ALL ABOUT EGGS

Crack Open a Collection of Agriculture in the Classroom's Favorite Egg Resources for the Classroom

FEATURING:

CLASSROOM LESSONS Egg Carton Math Farmer Ben's Egg Basket Eggs: From Hen to Home FoodMASTER: Eggs Be a DetEGGtive! Eggs Around the World

BOOK SUGGESTIONS

Additional Resources

Agriculture in the Classroom's All About Eggs unit has been generously sponsored by the Virginia Egg Council.



Standards of Learning

Math: K.1, K.6 Science: K.7, K.9 English: K.2

Objective

Students will:

- Compare two sets with 10 or fewer concrete objects using words such as more, fewer, or the same
- Add and subtract whole numbers up to 10
- Discuss the life of a chicken, starting from the egg

Materials

- Pom-poms, plastic eggs, or other small objects that can fit inside an egg carton
- Egg cartons cut and prepared the following ways:



Background Knowledge

Young children can benefit from concrete examples of abstract ideas. This lesson allows students to count objects and begin to understand addition problems that equal 10 or less.

Poultry is an important part of Virginia agriculture. Virginia farmers raise both broilers, chickens which are raised for their meat, as well as layers, chickens which are raised for their eggs. Both commodities are ranked in the top 10 of Virginia agricultural commodities. Eggs are produced by female chickens called hens. Hens begin laying eggs when they are 4-6 months old and will lay 6-7 eggs per week for the first 1-2 years of her life.

In this lesson you will use various colored pom poms to act as eggs in the egg cartons. Actual



egg shells can be brown, white, or even a shade of green or blue. The color of the shell does not indicate quality or nutritional value, but is instead a reflection of genetics and the breed of chicken.

Procedure

- 1. Create the manipulatives shown above. Use egg cartons to create representations of the numbers 1-10.
- 2. Practice counting with the students prior to the activity.
- 3. Discuss eggs, chicks, and chickens and the importance of them for Virginia farmers.
 - a. Read books such as *The Egg* by Gallimard Jeunesse, *Eggs and Chicks* by Fiona Patchett, or *From Egg to Chicken* by Gerald Legg
- 4. Show the students one egg-carton manipulative. Ask them to show you on their fingers how many eggs could go into the manipulative. Check for understanding and ask a student to explain the answer. Practice several times so students become familiar with the manipulative.
- 5. Show the students two manipulatives. Ask them to compare them. Can one hold fewer or more eggs than the other, or can they hold the same number of eggs? Have students explain the answers. Practice several times. Use the objects (pom-poms, plastic eggs, etc) whenever needed or wanted, especially to demonstrate one-to-one correspondence.
- 6. Show the students two manipulatives, but this time ask them how many eggs could the two manipulatives hold together? Ask them how they solved the addition problems. Also ask the students to find the whole egg-carton manipulative that equals the two added together.
- 7. Practice subtraction by putting the objects into the egg carton manipulative, and then take away a certain number to find the answer.

Extension

Create the lifecycle of an egg as it grows into a chicken. Also, this lesson could be helpful for older students struggling with the concept of addition and/or subtraction.





For more resources to connect children to agriculture visit AgInTheClass.org.

Content Area

Mathematics: Number Sense Science: Investigation

Objective

Students will:

- Count up to 10 eggs
- Match number symbol to words
- Investigate the physical properties of eggs

Materials

- 1 copy of each of 20 Large egg patterns -laminated if possible
- 1 Basket laminated with added paper pocket
- One raw egg
- One hard-boiled egg
- One clear bowl of regular water
- One clear bowl of salt water (optional)

Background Knowledge

One chicken lays about 1 egg per day for 2 ½ years which averages about 900 eggs. The color of the shell can be light to medium brown, white or light blue or green. The shell color is determined by the breed characteristics. A rooster is not necessary for an egg to be produced. A rooster fertilizes the egg which is necessary for the production of baby chicks. A rooster also warns the flock of intruders.

A fresh egg will sink and lie sideways in water while an older egg will turn big end up and float. If the egg floats above and does not touch the bottom of bowl it should be discarded.

A fresh egg will wobble as it spins because the yolk moves inside the shell. A hard cooked egg will spin evenly since the cooked yolk does not move inside the shell.

Salt water is heavier than an egg and will make it float, but regular water does not.

Procedure

- 1. Begin by showing students the two eggs. Discuss which animals lay eggs and show them pictures of chickens on the farm.
- 2. Pass around the hard-boiled egg and let students touch it.
- 3. Ask students to describe the egg to you. How does it feel? How does it look? What color is it?
- 4. Ask children to make predictions on whether the egg will sink or float. Test their predictions (for older students you may choose to use both the fresh and salt water to demonstrate the difference) by dropping the egg in the water.
- 5. Cut out basket pattern and egg patterns and laminate
- 6. Using pattern, cut and fold a plain piece of paper to form pocket and tape to back of basket to hold eggs
- 7. Hand out paper eggs to children. Let children take turns putting one number egg in first slot. Children will recognize egg with corresponding number word and put in second slot.

Extension

Make a nest from recycled, shredded paper, mixed with white glue. Mold in a foam bowl or foil shaped as



For more resources to connect children to agriculture visit AgInTheClass.org.

bowl form and allow to dry. Remove from bowl or foil to complete drying. Add paper eggs with numbers for matching game.

