

HATCHING SCIENCE WITH CLASSROOM CHICKS

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NEVADATEACH

Why Hatch Chicks in the Classroom?

Hatching chicks in the classroom can be an effective way to:

- Increase student engagement
- Investigate how organisms change and develop over time
- And study embryology, life cycles, heredity and animal needs

Benefits of Chickens In Permaculture

- Chickens eat many scraps, and in doing so create manure that is rich in Nitrogen. This not only helps with plant growth, but also creates a wonderful compost when mixed with clippings and rotting leaves.
- Chickens are known for not only eating weeds that appear in gardens, but also insects that may damage plants.
- Chickens often till the soil, which aerates the top layer of soil, making it beneficial for organisms such as worms and the next batch of plants. This also helps water permeate through the soil.

What Is The NGSS Connection?

- 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-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all
- 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Activities For Teaching Eggology

- Activity 1: Egg Anatomy
- Activity 2: Air Transfer
- Activity 3: Creating Optimal Conditions
- Activity 4: Chick Life Cycle & Hatching Chicks

ACTIVITY 1: EGG ANATOMY

Purpose

- Students will identify the various components of an egg, understanding that everything a chick needs to develop, grow and eventually hatch is provided within its shell.

Related Standard

- 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Things To Do

- Egg Dissection
 - Students will dissect an egg and identify the various structures found within using the *Parts of an Egg Diagram*.
- Egg Model Creation
 - Students will create a physical model of the inside of an egg, learning the functions of the structures that provide everything a chick needs to grow and develop.
- Review With Creation of *Parts of an Egg Book*
 - Students will review the parts of an egg by creating a booklet, applying their knowledge gained through the egg dissection and model creation.

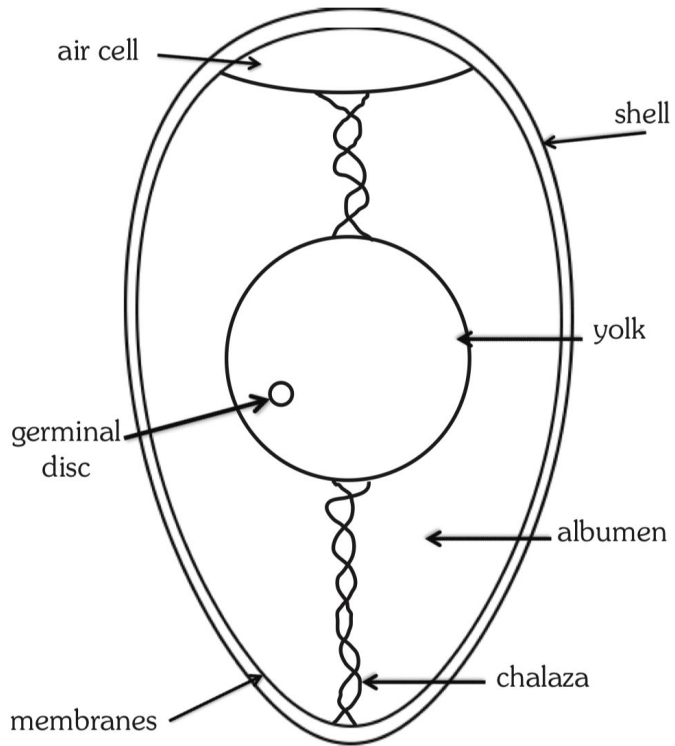
Materials

- *Parts of an Egg* PowerPoint
- Unfertilized (Grocery Store) Eggs
- Paper Towels
- Gloves
- Shallow Containers
- Toothpicks
- *Parts of an Egg* Diagram
- Paper Cups
- Plastic Wrap
- Cotton Balls
- Cardstock
- Scotch Tape
- Yellow Beads
- Pipe Cleaners
- White Paint
- *Parts of an Egg* Book
- Brass Fasteners
- Scissors

Instructions For Egg Model Creation

- Obtain a paper cup and cut it into two, lengthwise, from top to bottom - each student will need one of the halves. This will represent the shell.
- Line the inside of the cup with plastic wrap and tape along the edges around the outside of the cup. This will represent the membrane.
- Trace the bottom circle of the whole paper, cut it out, and cut it in half. Tape this semi-circle to the bottom of the half-cup. This will represent the air cell.
- Obtain a cotton ball, pull on it to enlarge it. Place this flat onto the plastic wrap. This will represent the albumen.
- Twist two pipe cleaners together into the shape of a double-helix, and slide the yellow bead onto the pipe cleaners. These will represent the chalaza and the yolk.
- Tape the twisted pipe cleaners vertically along the inside of the cup, ensuring the bead is in the center of the cotton ball.
- Using the toothpick, paint a white dot onto the yellow bead. This will represent the germinal disk.

Parts of an Egg Diagram



ACTIVITY 2: AIR TRANSFER

Purpose

- Students will be able to understand how air is transferred through the pores in the egg shell to provide growing chicks with the oxygen necessary for their survival.

