin to study embryology.

### **Lesson 2: Candling (30 min)**

Youth will explore the role that incubation plays in egg development. Through the use of candling, youth will be able to determine if their eggs are developing.

### **Lesson 3: Chicken Breeds (30 min)**

There are a variety of types of chickens, and in this lesson youth will learn five common breeds. Youth will also learn about the difference between meat and egg laying chickens.

### **Lesson 4: Hatching (30 min)**

At this point the chicks are getting ready to hatch from their eggs. Students will explore the hatching process and learn about the next steps after the chicks hatch.

### **Lesson 5: Chick Development (30 min)**

In this lesson, youth will learn more about their baby chicks as they observe the differences between a baby chick and a chicken as well as begin to identify the different parts of a chicken.

## **Lesson Overview: 3rd – 4th Grade**

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### **Lesson 1: The Inside Story (45-60 min)**

Eggs play an important role during a chick's embryonic development. In this lesson, youth will learn about the parts of the egg and the role that each part plays. They will explore how a fertilized egg becomes a chick. Youth will also learn about the differences between hens and roosters.

### **Lesson 2: What's Happening (45-60 min)**

The best way to identify what is happening within an egg as it develops is to candle it. Candling involves shining a light through the shell to see what is happening within the egg. In this lesson youth will learn all about it and observe what is happening to the eggs in their classroom.

### **Lesson 3: Farm to Table (45-60 min)**

In this lesson youth will explore how eggs get to their table as they learn about the nutrition of eggs. Youth will also prepare for their chicks to begin hatching.

### **Lesson 4: Backyard Farm (45-60 min)**

Once the chicks begin to hatch out of their shells, their needs increase. In this lesson youth will explore what it takes to care for their baby chicks.

## **Bonus Lesson Overview**

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In this optional lesson, youth will have the opportunity to explore the egg and poultry industry. Youth will meet real poultry producers and learn about related careers. Virtual experiences are available, but the lesson also outlines how to bring a local professional into your classroom.

## **Education Standards: Kindergarten – 2nd Grade**

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### **South Dakota Science Standards**

**K-LS1-1** Describe patterns of what plants and animals (including humans) need to survive.

**K – ESS3-1** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

**1-LS1-2** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

**1-LS3-1** Construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

**2-LS4-1** Make observations of plants and animals to compare the diversity of life in different habitats.

### **Economics**

**1.E.1.2** Describe ways in which people earn money

**2.E.1.1** Identify goods and services available in the students' communities

### **Writing Standards**

**K.W.8** With guidance and support provide a response to a question using a combination of drawing, dictating, and writing by recalling information from experiences or gathering information from provided sources.

**1.W.8** With guidance and support, use background knowledge and/or information gathered from sources to respond in writing to a question

**2.W.8** Use background knowledge and/or information gathered from sources to respond in writing to a question

### **Agriculture Literacy**

#### **Plants and Animals for Food, Fiber & Energy Outcomes**

- Explain how farmers/ranchers work with the lifecycle of plants and animals (planting/breeding) to harvest a crop
- Identify animals involved in agriculture production and their uses (i.e., work, meat, dairy, eggs)
- Identify examples of feed/food products eaten by animals and people

#### **Culture, Society, Economy & Geography Outcomes**

- Discuss what a farmer does
- Trace the sources of agriculture products used daily

## **Education Standards: 3rd – 4th Grade**

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### **South Dakota Science Standards**

**3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

**3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms.

**3-S4-2** Use evidence and reasoning to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

**4-LS-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

### **South Dakota Math Standards**

**3.OA-A.** Represent and solve problems involving multiplication and division.

**3.OA-B.** Understand properties of multiplication and the relationship between multiplication and division.

**4.NBT.B.5** Use place value understanding and properties of operations to perform multi-digit arithmetic.

Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

## **Social Studies**

**3.E.1.1** Explain ways producers use resources to produce goods and services

## **Agriculture Literacy**

### **Plants and Animals for Food, Fiber & Energy Outcomes**

- Provide examples of specific ways farmers/ranchers meet the needs of animals
- Understand the concept of stewardship and identify ways farmers/ranchers care for soil, water, plants, and animals

### **Food, Health and Lifestyle**

- Identify careers in food, nutrition, and health
- Identify food sources of required food nutrients

## **Health/Nutrition (HEALTH)**

**Health Standard 1:** Comprehend concepts related to health promotion and disease prevention to enhance health.

- *1.2.1* Describe healthy behaviors impact personal health.



