



Upper Valley Farm to School Network Community Curriculum Pilot Project

March 2013 - Eggs

Overview: Students will learn about why eggs are healthy. They will discuss differences among eggs. They'll dissect hard-boiled eggs and draw and label a diagram of an egg. Then, students will make and sample deviled eggs.

Focusing Questions: How do eggs help our bodies & brains? Are all eggs the same? What are the parts of an egg?

Standards Addressed:

Common Core State Standard for Writing: Text Types and Purposes: 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.

VT Standard 3.5: Healthy Choices: Students make informed, healthy choices that positively affect the health, safety and wellbeing of themselves and others. This is evident when students:

g. Can identify and classify foods according to the Food Pyramid Guide. *

*The Food Pyramid Guide is no longer in use; we assume that this standard now refers to MyPlate, the current visual for the USDA dietary guidelines.

VT Standard 7.13: The Living World: Organisms, Evolution, Interdependence: Students understand differences among living organisms, understand the role of evolution, and recognize the interdependence of all systems that support life. This is evident when students:

- a. Identify characteristics of organisms (e.g., needs, environments that meet them; structures, especially senses; variation and behaviors, inherited and learned);
- b. Categorize living organisms (e.g., plants; fruits, vegetables)

VT Standard 7.1 Scientific Method: Students use scientific methods to describe, investigate, explain phenomena, and raise questions in order to:

- Generate alternative explanations — hypotheses — based on observations and prior knowledge;
- Design inquiry that allows these explanations to be tested;
- Deduce the expected results;
- Gather and analyze data to compare the actual results to the expected outcomes; and

- Make and communicate conclusions, generating new questions raised by observations and readings.

This is evident when students:

- a. As questions about objects, organisms and events in the world around them
- b. Use reliable information obtained from scientific knowledge, observation and exploration;
- f. Use either deductive or inductive reasoning to explain observations and phenomena, or to predict answers to questions;
- i. Work individually and in teams to collect and share information and ideas.

If doing measurement activity extension, VT Standard 7.7: Students use geometric and measurement concepts. This is evident when students:

- b. Examine, compare, and analyze real objects and abstract figures by one-, two- and/or three-dimensional features
- f. Measure as exactly as possible or round off, as appropriate, and justify the choice

Materials:

- Teacher survey
- Egg true/false sheet (1 copy for instructor or a copy for each pair of students, depending on grade level)
- Raw eggs (1 per group of 2-4 students)
- Hard-boiled eggs (1 per group of 2-4 students)
- Card stock for journal pages
- Ingredients for deviled eggs:
 - Mayonnaise (1/3 c per dozen eggs)
 - Relish or pickle juice (2 Tbsp per dozen eggs)
 - Dijon mustard (1 tsp per dozen eggs – not too spicy for kids!)
 - Salt, pepper and paprika to taste
 - Tomato, onion and/or parsley for additions/garnish - optional
- Cooking supplies:
 - Medium mixing bowl for making filling
 - Measuring spoons
 - Mixing spoon
 - Fork for mashing cooked egg yolks
 - Safe knives for each student (or for each adult, depending on age of students & teacher preferences) to cut hard boiled eggs in half
- Napkin for each student
- Compost or trash receptacle for uneaten deviled eggs
- For measurement extension:
 - Copies of measurement worksheet for each student
 - One four-inch piece of string for each group of students
- For MyPlate/food groups extension
 - Copies of MyPlate coloring sheet for each student

Preparation:

Be prepared to spend about 1 hour preparing - about 30 minutes to cook the hardboiled eggs (one per group of 2-4 students). Mark raw eggs with a pencil or marker. Gather other materials.

Procedure:

1. Hand out teacher survey.

Before you start, give the teacher a copy of the survey, and ask if they can fill it out at the end of the lesson before you leave.

2. Egg nutrition discussion & true-false (10 min):

“Eggs help our bodies and brains, do you know how?” Take some responses. “It sounds like you know some things already about how eggs help our bodies and brains. Let’s test what you know & learn some new facts...” Present the pupils with the following statements and ask them to discuss with a partner whether they are true or false.

- Eggs hardly have any vitamins in them at all (False)
- Eggs contain proteins that help our bodies to repair themselves (True)
- Eggs have loads of vitamin C in them (False)
- Eggs contain vitamin D, which is great for healthy bones (True)

Then review (true!) basics of why eggs are healthy.

