Inside the Egg, Hatching Chickens

Integrated Core—Grade K-2; Science—Grade 3

Materials

Activity 1

- Fertile eggs (*for more information on obtaining eggs, incubators, and other resources necessary for hatching chicks, please see the AITC embryology website:* http://extension.usu.edu/aitc/chicks)
- Modeling clay, black construction paper, tape, scissors, small paper plate
- One six-inch high-intensity LED flashlight, such as a "Mini Maglite©"
- One pint-sized milk "chug" carton with packaging wrapper removed

Activity 2

- *Inside the Egg* activity worksheet, one for each child
- Scissors, glue, and crayons or colored pencils
- Two dinner-plate-sized paper plates, for each child
- Metal craft brads, one for each child

Background

Embryology is the science that deals with the growth and development of an embryo. Using fertile eggs, from a chicken, to investigate animals and life cycles through the study of embryology can be an effective way to increase excitement and teamwork, and enhance life lessons.

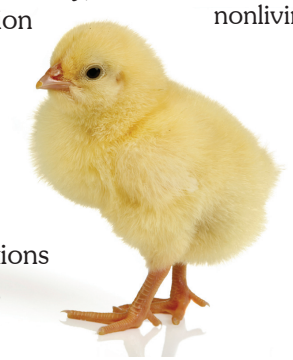
A rooster mates with and fertilizes a hen's egg yolk before the hen lays the familiar hard-shelled egg. Each fertilized egg becomes an embryo that, under the right conditions, will grow to be a chick. The yolk and albumen of the egg provide food for the growing embryo. The albumen, or white of the egg, also provides the embryo with protection against shock because it's like a watery sac. The blunt end of the egg contains the air cell. Just before the embryo breaks out of its shell, it takes its first breath of air from this air cell.

Hens that have not mated with a rooster will still lay eggs. Because these eggs have not been fertilized, they are not fertile and will not become embryos. Eggs sold in the grocery store are infertile.

Hatching Eggs in the Classroom:

Eggs are incubated in two different ways—by a broody hen or by an incubator. Obviously, for the classroom, the incubator is the preferred method. There are two types of incubators—still-air and forced-draft. Both types can be used in a classroom setting, although the forced-draft type is most commonly used. Successful egg hatching requires the right temperature, humidity, ventilation, and egg rotation.

Raising chicks and chickens has become a very popular hobby, especially in urban areas. Due to the demand for information and materials, Utah AITC created an embryology website http://extension.usu.edu/aitc/chicks. This site was developed to help teachers hatch eggs successfully in their classrooms. Teachers can find information on how to obtain fertilized eggs; where to buy reliable, yet inexpensive incubators; a checklist for necessary materials; a step-by-step guide for successfully hatching eggs; instructions and ideas for caring for the chicks after they have hatched; and frequently asked questions.



Agriculture in the Classroom
UtahStateUniversity
COOPERATIVE EXTENSION

Time: Activity 1: Up to 1 hour, *dependent upon the number of eggs*
Activity 2: 45 minutes

Grade Levels: K-3

Grade K
Standard 3
Students will observe and describe animals in the local environment.

Objective 2
Observe, describe, draw, and compare familiar animals. Describe how young animals are different from adult animals. Describe how animals care for their young. Distinguish between real and make-believe animal behaviors.

Grade 2
Standard 3
Students will develop an understanding of their environment.

Objective 1
Investigate relationships between plants and animals and how living things change during their lives. Describe the life cycle of animals using diagrams and pictures. Describe relationships between plants and animals.

Grade 3
Standard 2
Students will understand that organisms depend on living and nonliving things within their environment.

Objective 1:
Identify characteristics of living and nonliving things.

Activity 1: Candling an Egg

1. Candling an egg is a simple and effective way to show students that there is life inside the eggshell. Candling means to shine a bright light through the shell to examine whether the egg is fertile and the embryo is viable for incubation/hatching.