## PROGRAM PREPARATION

Consider when you want your chickens to hatch (not on a weekend; preferably a Tuesday or Wednesday to avoid early or late hatches happening on the weekend). They generally hatch around day 21, so count backwards from there to determine the dates of your program and overall timeline. There is a detailed timeline for both pre-planning and classroom activities following this preparation section.

### Materials

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#### Eggs

In order to be successful, you will need to obtain fertile eggs that are less than 10 days old for hatching. Most eggs sold in grocery stores are NOT fertile and cannot be used for incubation. This means that you will need to obtain eggs from a local producer or order them from an online source such as [cacklehatchery.com/](http://cacklehatchery.com/) or [strombergschickens.com](http://strombergschickens.com). Ideally you will want to obtain 24 eggs to ensure that you have plenty viable eggs; not all eggs will hatch.

Eggs should NOT be washed as it removes the protective barrier on the shell. If an egg is excessively dirty and has manure on it, it should not be hatched.

If you order your eggs online allow them to rest air sack side up (small end down) in a carton at room temp out of the sunlight for 3-4 days.

If eggs need to be stored prior to classroom activities, store them at temperatures of 50-60°F with 70% humidity. If they are to be stored more than 2 days prior to incubation, they should be rotated each day to prevent the yolks from sticking to the shell.

Be sure to transport fertile eggs in a protective carton with the small end down. Do not leave them in the sun or a hot car and don't let them get below 35°F.

#### Incubator

If you don't already have one, you will need to secure an incubator. There are several different options that you can select. The most economical version would be a Styrofoam Little Giant still air incubator as depicted in Figure 1. However, if your means allow, it is suggested that you select a clear top incubator similar to those in Figure 2 or Figure 3. The ideal incubator will also have an egg turner in it to eliminate the need of turning eggs manually.



Figure 1: 'Styrofoam Still Air Incubator'. [Amazon](#)



Figure 2: Clear Top Incubator: Incuview All in One Automatic Incubator with Egg Turner.' [Amazon](#)



Figure 3: Clear Top Incubator: Manna Pro Harris Farms Nurture Right Incubator.' [Amazon](#)

Incubators should be placed in classrooms away from drafts and direct sunlight. They should also be turned on and brought to temperature two days prior to placing eggs in them. It is a good idea to test the incubator before you ever receive your eggs.

### Instrumentation

While incubators have built in temperature and humidity units, it can be advantageous to obtain an additional external unit, like the one in Figure 4, to ensure the incubator is running properly.



Figure 4: Dual Sensor Humidity and Temperature Controller. [Amazon](#)

### Candling Light

While there are many items marketed specifically for candling eggs, a special light is really not needed. A high-intensity LED flashlight used in a darkened classroom will work just fine.

### Brood Box & Heater

A brood box will become the home for the baby chicks once they have completely dried after hatching. The box can be something as simple as a rubber tote or kiddie pool, or you can purchase a classroom brooder box, like that in Figure 5.

A brood box will need to maintain a temperature of 90-95°F and therefore a heat source (heat lamp or chick brooder specific heater (Figure 6)) will be needed. Brooder heaters are a safer classroom option.

This box will serve as a temporary home for the chicks once they hatch. It needs to be located somewhere that it can be kept warm and free from drafts. Ideally the temperature of the box will be kept at 90-95°F. This can be obtained by using a heat light bulb or a heater specifically designed for a brooder box. The bottom of the box should contain about 2 inches of wood shavings, straw, or sand to give the chicks better footing and to help keep the box clean. This material should be changed daily to keep the box clean and dry.