Place artificial eggs around the classroom and have an egg scavenger hunt.



For more resources to connect children to agriculture visit AgInTheClass.org.

National Agriculture in the Classroom

Relevancy and Engagement: agclassroom.org

Eggs: From Hen to Home

Grade Level(s)

K - 2

Estimated Time

40 Minutes

Purpose

In this lesson students will learn about the production of eggs beginning on the farm and ending in their home. Students will also identify the culinary uses and nutritional benefits of eggs.

Materials

- Hen to Home PowerPoint
- Computer and LCD Projector
- Hen to Home Role Play Signs (Print 1 copy)
- Small box (shoebox size)
- Egg collecting basket
- Wash basin with water (or sink)
- Towel
- 1 or 2 dozen eggs in a carton
- Flashlight

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

Hen to Home Role Play Signs

[https://naitc-api.usu.edu/media/uploads/2015/07/15/Hen_to_Home_Role_Play_Signs.pdf]

The A "MAZE" ing Egg

[https://naitc-api.usu.edu/media/uploads/2015/07/15/The_A_MAZE_ing_Egg.pdf]

Hen to Home PowerPoint

[https://naitc-api.usu.edu/media/uploads/2015/07/15/Hen_to_Home.pptx]

Vocabulary

coop: an enclosure where poultry live

egg: an oval or round object laid by a female bird

hen: female chicken usually raised to produce eggs

Interest Approach – Engagement

- 1. Ask your students what they had for breakfast. Identify the students who had eggs for breakfast. Ask them how their eggs were prepared. Were they scrambled, fried, or boiled? Were they in an omelette? Do they know that eggs are used to make pancakes and waffles too?
- 2. Ask the students if they know where the eggs came from. Was it the grocery store? Where were they before the grocery store? Today they are going to find out!

Did you know? (Ag Facts)

- The process from "Hen to Home" takes approximately a week or less.
- When refrigerated, eggs have a shelf life for 3-5 weeks!
- The majority of eggs purchased in a grocery store have white shells and were produced by a *White Leghorn*, a breed of chicken known for their egg production.

Background - Agricultural Connections

Eggs are produced by **hens** (female chickens) on farms. Chickens are domestic fowl, as are, turkeys, ducks, and geese. All species of poultry lay eggs, chicken eggs are most commonly consumed in the United States. **Eggs** are produced by female chickens which are called *hens*. Hens begin laying eggs when they are 4-6 months old. A good laying hen will produce 6-7 eggs per week for the first 1-2 years of her life.

Eggs come in various shell colors although there is no nutritional difference between different colored eggs. The shell color depends upon the breed of chicken. Eggs can be white, tan, brown, or even a light shade of green. Chickens can be raised on a large or small scale. A few chickens can easily be raised in a backyard to provide eggs for a family. Eggs that are purchased from a store likely came from a farm. Chickens live in houses called, a **coop**. They eat a special feed that includes grains such as ground up corn and wheat.

Eggs that are produced for the purpose of eating will never develop into a chick because the eggs are not fertilized by a rooster nor are they ever incubated (kept warm). On a farm, eggs are collected each day. The eggs then go through a processing plant where they are washed, checked for abnormalities, and then packaged. The contents of an egg can be seen by holding it up to a light. If an egg has an abnormal shape or appearance, it is discarded and the remaining eggs are packaged into cartons. The eggs leave the processing plant in refrigerated trucks which deliver the eggs to retail grocery stores to be sold to consumers.

Eggs are an important part of our diet. Eggs are an abundant source of protein. Though eggs can be prepared in various ways for breakfast, they are also important and commonly used in other foods. Eggs help bind ingredients together, act as a leavening agent, and help to thicken soups and sauces.

Procedures

Preparation: Before class take the eggs out of the carton and place them in a box that is labeled "nest." This box will represent the nest box where hens lay their eggs on the farm. Keep the cartons handy for step 3 of the lesson.

- 1. Project the Hen to Home PowerPoint in the front of the class.
- 2. Begin with slide 2, titled "Farm." Choose 1 student to be the farmer. Explain to the student and the class that on their farm they raise chickens. Female chickens are called "hens" and hens lay eggs. Now ask the "farmer" to take the egg basket and collect the eggs from the "nest." As he/she is doing so, explain that chickens live in special pens or houses that are called "coops." The farmer makes sure that the hens have food and water. Naturally, hens like to lay their eggs in a nest or box. Explain that feeding, watering, and collecting eggs each day are chores an egg farmer would complete. Once the "farmer" has collected the eggs, ask them to stay in front of the class holding their sign. Using slides 3, 4, and 5 teach the students how many eggs a chicken lays per day, what they eat, and what color eggs are.



