

# What's in an Egg?



## Introduction

It's likely your students have some experience removing eggs from the refrigerator to use in cooking or baking. But they might not have had an opportunity to stop and wonder, "*What's in an egg?*"

In this lesson, students experience the phenomenon *some eggs produce chicks and some do not*. Student questions drive an investigation of "grocery store eggs" and using the thinking tool of structure and function, students begin to make sense of science ideas about multicellular organisms and sexually reproduction.

## What is Sensemaking?

Sensemaking is actively trying to figure out how the world works (science) or how to design solutions to problems (engineering). Students **do** science and engineering through the science and engineering practices. Engaging in these practices necessitates students be part of a learning community to be able to share ideas, evaluate competing ideas, give and receive critique, and reach consensus. Whether this community of learners is made up of classmates or family members, students and adults build and refine science and engineering knowledge together.

<b>Phenomenon:</b> Some chicken eggs produce baby chickens and some do not.		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (3-5)</li> </ul> <p><b>Planning and Carrying Out Investigation</b></p> <ul style="list-style-type: none"> <li>Conduct an investigation and/or evaluate and/or revise the experimental design to produce data to serve as the basis for evidence that meet the goals of the investigation.</li> </ul>	<p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular)</li> </ul> <p><b>LS1.B: Growth and Development of Organisms</b></p> <ul style="list-style-type: none"> <li>Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.</li> </ul>	<p><b>Structure and Function</b></p> <ul style="list-style-type: none"> <li>Analyze and interpret data to provide evidence for phenomena.</li> </ul>
<p><b>This lesson could be one in a series of lessons building toward:</b>  <b>MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]</b></p>		

### Materials (per student or per pair of students)

egg, uncooked  
 flashlight  
 plastic spoon  
 toothpicks (2)  
 paper plate  
 cup (to keep egg from rolling)

### Supporting Resources

- What's in an Egg? Student Facing Slides (Google Slide Presentation)
- Video: Presentation of the Phenomena (Video)
- Are Miss Pauletta's Eggs Fertile? (YouTube Video)
- Student Reference Egg Dissection (Google Doc) (Student Handout)
- Science of Eggs: Anatomy of an Egg (Student Handout)
- Science of Eggs: Eggs (Student Handout)

The supporting resources listed above can also be accessed in the *What's in an Egg?* collection of resources: <https://bit.ly/DD-03-25-2020>. If you are an NSTA member, you can save this collection in your library.

## Experience the Phenomenon (What am I exploring today?)

**Guidance:** Students will be introduced to the through the *What's in an Egg? Introducing the Phenomenon* video. The goal is to get students thinking about eggs and wondering why some eggs produce chickens and some do not. Presenting a phenomenon and asking students to generate questions about what they've observed creates a **need** to figure out the answer to those questions. This is authentic engagement and a powerful motivation (unlike "learning about" the difference between fertilized and unfertilized eggs and being asked to recall the information later).

**Experience the Phenomenon.** Share the video clip (**Slide 3**) with students. Ask them to think about the idea introduced in the video clip (**Slide 3**). "*What is the difference between the egg we might eat and one that produces a chicken?*" and have them write any questions they have down on a sheet of paper.

ALL student questions are okay at this point. Our goal is to motivate curiosity and not distinguish between "good questions" and "bad questions" or "right questions" and "wrong questions". Common questions will arise for most students, which is what this task builds upon.

Although some students may know that fertilized eggs can grow into chickens and unfertilized eggs are used as food, prompt them to think about other questions they might have about eggs.

Suggested prompts:

- What questions do you have about what happens?
- What questions do you have about the different parts of the egg?
- What questions do you have about other kinds of animal eggs?

## Investigative Questions (What question do I have about what I just saw?)

**Guidance:** It is important to allow time for thinking. Many students have ideas and questions but need time to formulate their idea or question into words. Some students may also benefit from writing things down first before they share. As adults we may be tempted to give students questions we feel might be important to explore, however we need to refrain from this and allow our students to practice asking their own questions.

Investigative questions are common questions kids may ask after they are introduced to the phenomena. Although questions may vary, many students are curious about why some produce chicks (or some other animal) and others do not.

Common questions (**slide 4**):

- Can we eat all types of eggs?
- Do some chickens make eggs for the store that we eat and different chickens lay eggs that make chicks?
- What is the difference between an egg that makes a chicken and one that we eat?

- How do we tell the difference?

After all the questions have been asked, we want to prompt our students to express their own ideas of how to figure out the answers to their questions. Ask them, "What could we do to figure out some things about eggs?" Common responses might include:

- Break open some eggs to see what is inside
- Google some of our questions
- Get some eggs and see if they will hatch

Let's start by seeing if there is a way to figure out what is inside the egg without breaking it open. Ask, "Do you think there is a way to see inside an egg without breaking the shell?" Allow your students to express their ideas. Many students will say to x-ray them, so that is what we will do, kind of...

### **Investigative Questions (What question do I have about what I just saw?)**

**(Slide 5)** If we were able to look inside an egg, what would you look for? What would you expect to see? Do you think we would see might see different things depending on the egg?