The box will also need to contain a waterer and feed dish.



Figure 5: 'Chick Starter Home.' [Amazon](#)

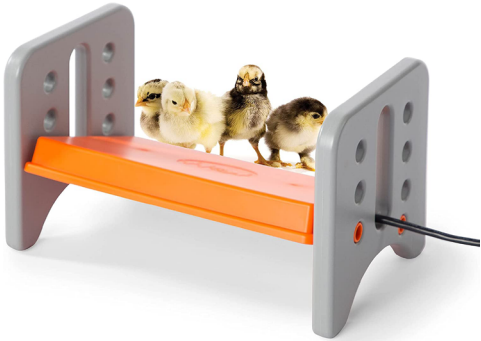


Figure 6: Poultry Brooder Heater.' [Amazon](#)

## Bedding

The bedding not only allows for keeping a cleaner environment for the chicks, but it also prevents them from slipping. Bedding can be wood chips (avoid cedar chips), a towel, sand, or something similar. If using a loose material like wood chips or sand you will want to use enough to coat the bottom of the brood box with 2 inches of material. Newspaper can also be used, but it has a tendency to be smellier than other options. The bedding will need to be changed once per day in order to keep the environment clean.

## Feed

Once your chicks have been moved to the brooder, a shallow container will be needed for feed and another for water. A plastic lid works well for containing feed as chicks instinctively peck at the ground and a food dish they can walk through is ideal. For water, be certain the dish is not more than 0.5 inches deep.

Baby chicks will be fed chick starter which is a high protein (20%) feed with small pieces ideal for baby chicks. The chicks will also need fresh water. You may elect to add electrolytes to give an additional boost to your baby chicks.

## Pre-Planning Checklist

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**30 days prior or earlier:** Meet with collaborators to discuss the project, lay out expectations and requirements of each partner. This plan should include everything from who is teaching the lessons to who is responsible for checking the incubators everyday (including weekends).

**30 days prior:** Identify a local poultry producer to donate fertilized eggs to the project, or you can purchase fertilized eggs online.

**30 days prior:** Identify homes for the baby chicks after they hatch. If the eggs are obtained through a local producer, that producer may be able to assist with this or even request that the chicks be returned to them. Otherwise, it is suggested that you work with local 4-H youth or chicken producers raising their own birds.

**30 days prior:** Discuss with your janitor that you have an incubator in the room and the classroom temp needs to remain stable.

**7 days prior:** Remind your janitor that you have an incubator in the room and the classroom temp needs to remain stable.

**3-4 days prior:** If you order your eggs online allow them to rest air sack side up in a carton in a room temp area out of the sunlight.

**2 days prior:** Deliver/Set up incubators in the classroom.

Incubators will need to be monitored and filled with water. This is a good task to complete before and after school. There is a daily incubator record in the Appendix that can be utilized to aid in this monitoring.

The temperature and humidity will also need to be monitored daily. The temperature of the forced air incubator (has fan) should be 99.5°F. If you are using a still air incubator, then the temperature needs to be between 101°F and 103°F, with the bulb at the top of the eggs. Overheating will speed up the rate of development, causing abnormal embryos, lower hatch rate or early death. The temperature should be consistent for at least 24 hours prior to adding eggs.

Humidity is important to controlling the water lost from incubating eggs. Follow the instructions that come with your incubator.

To set up your incubator, you must not only consider the temperature, humidity, ventilation, and turning the eggs regularly but also the location. The location of your incubator should be placed so that it is free from drafts of air and direct sunlight. Temperature is most important when considering the effectiveness for a good hatch. Ventilation from the incubator provides oxygen for the embryo to develop, while the gases given off by the embryo need to be removed.

Do not leave the incubator in direct sunlight or near open windows.

Prepare students for the project by introducing them to incubation.

**1 days prior:** Have eggs dropped off and if they are dropped off a day early, store them at temperatures of 50-60°F with 35-55% humidity. If they are to be stored more than 2 days prior to incubation, they should be rotated each day to prevent the yolks from sticking to the shell. Eggs with excessive manure should not be put in the incubator, however do not try to clean the eggs as eggs have a protective film that can be washed away. For this reason, also be careful not to get eggs wet when adding water to the incubator.