- 3. While displaying slide 6, titled "Processing Plant" choose another student to be the processing plant worker. Ask the farmer to give the eggs to the student who is the processor. Explain that after eggs arrive at the processing plant they are cleaned. Have the student wash the eggs in a wash basin with water or at a sink in your classroom and then place the eggs on a towel to dry. After the eggs are washed at the processing plant, they look at the inside of the egg by using a bright light. Ask the students if they know what is inside an egg. Display slide 7 and point out the yolk, white, and shell. Pick up one of the eggs and point out the shell. Then, turn the lights off and use the flashlight to see inside of the egg. This process is called, *candling*. The students should be able to see the yolk and the white. (White shelled eggs are easiest to see inside.) The last task for the processor to complete is to place the clean, dry eggs in an egg carton. Ask the "processor" to stand to the left of the "farmer" with their sign.
 - **Teacher Tip:** When candling an egg with a regular flashlight, seal your thumb and forefinger in a circle around the end of the flashlight and place the egg on top. This will help direct all of the light through the egg making the inside of the egg more visible.



4. While displaying slide 9 titled "Transportation" choose a student to be the truck driver. Ask the student playing the role of the processor to hand the carton of eggs to the truck driver. Explain to the students that the truck driver puts the eggs in the truck and transports the eggs to the grocery store. Eggs are transported in special trucks that are refrigerated to keep the eggs cool and fresh. To simulate the truck driving to the store, walk with the student "truck driver" around the perimeter of the classroom carrying the eggs. Explain that sometimes eggs have to travel many miles to arrive at the grocery store. Once you have reached the front of the classroom again have the "truck driver" stand to the left of the "processor" holding their sign.



5. While displaying slide 10 titled "Grocery Store" choose a student to be the grocer. Ask the "truck driver" to deliver the carton of eggs to the grocer. Explain to the class that once the eggs arrive at the grocery store they are placed on a shelf in a refrigerator until someone purchases them. Ask the "grocer" to place the eggs on a "shelf" (nearby table or desk) and then stand to the left of the truck driver with their sign.



 While displaying slide 11 titled, "Home" choose a student to represent a mom or dad at the grocery store. Ask the student to pick up the carton of eggs, pretend to pay for them, and take them home. Use slides 12, 13, and 14 to teach students about the nutrition found in eggs and the different foods that eggs are in. Ask the student representing the consumer to stand to the left of the grocer.



7. With all 5 students standing in front of the class, review the steps an egg passes through to get from "Hen to Home."

Concept Elaboration and Evaluation

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

- A female chicken, called a hen is raised on a farm to produce eggs for us to eat.
- Hens can lay about 1 egg per day once they are full grown.
- Eggs are produced on a farm, cleaned and packaged at a processing plant, transported to a grocery store, then finally sold to a consumer.



We welcome your <u>feedback</u>! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Have students color and complete the "A "MAZE" ing Egg" worksheet.
- If any of your students have their own chickens, invite the student to bring some eggs from home. Compare
 the size and color(s) of eggs with those that are typically purchased from the grocery store.

 Visit the Interactive Map Project website and view the map representing Egg Production in the United States. Identify the state that produces the most eggs, then find where your state ranks for egg production.

Suggested Companion Resources

Hatching Chicks in Room 6 (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=864]

Zinnia and Dot (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=749]

Tillie Lays an Egg (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=748]

Daisy Comes Home (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=611]

Chickens on the Farm (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=610]

Chick Life Cycle (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=552]

One Egg (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=537]

- How Food gets from Farms to Store Shelves (Book) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=360]
- Farm Animals: Chickens (Book)
 [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=365]
- The Cow in Patrick O'Shanahan's Kitchen (Book) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=195]
- Chicks & Chickens (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=237]

All About Eggs (Multimedia)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=742]

- Virtual Egg Farm Field Trips (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=780]
- Eat Happy Project video series (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=822]
- Hatching Science: 21 Days of Discovery Video (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=631]
- Eggs 101: A Video Project (Multimedia)
 [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=779]
- Chicken Embryo Development (Multimedia)
 [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=665]

Sources/Credits

A "MAZE" ing Egg worksheet provided by Utah Agriculture in the Classroom.

Author(s)

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Organization Affiliation

National Agriculture in the Classroom

Curriculum Matrix: agclassroom.org/teacher/matrix

National Agriculture in the Classroom

Relevancy and Engagement: agclassroom.org

FoodMASTER: Eggs

Grade Level(s)

3 - 5

Estimated Time

Two 60-minute sessions plus optional activity

Purpose

Students will learn the process of egg production from hen to home, explore the parts of an egg, perform measurements of circumference and height, compare raw egg whites to egg white foams, and prepare Meringue cookies.

Materials

Interest Approach/Motivator:

• 1 copy of Egg Interest Approach Pictionary Cards.

Activity 1:

- For the teacher: 1 plate or bowl, 1 table knife, 1 paper towel, 1 egg, 1 hard boiled egg.
- For each group: 3 plates or bowls, 2-4 hand lenses, colored pencils, 1-2 rulers, 1 food scale, 1-2 tape measures or five-inch strings, paper towels, 1 raw pasteurized shell egg, 1 hard boiled egg.

Activity 2:

- For the teacher: Toaster oven, 1-2 toaster oven cookie sheets, 1 egg separator, 1 mixing bowl, 1 table knife, 1 small bowl, 1 set measuring spoons, 1 set dry measuring cups, 1 hand mixer, oven mitts, hot pad holders, spatula, cooking spray, 3 eggs, 1/8 teaspoon cream of tartar, 1/2 teaspoon vanilla extract, 2/3 cup sugar, 1 tablespoon unsweetened cocoa powder, 1/3 cup semisweet chocolate chips.
- For each student: 1 napkin.