2. If you have eggs with white shells, you should candle the eggs around the fourth day after they have been laid. Dark-shelled eggs, however, will give more accurate results after about a week. Any dirt on the shells should be brushed away, *not washed* away. Washing eggs can lead to the introduction of bacteria inside the shell and can harm the embryo.
3. Using the materials listed for this activity, make an egg candler by first placing the base of the flashlight into the modeling clay. Place the flashlight/clay on the small paper plate. The clay will hold the flashlight in an upright position. Next, cut the base of the milk container off and wrap the container with black construction paper using tape to keep it together. Try to tightly cover as much of the plastic bottle as possible so that the light will be directed toward the opening on top. Next, set the bottle down over top of the flashlight structure. Using another piece of clay, wrap it around the top of the bottle to seal any gaps between the construction paper and the top. This will also create a better base upon which to set your egg. Finally, carefully place 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 micro-cracks can inhibit successful hatching.

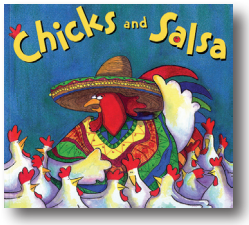
4. In a fertile egg, there will be a fine network of veins running out from a dark center. "Clears" (those with no visible embryonic development) are infertile, while an egg with a few small blood spots is a fertilized egg in which the embryo has died. Check out this website to see some visual examples of fertile and viable eggs and some bad eggs: http://shilala.homestead.com/candling.html.

5. Ask the students to determine which is the living thing—the eggshell or the embryo? Why is the embryo alive? What are the characteristics of a living thing (*breathes, eats, has body organs*)?
6. Have the students discuss the needs of the egg from the hen. Could the egg hatch on its own without the help of a hen or human (like

Cluck for Chicken Fiction

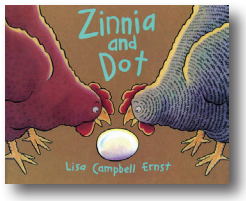
These books tell some great tall-tales about chickens.

Chicks and Salsa



A rollicking story about a rooster that is a little smarter than the average barnyard animal. Farmer Nuthatcher's chickens are tired of their regular feed, and it just so happens that the rooster has been watching cooking shows over the farmer's wife's shoulder. He has some ideas, beginning with chips and salsa. In no time at all, the barnyard is filled with "Fiesta!" This story is a fun food-filled cuisine adventure that students will love.
Author: Aaron Reynolds
ISBN: 978-1-59990-099-5

Zinnia and Dot



Two hens have such pride in their eggs that it overshadows all sense of perspective and results in the theft, by a wily weasel, of all but one of the eggs. The remaining egg then becomes the source of even more rancor until a pair of doves persuades the feuding families to share the responsibility of sitting on it. A winning tale of a friendship that triumphs over vanity. A good story for incorporating and discovering the importance of teamwork.
Author: Lisa Campbell Ernst
ISBN: 978-0670830916

in the incubator)? *No*. How is this similar to a child's reliance on their parents? How does this differ from plants? Do plants require a parent to take care of them?

7. How are plants and animals similar? How are they different? How do plants and animals differ from rocks (non-living)?
8. 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 things are often done by the hen. The hen knows how to do all of these things by *instinct*, or a natural behavior. Animals have instincts or behaviors that help them find food, shelter and other necessities that help them stay alive without human help.
9. Have the students list the needs of a baby or child. How does an adult know how to care for a baby or child? (*Some instinct, but we can also learn from our parents or other adults, read books or gain knowledge by learning in other ways*). Help the students to understand that people, animals, and plants are all living and have life cycles, but that each is very different in their needs and the ways that those specific needs are met.

Activity 2: Inside the Egg, Lifecycle Wheel

1. Give each student a copy of the *Inside the Egg* worksheet.
2. Have them color the worksheet and cut along the dashed lines as indicated on the page.
3. Glue the largest square in the center of one of the paper plates and have the children write their names below the square. This will be the lifecycle wheel cover, titled *An Egg Hatches*.
4. Have the students put the remaining stages of development in numerical order according to date. *Day 1* should be listed first and *Day 21* should be listed last. Now students should paste their squares (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 paper plate. Lay this paper plate over top of the second paper plate. Finally, place a metal brad through the center of both paper plates so that a rotating storyteller is formed.
6. Place the students in pairs and have the students share their story with another student.