## Activity Scheduling Checklist

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**Day 0:** Eggs are then distributed to classroom.

For Kindergarten – 2nd Grade use Lesson 1: Eggs

For 3rd Grade to 4th Grade use Lesson 1: The Inside Story

Place eggs in incubator.

**Day 0-7:** Monitor heat and humidity levels and keep water reservoirs full by adding warm water. When you add water to the reservoirs do NOT get the eggs wet.

**Day 7-10:** For Kindergarten – 2nd Grade use Lesson 2: Candling

For 3rd Grade to 4th Grade use Lesson 2: What's Happening

**Day 8-14:** Monitor heat and humidity levels and add water as necessary.

**Day 14:** For Kindergarten – 2nd Grade use Lesson 3: Chicken Breeds

**Day 14-18:** Monitor heat and humidity levels and add water as necessary.

Prepare the brooder box as described earlier.

**Day 18:** For Kindergarten – 2nd Grade use Lesson 4: Hatching

For 3rd Grade to 4th Grade use Lesson 3: Farm to Table

Increase the humidity of the incubator to 60-80%.

Once the humidity has been increased, put incubator into 'lock-down' mode. Stop or remove the egg turner and either lay the eggs flat or place them in a foam egg carton with the wide side of the egg up. From now on, the number of times the lid is opened should be limited to when chicks need moved as changes in humidity level in the incubator can impact the other eggs/chick's survival.

**Day 18-21:** Monitor egg activity

As eggs hatch remove the chicks from the incubator and place them in the brood box after they have dried, approximately 12 hours. At 12 hour mark, if other eggs have pips in them leave the newly hatched chicks in incubator and monitor progress.

For 3-4th Grade use lesson 3: Farm to Table " It is labeled NUTRITION on the power point" Change Power Point to reflect "Farm to Table" name.

**Day 21 or 22:** For 3rd Grade to 4th Grade use Lesson 4: Backyard Farm

**Day 24-27:** Last day to hatch

Discard all remaining unhatched eggs after 60 hours since the first chick has hatched.

Turn off incubator and clean. Remove all egg shells and debris, and disinfect surfaces that had contact with hatching eggs (water trays, hatching floor) with a mild bleach solution.

**Day 26-28:** For Kindergarten – 2nd Grade use Lesson 5: Chicken Development

For 3rd Grade to 4th Grade use Lesson 5: Meet a Chicken Farmer

**Day 26- 31:** Chickens go home with their new family

**Day 32+:** Collect all equipment

## Teacher FAQ:

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Answers below are the 'quick answers', with more in depth explanations throughout the guide.

### **How long does it take for chicks to hatch?**

Eggs are fairly consistent about hatching at 21 days, but do be aware there is a range. For this reason, it is advised to plan day 21 for the middle of the week. Smaller eggs (bantam breeds) may hatch a day sooner, and a slightly cooler (or warmer) temperature may affect incubation period by a day. No egg should take longer than 23-24 days.

### **What materials do I need to hatch chickens in my classroom?**

Ideally, you will want an incubator (styles and qualities range, but almost any style will work), a thermometer, a hygrometer, an egg turner (especially important in a classroom setting where individuals are not available to turn eggs on the weekend), a brooder box for hatched chicks, a heat lamp or brooder heater (safer for classrooms), and chick starter feed.

### **How do I select an incubator?**

Almost any style of incubator will work. Things to consider and look for are costs (most will cost about \$100, but they can range from \$50 to a few hundred dollars), having a viewing window (which will reduce the temptation to open the lid unnecessarily), egg turners, ease to clean, and ease to add water without opening the lid or touching the eggs with the water.

### **How many eggs can be set in the incubator?**

The rule of thumb is that an average "large egg" placed on its side needs 3  $\frac{3}{4}$  square inches. Calculate the floor area of your incubator and divide by 3  $\frac{3}{4}$  in. Remember, it is unlikely that all eggs will be fertile and develop, and so you may remove eggs (thus freeing up space prior to hatching) when candling eggs.