While You Wait Activity:

• For the teacher: 1 egg separator, 2 mixing bowls (small or medium), 1 table knife, 1-2 hand mixers, 1-2 liquid measuring cups, 2 eggs.

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

Egg Interest Approach Pictionary Cards

[https://naitc-api.usu.edu/media/uploads/2015/06/10/Egg_Interest_Approach_Pictionary_Cards.pdf]

Math Enrichment Activity Key

[https://naitc-api.usu.edu/media/uploads/2015/06/08/Eggs_Math_Enrichment_Activity.pdf]

Egg Spectrum (Math Enrichment Student Handouts)

[https://naitc-api.usu.edu/media/uploads/2015/06/04/Egg_Spectrum_Student_Handouts.pdf]

Student Handouts

[https://naitc-api.usu.edu/media/uploads/2015/06/04/Student_Handouts_3.pdf]

Teacher Answer Key

[https://naitc-api.usu.edu/media/uploads/2015/06/04/Teacher_Answer_Keys.pdf]

Essential Links

FoodMASTER Website

[http://www.foodmaster.org/index.html#.VXCcgGRVhBc]

Vocabulary

chalazae: the white strings on each side of the yolk that hold it in the center of the egg

membrane: a very thin skin or covering

porous: having tiny pores or holes

soft peaks: egg white foams that stand up at first and then fall over

stiff peaks: egg white foams that stand up with only the tips falling over

vitelline membrane: the skin around the yolk

Interest Approach – Engagement

- 1. Play a game of Pictionary with your students to illustrate the steps of egg production from the farm to their home.
- 2. Print 1 copy of the Egg Interest Approach Pictionary Cards and cut the 6 cards into separate pieces.
- 3. Choose 6 students from your class and line them up at the board in chronological order from left to right.
- 4. Give each student 1 card and instruct them to sketch their word until the class guesses it. Begin with student #1 and continue until all 6 students draw their word.
- 5. After the class guesses each word, have the student read the additional facts on their card.
- 6. When the game is complete, the Pictionary sketches will illustrate the path of egg production from the farm to our homes.

Background - Agricultural Connections

Introduction to FoodMASTER:

FoodMASTER (Food, Mathematics and Science Teaching Enhancement Resource) is a compilation of programs aimed at using food as a tool to teach mathematics and science. It is our theory that if food is used as a tool to teach mathematics and science, students will be better prepared to demonstrate and apply mathematic and scientific knowledge. Because students encounter food on a daily basis, they have preexisting contextual experiences preparing them for learning new and relevant mathematics and science material.

Food is conducive to hands-on and virtual, inquiry-based, active learning that uses multiple senses to engage students in the learning process. Utilizing food allows for an interdisciplinary approach to learning concepts and ideas in a variety of scientific subjects like general science, biology, chemistry, microbiology, nutrition and health. Additionally, food labs are a dynamic way to teach mathematics concepts such as numbers and operations, algebra, geometry, measurement and problem solving.

The knowledge and skill development that can be inspired by the FoodMASTER approach is limitless. Proper use of measurement tools, data collection and interpretation, application and generalization, classification and organization, graphing and comparative analysis, understanding chemical changes, observing functions of ingredients and controlling variables, pricing, critical thinking, self-directing learning, and team building are only a few of the potential knowledge and skill development areas for intermediate grade students experiencing FoodMASTER's scientific inquiry labs.

Additional FoodMASTER lessons can be found to cover health and nutrition topics such as: Food Safety, Vegetables, Fruits, Milk and Cheese, Meat, Poultry and Fish, Fats and Oils, Grains, Measurement, and Meal Management.

Background for this lesson:

Did you know a hen can lay 250 to 300 eggs a year? That's a lot of eggs! In the United States, chicken eggs are the most popular, but you can eat duck eggs, goose eggs, ostrich eggs and more. In this chapter, we will focus on chicken eggs.

Chicken eggs are an excellent source of protein, vitamins and minerals. However, a microorganism called Salmonella can infect eggs and make you sick. Thoroughly cooking eggs makes them safe to eat because cooking kills Salmonella. To stop foodborne illness, be sure everyone washes their hands after touching raw eggs and that no one eats raw eggs.

In this lesson, students will:

- 1. list several parts of an egg and complete egg fact tables;
- 2. make pictorial representations of the parts of an egg;
- 3. practice measurement skills using appropriate units for weight, circumference and height;
- 4. make egg white foams and identify egg white soft peaks and stiff peaks;
- 5. measure ingredients accurately and complete a Venn diagram comparing raw egg whites and egg foams; and
- 6. students will make and test a prediction and measure time accurately.

Procedures



Activity 1: Egg-ceptional Eggs Scientific Inquiry: Egg Facts

- 1. Read *Egg-ceptional Eggs* and complete the Doodle Bugs.
- 2. Demonstrate how to crack a raw egg: Hold the egg over a plate. Gently tap the side of the egg shell with a table knife to crack the shell. Use



both hands to gently pull the two sides of the shell apart. Pour the egg onto the plate. Discard the egg shell and wash your hands.