- Eggs are high in protein, which is good for your muscles and gives you energy.
- Eggs have vitamins and minerals that...
 - Help your brain with thinking (B vitamins, choline)
 - Keep you from getting sick and give you energy (B vitamins, omega 3 fats)
 - For 3rd & 4th graders, you can use the term “immune system” – the B vitamins and omega 3 fats in eggs are good for your immune system
 - Keep your skin and eyes healthy (Vitamin A)
 - Build strong bones (Vitamin D)

Why do you think eggs have so many important nutrients in them? (Because they need to have enough food inside to grow a baby chicken!) How do those nutrients get there? (What chickens eat! So if chickens are eating healthy food, the eggs are healthier. The nutrients in an egg change based on the chicken’s diet).

3. Are all eggs the same? (10 min):

Talk about the differences among eggs. Ask students for their ideas, and add others that they don’t think of. Some ways eggs vary:

- Egg shells come in different colors

- Eggs shells can be thin and fragile or strong and thick (Farmers feed chickens oyster shells to make sure they have enough calcium to make thick shells that won't break).
- Eggs come in different sizes – not only are there medium, large and jumbo, there are also eggs even bigger than jumbo, and tiny eggs from young chickens (pullets) that are so small they don't have room for a yolk!
- The inside of the egg changes based on the season and how old the egg is. The color of the yolk can be more or less orange depending on how fresh it is and what the chicken is eating.
- Eggs are healthiest for us when they come from chickens with a healthy diet of grasses and grubs (bugs are good sources of protein for chickens).

If you have time, you can mention that eggs are more plentiful at different seasons based on the amount of light. You can also discuss the difference between small- & large-scale egg production. See background information for more on both of these topics.

4. Egg dissection & diagram (20 min):

Students will peel & “dissect” their own hard-boiled eggs, and also examine a raw cracked egg.

Model cracking a raw egg into a bowl, and peeling a hard-boiled egg and cutting it in half symmetrically. Discuss symmetry with older students (2-4).

- Symmetry: exact correspondence in size, form and arrangement of parts on opposite sides of a plane, line or point.

Remind students to be careful with the knives even though they aren't sharp, and to use them appropriately (no sword fights). Also, tell students that they will later eat the hard-boiled eggs, and they should try not to touch it too much or get it dirty – observe with their eyes only after peeling it and cutting it open.

Discuss what it means to be a good observer/scientist. “Good scientists look carefully at, or observe, the things they are learning about. I want you all to be good scientists and to closely and carefully observe both your raw and hardboiled eggs.” Instruct students to draw what they see, to make a scientific diagram – a careful, detailed drawing with labels of the parts they know.

Ask students to wash their hands. While they are washing their hands, pass out a hard-boiled egg and a raw egg to each group of students as well as a paper bowl, a paper plate, and a butter knife. Give the students 10 minutes to dissect and draw their eggs in their groups. Their drawing will be a part of their journal entry for this lesson.

After students have dissected & observed their eggs, go over the parts of an egg and what each part does for a chicken. You can draw your own diagram on a white/chalk board, or pull up the attached diagram on the Smartboard. Students will record a developmentally appropriate amount of information about egg parts on their diagram, adding labels for parts they didn't know and writing descriptions of what each part does.

Egg parts:

For Kindergarten & 1st graders:

- Shell – the hard part that protects the insides of the egg & the growing chick
- White – the gooey clear part in the raw egg that turns white when cooked. This part contains the water for the baby chick, and the protein it needs to grow.
- Yolk – the yellow part. This contains most of the food, or nutrients, for the growing chick, including fat, vitamins and minerals.

For 2nd-4th graders:

- Shell - the hard part that protects the insides of the egg & the growing chick
- Albumen – also known as the white, the gooey clear part in the raw egg that turns white when cooked. This part contains the water for the baby chick, and the protein it needs to grow.
- Yolk - the yellow part. This contains most of the food, or nutrients, for the growing chick, including fat, vitamins and minerals.
- Chalazae (shah-LAY-zee) – white cords made of protein that hold the yolk and growing baby chick in the center of the egg where they're protected & have enough space. You can think of these as the seatbelt of the egg.
- Membranes – there are 2 membranes between the shell and the albumen that regulate what goes in and out of the egg, protecting it from bacterial infection. See if students can find this thin layer on their egg shells. The 2 membranes (inner and outer) are both surprisingly strong and are made partly of keratin, the same protein in human hair.
- Air cell – when an egg is laid, it is the same temperature as the chicken's body, which is very warm. It cools off once it leaves the hen's body, when it cools it gets smaller, because colder things are smaller than warm things. Then there is extra space between the contents of the egg and the shell, which is called an air cell. You can see the air cell in a hard-boiled egg – one end is flattened/dips in.