### **What conditions do I need to create for the eggs?**

Prior to hatching, eggs should be stored in a cool area with a humidity near 70%.

### **Where do I get the eggs?**

Eggs can be purchased online (such as [strombergschickens.com](http://strombergschickens.com)) or from a farm that has laying hens and at least one rooster. Many farms will be willing to give you eggs for free, especially if you offer to return the chicks to the farm after hatching. Eggs should have been laid within 10 days prior to starting incubation.

### **How do I care for the chicks once they have hatched?**

During hatching, open the lids as few times as possible. Hatched chicks can stay in the incubator for up to 24 hours, and so there is no reason to remove each chick as it hatches. Wait until they are fluffy and you have multiple chicks to remove (or you are confident no more eggs are hatching).

Chicks are fairly simple to care for once hatched. The heat lamp or brooder heater should maintain a temperature of 90-95 degrees for the first week. Watch the chicks, and if they are bunched up under the heat source, move it closer to the chicks or turn the temperature up. If chicks are spread out and avoiding the heat source, raise it or turn the temperature down.

Chicks must be provided with food and water, and have their beaks dipped in the water when first placed in brooder.

### **What do I do with the chicks once we wrap up our lessons?**

Prior to starting your lessons, you will want to determine the home for your chicks. This may be the farm you received your eggs from, or reach out to your local 4-H advisor to see if they may know of a 4-H poultry project member willing to take them! That member may also be available to assist and mentor throughout the course of the incubation period.

### **Are there health risks associated with having chicks in my classroom?**

Although extremely rare, salmonella is a potential risk. Emphasizing the importance of sanitation and good hygiene before and after handling any eggs and chicks is an important lesson for the students and reduces the health risk associated with the project to almost zero.

### **What is lockdown day?**

Lockdown happens on day 18. We need to increase the humidity to 60-80%. Depending on your incubator of choice there are some different ways to do this. You may fill more of the water reservoir under the eggs. You may need to add wet kitchen sponges to get your humidity higher.

## **STUDENT FAQ:**

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### **Can all chickens fly?**

While some lighter breeds can fly very short distances, for most chickens, their body weight is too heavy to allow for flight.

### **Why do some yolks have different shades of yellow?**

Different colored yolks for different diets of chickens, rather than being related to shell color. Often though, eggs being marketed as brown eggs have a diet that makes the yolks darker.

### **Can more than one chicken hatch from an egg?**

Yes, but it is extremely rare. There are two ways that this can happen. The first, and most common is when a fertilized egg has a double yolk. The second, and least common, is when a fertilized single yolk egg has two fertilized germs.

### **Why does my egg have two yolks?**

Double yolk eggs are most commonly produced by young chickens who are just starting to lay eggs. Their egg-forming organs have not fully adjusted or synchronized and release two yolks at once.

### **Why are some eggs brown?**

The breed of chicken determines the color of the egg. If you look at the ear lobe of a chicken it will mostly likely produce that color of egg; i.e. red ear lobes = brown eggs.

### **How many roosters are needed for a group of hens?**

Chickens, unlike other birds like penguins and geese, do not mate for life. One rooster can fertilize the eggs of a dozen or so hens.

### **How old are chickens when they begin laying eggs?**

Chickens may begin to lay eggs at 4-6 months of age.

### **How do you tell if the chick is a boy or girl?**

Identifying the gender of a chick is very difficult. Only trained individuals are able to tell the difference. They do this by examining the external organs or observing the length of the chicks' wing feathers within the first days of hatching.

### **How long do chickens live?**

How long a chicken lives depends on the type of chicken. A broiler chicken, which is used for meat, will grow to be 6-8 weeks old before going to market. Chickens that are utilized for producing eggs generally are kept until they are 18-20 months old. If chickens are allowed to live out their lives naturally, they live an average of 6-10 years.