Additional Resources

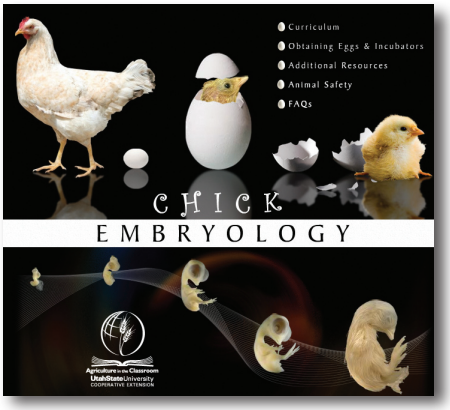
Chicken and Egg

A basic nonfiction book about the birth of a chicken. Full-color photographs show what is happening inside the egg. Also available in a "big book" format.
Author: Christine Back
ISBN: 978-0440846253

Backyard Chicken.com

This website contains additional information on egg candling, hatching tips, and handling young chicks. There are some excellent video clips, especially of chicks developing inside the egg. http://backyardchickens.com/LC-candling.html

Chick Embryology AITC Website

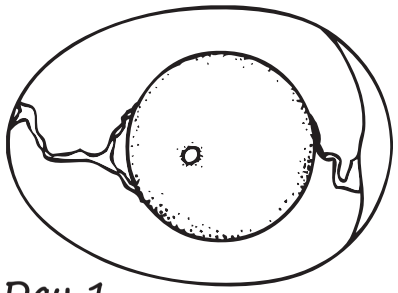


The website was developed to help teachers hatch eggs successfully in their classrooms. Teachers can find information on how to obtain fertilized eggs; where to buy reliable, yet inexpensive incubators; a checklist for necessary materials; a step-by-step guide for successfully hatching eggs; instructions and ideas for caring for the chicks after they have hatched; and frequently asked questions. Visit today: http://extension.usu.edu/aitc/chicks

Inside the Egg

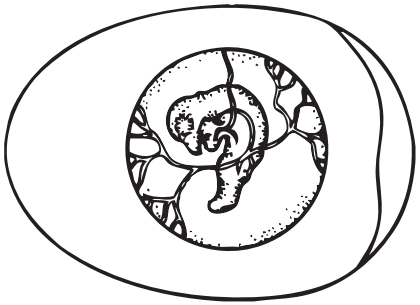
Color each of the pictures. Use scissors to cut on the dotted lines. Place the largest picture, "An Egg Hatches," in the center of a paper plate. Line up each of the remaining pictures in numerical order, starting with *Day 1* and ending with *Day 21*. Glue them in order around the edge of a separate 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 each of the steps of egg hatching as you rotate the bottom plate. Now you can tell the story of a chick hatching from an egg.

Cut here



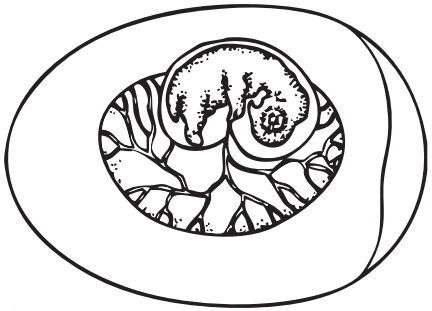
Day 1

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



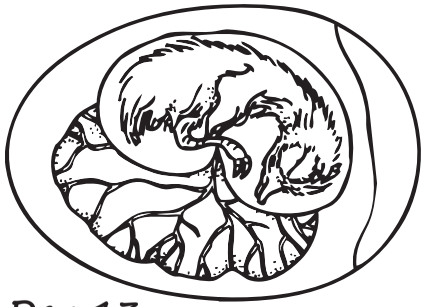
Day 3

Can you see the chicken's head and heart?



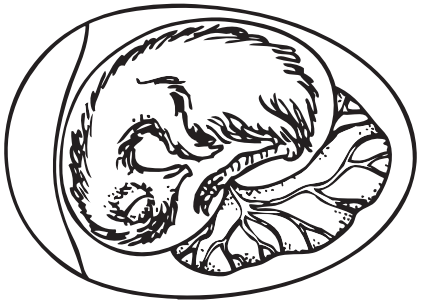
Day 6

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



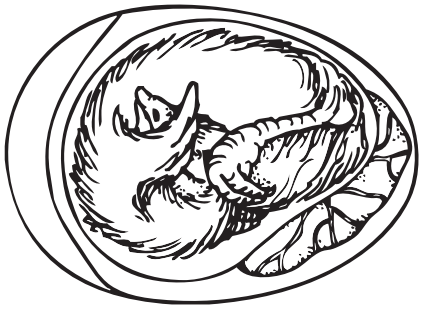
Day 13

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



Day 16

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



Day 19

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.