5. Deviled eggs demonstration & taste test (15 min):

Have a student or another adult collect the raw eggs in a trash/compost receptacle. Demonstrate how to make deviled eggs using the dissected hard-boiled eggs. Collect the yolks, then make the filling, and distribute into each egg white. Cut egg halves into pieces so there are enough samples for everyone. Offer to sprinkle paprika on students' samples. Once students have tasted their samples, record students' reactions in a chart on the white/Smart board. To close, ask students, "Why are eggs healthy?". If there is time, have students record their answer in their journals.

Extensions:*MyPlate Activity – Grades K-2 (15 min)*

Ask students whether they know about MyPlate. Show the MyPlate graphic, and tell students what food groups are on the plate. Ask, what food groups are eggs in? Once students have figured out which category eggs fit in, have them draw a meal on their MyPlate coloring sheet that includes eggs as the protein.

Measurement Activity – Grades 3-4 (20-30 min)

1. Ask students to compare their raw eggs to other groups' eggs. Do they look the same size? Are all eggs the same size? How can we answer that question? Take responses. Students should be able to come up with measuring, and/or an experiment.

2. Demonstrate how to use string to measure the egg. Ask students what shape an egg is. This is a tricky question! If it were flat, it would be an oval. Since it is three dimensional, it is an ovoid, which is actually just a fancy mathematical term for a sphere. How and where should we measure the egg to compare different eggs? We should measure it from top to bottom and around the middle. These measurements are called the vertical circumference and the horizontal circumference. Talk about what vertical, horizontal and circumference mean. In this case, we are going to consider vertical to be the long part of the oval, which would be standing up if the widest end of the egg were flat on the bottom.

- Vertical: standing up, perpendicular to the horizon or ground, lengthwise, up and down, hot dog
- Horizontal: laying down, parallel to the horizon or ground, across, hamburger
- Circumference: the distance around the outside of a closed curve or circle – this term describes the outside of ovals as well as circles

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 on the handout.

3. Show them how to measure the egg vertically, mark and measure. Record the measurement on the handout.

4. Have the children do the same thing with their eggs, keeping measurements on the handout. Have each child in every pair measure the egg to compare measurements/check accuracy. Discuss how scientists measure twice (or many times) to make sure their data is accurate.

- Accurate – correct, carefully calculated
- Data – information or facts gathered in a scientific way

5. Share measurements of eggs to see that eggs that appear the same size really aren't. Look how very different eggs can be size-wise!

6. Talk about the scientific process. Our question was, "are all eggs the same size?" Our experiment was to measure many eggs vertically and horizontally. We kept track of our measurements on a piece of paper. We all measured our eggs in the exact same way. What did we learn? Eggs do not come in the same size—even when they have been sorted for size!

7. Scientists do experiments like this all the time. To test our findings, someone else can take our eggs and measure them to see if they come up with the same findings. If you want to, and have the time, let children swap their handouts and eggs with one another to double check measurements and findings.

Eggs in different cultures (at least 15 min)

Discuss the importance of eggs in different cultures – different recipes, different traditions (religious and otherwise). Patricia Polacco's picture book Rechenka's Eggs is a wonderful fictional story that relates to this approach.

Acknowledgements:

- The Ottauquechee Health Foundation and the New Hampshire Charitable Foundation's Wellborn Ecology Fund generously fund UVFTS' Community Curriculum Project.
- Chloe Powell and Aurora Coon developed this lesson, with help from Peter Allison, Shannon Cramer, Cat Buxton, and Karen Ganey.
- The true/false activity was adapted from "The Eggs Factor: Kids in the Kitchen" curriculum, found at: <http://www.crackingeggs.co.uk/>
- The measurement activity extension was adapted from the University of Michigan, Reach Out program's Egg Fun lesson plan, found at: <http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/egg2.htm>
- The MyPlate extension uses materials from Serving Up MyPlate: A Yummy Curriculum, available at: <http://teamnutrition.usda.gov/Resources/servingupmyplate.htm>
- Sources for background information include:
 - Incredible Edible Egg website: <http://www.incredibleegg.org/>
 - <http://nutritiondata.self.com/foods>
 - About.com
 - Wikipedia
 - Foodtimeline.com

Appendices:

1. Teacher survey
2. Egg diagram
3. MyPlate coloring sheet
4. Measuring eggs worksheet
5. Eggs take-home
6. Background information