### **Do different colored eggs have different nutrition values?**

Generally speaking, the color does not determine the nutrient value of the eggs. The chicken's diet can affect the nutritional content of the egg, and typically those who are focusing on nutrition of eggs (aka high omega 3), purchase breeds that lay brown eggs. Additionally, the breed of the chicken can impact the nutritional value, so producers interested in focusing on nutrition (like high omega 3) may select a specific breed that lays a specific color of egg.

### **When a chicken is sitting on her eggs, do they leave them to eat and drink?**

Yes, hens are able to leave their nest for up to 15- 20 minutes when they are sitting on their eggs. Unless the temperatures are extremely cold the eggs should be able to maintain their temperature for this short amount of time. If she stays off too long or abandons the nest the eggs won't hatch.

### **Do fertilized eggs always hatch?**

Not all fertilized eggs will hatch. Hatchability is influenced by the age of the eggs at setting, conditions before incubation, parents (health and diet), and conditions during incubation. You should expect approximately 50-75% of eggs to hatch in ideal conditions.

## Supplementary Resources

While we have provided you with the minimum requirements to have a successful program, there are a variety of resources that can enhance your hatching program. Here are some suggestions that we have for you:

- **Chicken Life Cycle Models:** [https://www.amazon.com/learning-resources-chick-cycle-exploration/dp/b001sca71g/ref=asc\\_df\\_b001sca71g/?tag=hyprod-20&linkcode=df0&hvadid=312435068336&hvpos=&hvnetw=g&hvrnd=3442080672184007987&hvpon=&hvptwo=&hvqmt=&hvdev=c&hvdvcmid=&hvlocint=&hvlocphy=9020510&hvtargid=pla-423563492075&psc=1](https://www.amazon.com/learning-resources-chick-cycle-exploration/dp/b001sca71g/ref=asc_df_b001sca71g/?tag=hyprod-20&linkcode=df0&hvadid=312435068336&hvpos=&hvnetw=g&hvrnd=3442080672184007987&hvpon=&hvptwo=&hvqmt=&hvdev=c&hvdvcmid=&hvlocint=&hvlocphy=9020510&hvtargid=pla-423563492075&psc=1)
- **Egg Laying Chicken Growth and Development Poster:** Chicken Growth & Development – White Leghorn Hybrid Pullet (resource from Lancaster County 4-H). [<https://lancaster.unl.edu/4h/embryology/ChickGrowthDevelopment17x22.pdf>]. This resource is utilized in Lesson 5 of the K-2 Curriculum. Links are also found within that lesson.
- **Meat Chicken Growth and Development Poster:** Chicken Growth & Development – Cornish/Rock Market Broiler Cockerel (resource from Lancaster County 4-H). [<https://lancaster.unl.edu/4h/embryology/ChickGrowthDevelopment17x22Broiler.pdf>]. This resource is utilized in Lesson 5 of the K-2 Curriculum. Links are also found within that lesson.
- **National Ag in the Classroom Chicken lessons:** [https://agclassroom.org/matrix/search\\_result/?search\\_term=chickens](https://agclassroom.org/matrix/search_result/?search_term=chickens)



# **Appendix A: Chicks in the Classroom Program Resources**







# Safe Handling of Chicks!

- Only handle one chick at a time.
- Hold the chick with both hands, but DO NOT squeeze.
- Keep your face away from the chick.
- Keep your hands away from your face, mouth and eyes while you are handling the chicks and until you have properly washed your hands.
- Wash your hands or use hand sanitizer.



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## Chicks in the Classroom - Letters Home

Dear Parents/Guardians,

For the next 28 days our classroom will embark on an exciting educational experience of hatching baby chicks, right in our classroom. This is an experience that your youth will remember for a very long time, and we want them to have a very successful experience. We will be guiding them along the way as they explore embryonic development, candling (looking into the eggs with a flashlight), the nutrition of eggs, and then the process of hatching. Once the chicks have arrived the youth will learn how to care for the baby chicks. We will review with the class the safe handling, and students will wash their hands before and after handling the chicks.