- 3. Demonstrate how to peel the shell off a boiled egg: Use the dull end of your knife to tap the wider end of the egg shell. Make several small cracks in the egg shell. Use your fingers to peel the shell off the egg white (this can also be done under cool water). Place shell pieces on a paper towel and throw away.
- 4. Instruct your students to read the *Scientific Inquiry: Egg Facts* directions, study the egg diagram, gather supplies and begin the activity. Remind students to record their findings in the appropriate chart and to record units of measurement, when appropriate.
- 5. Review the use of measuring tapes and scales. Students will place a plate or bowl on the scale, zero the scale and then add their egg, egg white or egg yolk. Zeroing the scale makes the weight of the plate/bowl disappear.
- 6. A teacher or other adult should break one raw egg for each group to study. Be sure to dispose of the egg when the group is done with their observation.
- 7. Review the parts of the egg and what the class learned about each part.

Teacher Tips:

- Be sure to take caution with raw eggs. Salmonella, a bacterium that causes foodborne illness, may be on the outside shell or inside the egg. For extra safety, use eggs pasteurized in their shells. Continue to encourage your students to practice good egg safety by washing their hands.
- In place of tape measures, students may mark their egg's circumference on a piece of string and then measure the length using a ruler.
- While measuring the hard boiled egg yolk's circumference, your students will need to be very gentle to keep the egg yolk from crumbling.
- Eggs used in this activity should not be eaten. If desired, you may provide boiled eggs for your students to eat at the end of the lab, after they have washed their hands and work areas.
- Discussion: Different kinds of chickens lay different colored eggs. Most stores sell white and brown eggs, but chickens lay green and blue eggs too. The color of the shell doesn't change the flavor or nutritional goodness of the egg.
- Extension: Discuss physical and chemical changes. Breaking the shell is a physical change, but boiling is a chemical change.
- Extension: Explore the porous shell by storing boiled eggs next to onions. As the porous egg shells let air inside, the eggs will begin to smell like onions.

Activity 2: Fantastic Foams Scientific Inquiry: Peaks, Peaks, Peaks

- 1. Read *Fantastic Foams* and complete the Doodle Bugs.
- 2. Follow Scientific Inquiry: Peaks, Peaks, Peaks directions to make meringue cookies.
- 3. Demonstrate how to separate egg whites from yolks:
 - Place the egg separator over the mixing bowl. (A helper may hold the egg separator.)
 - Gently tap the side of the egg shell with a knife to crack the shell.



- Use both hands to gently pull the two sides of the shell apart.
- Pour the egg into the egg separator. The egg white will fall into the bowl and the yolk will stay in the egg separator and be discarded.
- 4. Allow your students to take turns beating the egg whites, adding ingredients and dropping teaspoonfuls of meringue onto cookie sheets.
- 5. While beating the egg whites, ask your students to make observations about visible changes (size, color, state of matter). Be sure to point out soft and stiff peaks.
- 6. Instruct students to complete the Venn diagram.
- 7. While the cookies are baking, complete While You Wait: Egg-citing Egg Foams.
- 8. When the cookies are done, an adult should use oven mitts to remove the cookie sheets from the oven. Place cookie sheets on the hot pad holders.
- 9. Let the cookies cool. Remove the cookies from the tray with a spatula and place on napkins.
- 10. Serve one cookie to each student. Students will answer taste test questions.

Teacher Tips:

- Recruiting an extra adult to assist with lab management, setup and/or cleanup will help this activity to run smoothly.
- Remember to take extra caution when using the oven or toaster oven. Discuss the dangers of touching the oven.
- Be aware of any students will egg allergies. Students with egg allergies should not eat egg whites and may be given an alternate snack.
- Be sure to take caution with raw eggs. Salmonella, a bacterium that causes foodborne illness, may be on the outside shell or inside the egg. Reduce risks by following good food safety practices, including hand washing. To further reduce risks, buy raw pasteurized shell eggs.
- Instruct students to keep beaters inside the bowl. Beaters should never be turned on unless they are inside a bowl.
- Be sure the sugar is added gradually. Adding too much sugar at one time will flatten the egg whites.
- Extension: Beat egg whites to soft peaks, stiff peaks and the overbeaten stage to compare the many stages of egg white foams.

While You Wait: Egg-citing Egg Foams

- 1. Instruct your students to make a prediction before you begin beating the egg whites and yolks.
- 2. Allow students to assist with beating the egg whites and yolks and measuring the volume of the foams.
- 3. Instruct students to record times and volumes on their workbook pages.
- 4. Discuss the difference between the egg foams. Remind students that egg whites are mainly protein and yolks contain both protein and fat. The protein makes the egg foams strong. Whereas, fat prevents foaming.

Teacher Tips:

- Be sure to take caution with raw eggs. Salmonella, a bacterium that causes foodborne illness, may be on the outside shell or inside the egg. Reduce risks by following good food safety practices including hand washing. To further reduce risks, buy raw pasteurized shell eggs.
- Instruct students to keep beaters inside the bowl. Beaters should never be turned on unless they are inside a bowl.
- Beat egg whites first and then egg yolks. If you beat egg yolks first, be sure to clean beaters before beating egg whites. Any egg yolk contamination will decrease the foaminess of the egg whites.
- Extension: Beat egg whites with varying amounts of egg yolk included (none, 1 drop, 1 teaspoon and 1 yolk) and compare the volume of the egg white foams.