Related Standard

- 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Things To Do

- Observe Hard-Boiled Eggs
 - Students will make observations about a dyed hard boiled egg looking at the more than 7,000 pores that are accentuated by the dye.
- Pore Comparisons
 - Students will compare the size of the pores on the large end of the egg, where the air cell is located, versus the rest of the egg.
- Peel Hard-Boiled Egg
 - Students will peel the eggs to see that the food dye, just like oxygen, will enter through the pores of the egg shell to reach the developing embryo.
- Observe Raw Eggs
 - Students will observe a raw egg in warm water, noting the bubbles that are created from the pores on the surface of the shell.

Materials

- Hard-Boiled Eggs
- Food Coloring
- Hand Lenses
- Raw Eggs
- Shallow Containers
- Warm Water

ACTIVITY 3: CREATING OPTIMAL CONDITIONS

Purpose

Students will be able to understand what the optimum temperature and conditions the eggs need to be incubated in to hatch and survive after hatching.

Related Standard

- 3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all

Things To Do

- Egg Incubation
 - Students will understand that the need for a system to imitate the optimal conditions a hen would create for the developing chick can be done through the use of an incubator.
- Simulating a Nest
 - Students will understand that growth still occurs when the chick has hatched from its egg, so optimal conditions still need to be created and maintained.

Materials

- Incubator
- Fertilized Eggs
- *Incubation Log* Worksheet
- Brooder Pen
- Brooder/Brooding Lamp
- Thermometer
- Cedar Bedding
- Poultry Feed
- Water Dispenser
- Feed Dispense

Creating a Perfect Environment for Chicks & Humans

- Preventing the Spread of Disease
 - Diseases, like Salmonella, can be passed from human to chicken and vice versa. Before and after holding the baby chicks, hands must be washed thoroughly.
- Treating the Eggs and Chickens Humanely
 - Eggs are fragile, and contain a developing chick inside. Excessive handling can disrupt the development cycle. Eggs have pores, so the spread of airborne diseases can occur. Limit the interaction with incubating eggs.
 - Chickens, when hatched, are very fragile and still need to continue developing. Always hold the chicks with two hands. Limit the human and chicken interaction when possible.
- Maintaining a Mess-Free Environment
 - Baby chicks are incredibly messy. Clean out their enclosure once a week to ensure chick and human health is maintained.
- Growth Is Still Occuring
 - The baby chicks will not stay babies forever. They will need homes after they hatch. Make arrangements for a forever home before starting the incubation process.

ACTIVITY 4: CHICK LIFE CYCLE & HATCHING CHICKS

Purpose

Students will understand that chickens, like humans, go through a cycle of growth and development.

Related Standard

- 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

Things To Do

- Life Cycle Observation
 - Students will watch the *Chicken Embryo Development* YouTube video showing the progression of embryo development.
- Egg Candling
 - Students will use candling lamps to see inside of the eggs and will also use life cycle models to help visualize the embryonic growth that is occurring.
- Countdown to Hatch
 - Students will use the *Countdown to Hatch* kits, from *Ag In The Classroom*, to learn about what is occurring at the individual stages

Materials

- *Chicken Embryo Development* Video
- Chicken Life Cycle Models
- Candling Lamps
- *Countdown to Hatch* Kits

ABOUT US

KELBY LINDBERG

A born and raised Nevadan who enjoys being outdoors, Kelby is an undergraduate student at the University of Nevada, Reno, majoring in Agricultural Science, Environmental Science and Secondary Education. He plans to be a teacher and looks forward to getting students involved in the outdoors around them while appreciating the hard work it takes to be successful in life.

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ASHLEN REID

Ashlen was born in Las Vegas and is currently a senior at the University of Nevada, Reno. Ashlen will be graduating this Spring semester through the NevadaTeach program, where her major is Biology. Following graduation, she plans on teaching in Washoe County and implementing project based lessons (PBL) in her classroom. Ashlen has also been lucky enough to work for Mountain View Montessori for the past three years, and is excited to bring her knowledge of an efficient and successful school garden to her future jobs.

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NOAH WALLS

Noah is a sophomore at the University of Nevada, Reno (UNR). Originally from Las Vegas, Noah witnessed the beginning of the urban school gardening revolution that is currently underway, inspiring him to declare a major in Agricultural Science and develop the necessary skills to teach his future students about how their food is grown and harvested. At UNR, Noah works as a peer mentor for the NevadaTeach Program and can be seen helping entry-level students write inquiry-based lesson plans, prepare materials for their classroom practicum experiences and even raising broods of chicks!

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Resources

These lessons and the activities involved were adapted from NevadaTeach (NVTC) pre-service teachers and the Eggology (Grades 3-5) lessons created by the National Ag In The Classroom organization. For more information visit: www.agclassroom.org

Materials We Use

- Brinsea Products Mini II Advance Automatic 7 Egg Incubator
- Brinsea EcoGlow Brooder for Chicks or Ducklings
- Brinsea Products Candling Lamp for Monitoring The Development of The Embryo within The Egg
- Farm Innovators Model 3700 Baby Chick Starter Home Kit
- Miller Manufacturing 740 Mason Jar Water Base
- Harris Farms Galvanized Feeder Base Jar, 1 quart
- Purina Start & Grow Starter/Grower Non-Medicated Feed Crumbles, 5 lb Bag
- Learning Resources Chick Life Cycle Exploration Set



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