This type of education brings an enthusiasm to learning and we are lucky to share this experience with each student. We encourage you to ask your youth about their experiences each day. If you have questions or concerns please let us know.

Sincerely,

# **Appendix B: Youth Evaluation**

## Grades K-2 Evaluation

Please circle the correct answer to each question.

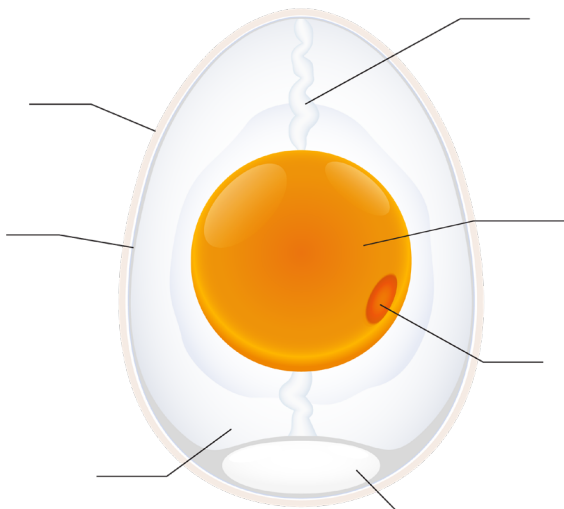
1. Which animal lays eggs?  
Cat                      Horse                      Chicken
2. What is the box called that is used with hatching chickens?  
Litter Box                      Incubator                      Elevator
3. What is the process called looking inside the egg to see if there is a baby chicken?  
Candling                      Flashlighting                      Lifting
4. What color is not a color a chicken egg can be?  
Silver                      Brown                      Blue
5. What is the hole called that the chick makes in the egg at the start of hatching?  
Round Hole                      Manhole                      Peep Hole
6. Can chicks in the egg make noise?  
Yes                      No
7. What is the large yellowish part of the egg called?  
Yolk                      Egg White                      Shell
8. Which of the following is not a type of chicken?  
Egg Layer                      French Pie                      Meat Type
9. Which of the following is needed to help hatch eggs?  
Chicken Food                      Water                      Visit by the principal
10. What is a female egg laying chicken called?  
Jimmy                      Rooster                      Hen

## Grades 3-4 Evaluation

Please circle the correct answer to each question.

1. It takes roughly \_\_\_\_\_ for a chicken to hatch.  
11 days                  16 days                  21 days
2. A male chicken is called a \_\_\_\_\_.  
Hen                          Buck                          Rooster
3. A female chicken is called a \_\_\_\_\_.  
Hen                          Doe                          Rooster
4. The temperature of the \_\_\_\_\_ should be 99-101°F for the first 18 days.  
Brooder Box                  Humidifier                  Incubator
5. A \_\_\_\_\_ is a young chicken (male or female) being grown for meat production.  
Hen                          Rooster                          Broiler
6. A baby chick that is not fully developed is called a(n) \_\_\_\_\_.  
Albumen                          Embryo                          Hatchling
7. Candling eggs allows you to see \_\_\_\_\_ as well as other key structures.  
Blood Vessels                  Proteins                          Feathers
8. Eggs are a great source of \_\_\_\_\_ for a nutritious diet.  
Vitamin C                          Fiber                          Protein

### Label parts of the egg



Shell Membranes  
Germ Spot  
Albumen  
Chalazae  
Shell  
Yolk  
Air Cell



# Appendix C: Educator Evaluation

We want to thank you for making the Chicks in the Classroom project a part of your classroom!

We would greatly appreciate any feedback you may have about this program. It will help us to make improvements as well as track the reach that it has had.

To provide feedback, you may follow this link:  
<https://sd4-hchickseducator.questionpro.com>

or

scan this QR code:



# **Appendix D: Completion Certificate**



**SOUTH DAKOTA STATE  
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**Congrats You Have Completed Your  
Embryology Training!**

**EGG-CEPTIONAL WORK**

**ON THIS DAY**



**FOR**

SDSU Extension 4-H Program Advisor \_\_\_\_\_

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