Concept Elaboration and Evaluation

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

- The eggs we eat are typically produced by chickens on farms.
- It's important to thoroughly cook eggs to decrease the chance of becoming sick from a foodborne illness.
- Eggs are a good source of protein.



We welcome your <u>feedback</u>! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Egg Spectrum: Complete the attached math enrichment activity. Students will learn about various colors of egg shells, their nutrients, and perform various calculations using eggs.
- Farmer's Market Tour: Arrange a tour of your community's farmers' market in the fall or spring to observe the variety of food items farmers have produced. Assign students to talk with the farmers to learn more about what they do. If a real tour is not possible, have students do a virtual tour online or invite one or more local farmers to talk about their role and the work they do in your community.
- Visit the Interactive Map Project website and view the map representing Egg Production in the United States. Identify the state that produces the most eggs, then find where your state ranks for egg production.

Suggested Companion Resources

Food Group Puzzle (Activity)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=239]

Food (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=274]

One Egg (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=537]

Chicks & Chickens (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=237]

Look Inside Food (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=258]

Inside An Egg (Book)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=235]

- Virtual Egg Farm Field Trips (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=780]
- Virtual Chicken (Multimedia)

[https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=236]

- Eat Happy Project video series (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=822]
- Hatching Science: 21 Days of Discovery Video (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=631]
- Eggs 101: A Video Project (Multimedia) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=779]
- Hatching Classroom Projects (Teacher Reference) [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=813]
- The Science of Cooking (Website)
 [https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=499]

Sources/Credits

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Organization Affiliation

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Curriculum Matrix: agclassroom.org/teacher/matrix



Be a DetEGGtive!

Time Frame:

2-3 class periods

Overview:

Students will conduct a series of scientific investigations, gather evidence, and write to explain what they have learned about the unique properties of eggs.

Objectives

- Students will make observations and conduct several scientific investigations.
- Students will identify and explain unique properties of eggs based on their scientific investigations.
- Students will write and illustrate a book to explain what they have learned.

Materials:

Chart paper Markers Paper Art materials "Detective's Logbook" student handout (one per student) Two dozen eggs (four of them hard boiled) Bowl Rulers (one per group) Six inch pieces of string (one per group) Scales (one per group) Clear glass or jar Hot water Magnifying glass



Lesson Background:

An egg's shell covers and protects what's inside the egg. An egg's yellow center is called the yolk. It contains about half the egg's protein, most of its vitamins, some of its minerals, and all of its fat. The clearish-white liquid around the yolk is called the egg white or albumen. It contains a little more than half the egg's protein, plus some of its vitamins and minerals.

Eggs range in size from peewee to jumbo. Younger hens tend to lay smaller eggs. The size increases as the hen grows older and bigger. Following are the weights associated with each egg size:

Jumbo- 30 oz. Extra large- 27 oz. Large- 24 oz. Medium- 21 oz. Small- 18 oz. Peewee- 15 oz.

There are seven to 17,000 tiny pores on an eggshell's surface, a greater number at the large end. As the egg ages, these tiny holes permit moisture and carbon dioxide to move out and air to move in to form the air cell. The egg can also absorb refrigerator odors through the pores.

An eggshell is very thin. It's composed of calcium carbonate. Vinegar is an acid. When an egg is placed in vinegar, the acid reacts with the eggshell's calcium to form the gas carbon dioxide. Gas bubbles appear on the shell and rise to the surface. Over a period of 35 to 48 hours, the entire eggshell dissolves, exposing the shell membrane which holds the soft insides of the egg. When the soft egg is put in water, water moves through the shell membrane by osmosis, causing the egg to swell. It will eventually become too full and break like a balloon.



Engage (15-20 minutes)

Note: Before class starts, hang four sheets of chart paper around the room with markers beside them. Next to each sheet of chart paper, place a hard boiled egg with one of the following questions written on it:

- What's inside of me?
- Are all of my friends the same size?
- Does my shell have any holes?
- Would I look different if I swam in vinegar? If so, how?
- 1. Explain to students that their help is needed to solve a mystery! Four eggs were mysteriously left in the classroom overnight. Each egg has a question written on it. Their job is to work together to answer the questions like real detectives would. Each answer will help them learn what is unique and special about eggs.
- 2. Divide students into four groups, and direct each group to stand by one of the pieces of chart paper. Ask a volunteer at each station to read aloud the question written on the egg at that station. Teachers may need to read the questions aloud to younger students.
- 3. Using the markers and chart paper, have each group predict an answer or answers to the question.
- 4. Rotate groups among all signs, giving each group a chance to predict answers to all questions. Review predictions together with the class, and encourage students to guess which ones they think are most accurate for each question.

Explore (30-40 minutes)

- 1. Distribute the "Detective's Logbook" student handout. Explain to students that, just like real detectives, they must use inquiry and observation to learn as much as they can about what is unique and special about eggs.
- 2. Review question 1: What's inside of me? Ask students how they might learn what's inside of an egg. If they don't suggest cracking one open, guide them in that direction. Then conduct the following demonstration:
 - Crack a raw egg into a bowl, and let students observe what's inside.
 - Ask students to describe to a partner what they see.



- Then, direct students to draw and label each of the following parts in their Detective's Logbook:
 - Shell- Protects and covers the egg. Made of calcium carbonate.
 - Yolk- Yellow center. Produces food for the embryo. Major source of vitamins and nutrients.
 - Albumin- Clear white liquid around the yolk. Protects the yolk and provides additional nutrition.
- 3. Review question 2: Are all of my egg friends the same size? Ask students how they might learn the answer to this question. One way to compare egg sizes is to measure them. Hold up an egg and ask students to name all of the different ways they could measure it. Ideas include measuring length, width, and even weight. For each measurable attribute, ask student volunteers for ideas of objects they could use to measure. For example, they could measure an egg with a ruler, their finger, a piece of string, or even a set of blocks. Once students have given several ideas for ways to measure the egg, follow the steps below:
 - In their groups, ask students to pick out three or four eggs that appear to be the same size.
 - Demonstrate how to use string to measure the eggs vertically and horizontally. Put a ruler down on the table or desktop. Use a piece of string to go around the middle or horizontal area of an egg. Put a felt-tip mark on the end of string that matches up with the beginning of it. Then put the string along the edge of the ruler and see how long it is. Write down this measurement by "Egg 1" on the handout.
 - Show them how to measure the egg vertically, mark and measure. Record the measurement on the handout.
 - Have the students do the same thing with the rest of the eggs, keeping measurements and observations in their Detective's Logbook.
 - Then, direct students to use the scale to weigh each egg and record the weight of each egg in the Logbook. Note: To prevent eggs from rolling off of the scale, you may want to weigh a cup and then have students weigh the eggs inside of the cup.
- 4. Review question 3: Does my shell have any holes in it? Ask students how they might learn the answer to this question. Then, conduct the demonstration below.
 - Place the egg carefully into the glass or jar.
 - Carefully pour hot water into the glass or jar until it is nearly full.
 - Leave the glass or jar on a table or flat surface and watch the egg closely for a few minutes (the glass may become hot so be careful).



- Direct students to record or draw their observations in the Logbook. Note: After surrounding the egg with hot water, they should observe tiny bubbles forming on the egg shell which eventually bubble their way to the surface. Explain to students that an egg contains a small air pocket at its larger end between the shell and egg white. When the air trapped inside this small pocket begins to heat up it expands and tries to find a way out of the shell. Ask students how they think the air escapes.
- Let students take turns using a magnifying glass to examine the egg. See if they can identify small pores on the shell. Direct students to add to their observations.
- 5. Review question 4: What would happen if I swam in vinegar? Ask students how they might find out the answer to this question. Guide them toward understanding that they could dip an egg in vinegar. Then, conduct the following demonstration. Explain to students that this demonstration may take one to two days to complete.
 - Place a raw egg in a jar, add enough vinegar to the jar to cover the egg, and replace the jar lid. Ask students what they see and have them record their observations in their Detective's Logbook. The shell is covered with tiny bubbles of carbon dioxide, some rising to the surface. Ask students to look at the jar after 36 to 48 hours and add to their observations. They will likely notice that the shell will dissolve.
 - What does this demonstration tell them about the properties of eggs?

Explain (20 minutes)

Divide students back into their four groups, and direct each group to stand by a different sign/egg from the beginning of the activity. First, ask the group to discuss among themselves what they learned from the demonstration and their observations about the unique properties of eggs. Then, have each group explain what they learned to the rest of the class. Allow students to ask questions or add to each other's explanations.

Elaborate (20-25 minutes with additional time investigation is conducted)

- 1. Work with the class to identify one additional question they could ask to help them learn more about what is unique and special about eggs. Examples include:
 - Does the weight of a raw egg change when it's hard boiled?
 - Can you crush an egg in your hand?



- Will an egg roll at different speeds on different surfaces?
- Will eggs roll in a straight line?
- 2. Challenge students to design an investigation that could help them answer the question they have identified. List the steps to the scientific process together on the board. Steps include:
 - Ask a Question
 - Construct a Hypothesis
 - Test Your Hypothesis by Doing an Experiment
 - Analyze Your Data and Draw a Conclusion
 - Communicate Your Results
- 3. Talk with students about different ways to organize and collect their data. Ideas include using tally marks, bar graphs, tables, or pictographs. Once the data is organized, students need to draw conclusions about what the data is saying. Encourage students to use words like more, most, less, least, same, and different as they describe their data.
- 4. Conduct the investigation and record the results in the Detective's Logbook.

Evaluate (20-30 minutes)

Finally, tell students that they will write and illustrate a book that informs readers about the unique properties of eggs. Their book must include at least four pages and a title page. Each page should include one to three sentences about something unique and special about eggs. Each page should also include an illustration. For example, one page may say, "Egg shells have holes. I know this because I saw eggs release air bubbles from the holes when put in water."

Standards:

CCSS ELA Standards

- CCSS.ELA-Literacy.W.K-3.2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCS.ELA-Literacy.W.K-3.8- Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.



- CCSS.ELA-Literacy.SL.K-3.1- Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-Literacy.SL.K-3.3- Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric...
- CCSS.Literacy.SL.K-1.5- Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

CCSS Math Standards

- K.MD.1- Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- K.MD.2- Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference.
- 1.MD.1- Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 1.MD.4- Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
- 2.MD.1- Measure the length of an object y selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- 2.MD.4- Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Next Generation Science Standards Framework

- Core Idea: PS1: Matter and Its Interactions
- PS1: A: Structure and Properties of Matter
- PS1: B: Chemical Reactions
- Core Idea: LS1: From Molecules to Organisms: Structures and Processes
- LS1.A: Structure and Function
- LS1.C: Organization for Matter and Energy Flow in Organisms



Detective's Logbook

Are you ready to be a detEGGtive? Your help is needed to solve an egg mystery! Four eggs have been left in your classroom with questions on them. You will make observations and answer questions to help you learn about the unique properties of eggs. Record your observations in this Detective's Logbook.

Question 1: What's Inside of Me?

What's inside of a raw egg? Do you know the parts of an egg? Your teacher will crack open an egg. Look at the parts of the egg. Draw and label parts below. Then describe each part. Use these words: shell, yolk, and albumen.

Question 2: Are All of My Friends the Same Size?

Do you think that all eggs are the same size? Measure and weigh several eggs. You can use eggs from the same carton or a different carton. Record your observations below.

	Vertical Measurement	Horizontal Measurement	Weight
Egg 1			
Egg 2			
Egg 3			
Egg 4			

What does your data tell you about the sizes of eggs?



Question 3: Does My Shell Have Any Holes?

Do you think eggshells have holes? Why or why not? Your teacher will perform a demonstration with an egg in water. Record or draw what you see below. How does this demonstration help you know if eggs have holes?

Question 4: Would I Look Different If I Swam in Vinegar? If So, How?

What do you think would happen to an egg if it was dipped in vinegar? Would it look the same or different? Your teacher will do a demonstration. Record or draw your observations below.

Did your observations help you answer the question?

Congratulations! You are a great "deteggtive!" What are three things you learned about the properties of eggs?

- 1.
- 2.
- 3.

incredible!

_Using key details in informational text (RI.3.2)



Grade 3

American Egg Board

Read.

The next time you eat an egg think about this. Someone in another part of the world may be eating an egg, too! Chickens lay eggs around the world. Eggs are eaten around the world.

People like eggs fixed in different ways. This is true where you live. This is also true around the world. But all egg dishes have things in common. They all include eggs, of course. This makes all egg dishes rich in protein. Many egg dishes are made by stirring eggs together and cooking them in a pan. What is added to the egg dishes is what makes them different. In China, shredded cabbage and grated carrots are mixed with eggs. In Russia chopped kale and onions may be added. In Spain, sometimes potato slices and chopped onions are cooked first. Then stirred eggs are poured on top and cooked until done. Different cooking spices are used, too. No matter where you live, eggs are a great food choice!

Follow the directions.

- **1.** Underline the main idea of paragraph one. Use a blue crayon.
- **2.** Underline the main idea of paragraph two. Use an orange crayon.
- **3.** Write two things all egg dishes have in common.

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MAP

- 4. Circle the names of three countries. Use a green crayon.
- 5. Explain how the underlined sentences support the main idea of paragraph two.
- 6. Tell why you think people in different parts of the world prepare eggs differently.

incredible! American Egg Board Grade 3

Answer Key for "Eggs Around the World"

- 1. Eggs are eaten around the world. (*underlined in blue*)
- 2. People like eggs fixed in different ways. (underlined in orange)
- 3. All egg dishes include eggs. All egg dishes are rich in protein.
- 4. China, Russia, Spain (*circled in green*)
- 5. The sentences describe different ways to fix eggs.
- 6. Answers will vary.

BOOK SUGGESTIONS

<u>Chickens on the Farm</u> by Susan Meredith

<u>The Cow in Patrick O'Shanahan's Kitchen</u> by Diana Prichard

<u>Food</u> by Felicity Brooks

<u>Hatching Chicks in Room 6</u> by Caroline Arnold

<u>One Egg</u> by Louise Spillsbury

<u>Producing Dairy and Eggs</u> by Jane Bingham

<u>What's for Lunch? Eggs</u> by Claire Llewellyn











ADDITIONAL RESOURCES

VIRGINIA EGG COUNCIL

One of the Virginia Egg Council's first priorities is to help educators teach about the goodness of eggs.

Visit <u>www.virginiaeggcouncil.org</u> to find:

- Downloadable resources such as coloring sheets, placemats, posters and more
- Links to children's egg craft ideas such as Mosaic Eggs and Egg Cup Vases
- Information on how to request free eggs for classroom use

VIDEO AND VIRTUAL FIELD TRIPS

- Visit <u>https://www.aeb.org/eggs-in-schools/classroom/videos/eggs101</u> where the American Egg Board has a collection of short video clips highlighting a variety of topics.
- Visit <u>https://www.aeb.org/eggs-in-schools/classroom/farm-to-table-virtual-field-trips</u> to take a virtual field trip to several different egg farms.

POULTRY READER

 Printable student reader packed with poultry information <u>http://www.agintheclassroom.org/TeacherResources/TerraNova/</u> <u>poultry_clr.pdf</u>

American Egg Board

The American Egg Board offers a wealth of classroom lesson plans (samples have been included in this unit), activity pages, and materials here: <u>https://www.aeb.org/eggs-in-schools/classroom/lesson-plans-and-materials</u>