Ask students to document what they will look for inside an egg and/or make predictions of what they might see. **(Slide 6)**

Watch the video *Are Miss Pauletta's Eggs Fertilized?* about the purpose of candling eggs. **(Slide 7)**

Now that we know that some eggs get fertilized and some don't you can take this time to explore these eggs from my (or the school's) refrigerator. Candling an egg can be done easily with a flashlight or the flashlight app on your phone.

As you investigate the egg with the light, what do you notice?

**Guidance:** It is important that you let the students you are working with tell you what he/she notices and to not point out the things you notice as the adult. The goal here is to allow students to practice making careful observations. If your student is struggling to make observations use question prompts to guide them instead of stating what you see.



Suggested prompts:

- Do you notice anything different with the ends (rounded tips) of the egg?
- How would you describe the shell?
- Can you see what is inside the shell?

Possible student observations:

- The egg glows.
- The light shines through the egg.
- The shell has little spots all over it, like the light shine through more.
- One of the ends is a little darker than the other.
- The light goes through but I still can't see what is inside the shell.

We have made some really cool observations, now let's take a minute to think about all the things we have figured out about eggs and look at questions we still need to answer.

We have figured out:

- Fertilized eggs could hatch into chickens (or other animals).
- Unfertilized eggs do not hatch into chickens and these are the one we get in the store to eat.
- We can kind of look into an egg to see if it is fertilized or not.
- If an egg is fertilized, we can see a dark spot and blood vessels starting to form.
- If an egg is not fertilized the light glows through the egg, and sometimes we can see the air sac.

Questions we still have:

- What is inside the egg?
- What do the different parts of the egg do?
- How would a chick get food inside the egg?
- How many parts does an egg actually have?

To answer all of these questions we will do an investigation to see what we can figure out by looking at what's inside the shell.

## Investigation (Based on my observations, this is my plan for investigating my question(s)...)

Before allowing students to crack open an egg to make observations, have them write down or draw a picture of what they think they might see inside the egg.

Many students will know that the egg consist of the shell, yolk, and the 'clear part' or whites and some may also talk about the white stringy thing. Although many students can identify the major parts of the egg, they do not know the other part or the function of the different structures.

Have students investigate an egg, inside and out (**Slide 8**). Share the *Egg Dissection Procedure* with students. Please remember to follow safety procedures as you would when handling food items.

**Guidance:** Have students really look at the different parts of both the shell and the inside of the egg. As students identify and document the different parts, it is not necessary that they know the names of all of the different structures. Have students use their own words to describe the structures they observe. The goal is to get kids to notice that the egg has many different structures. As students add structures to their chart have them make predictions about what those do (function) and also add their reasoning (why do they think those structures do the things they do).

When students are finished with their egg investigation, share *The Anatomy of an Egg* handout. Allow students time to obtain information about the structures of the egg and their functions. Students will probably not have observed each of the structures shown, and there is no need to document all of them. However, student may want to revise their charts to represent the names of the structures they did identify and itsfunction.

## Building Consensus

Let's look back at the questions we had at the beginning of this task, for example:

- Can we eat all types of eggs?
- Do some chickens make eggs for the store that we eat and different chickens lay eggs that make chicks?
- What is the difference between an egg that makes a chicken and one that we eat?
- How do we tell the difference?

Through our observations and investigations, were we able to answer most - or maybe all - of our questions. Think about all of things you just figured out about eggs and document them in your science notebook or handout.

**Guidance:** It is important that you allow students to document what they have figured out in their own words. Allow them time to get all their new understandings written down and then have a short discussion about what they have figured out through participating in this task. During this discussion the students should be doing most of the talking and the adult is there to listen and prompt the student.

We have figured out:

- Fertilized eggs could hatch into chickens (or other animals)
- Unfertilized eggs do not hatch into chickens and these are the ones we get in the store to eat.
- We can candle an egg to see if it is fertilized or not.
- If an egg is fertilized, we can see a dark spot and blood vessels starting to form.
- If an egg is not fertilized the light glows through the egg, and sometimes we can see the air sac.
- There are many different parts to an egg, more than what we thought.
- The different parts of the egg all do different things.
- The shell of the egg has pores that let things in and out.
- The yolk of the egg is what grows into a chicken.

Who knew there was so much to figure out about eggs! Are there more things we could find out? If you want to know more about the storyline this task was taken from please see the link in the Acknowledgement section.

## Home Connections

Eggs are something many students are familiar with but know little about. Families can expand on the learning in this task in many ways at home, including:

- Cooking eggs
- Cooking with eggs - why do we use eggs when we bake?
- Looking at the nutritional label - What structure make up the protein? or the fat?
- Soaking an egg in vinegar to see what happens to the shell

You can also explore *The Science of Cooking Eggs* (student handout).

## Acknowledgement

This Daily Do is inspired by and uses materials from the *How Do Eggs Become Chickens or Other Living Things?* storyline created by [Next Generation Science Storylines](#). This an open educational resource (OER) that can be used by teachers and families to implement student-driven learning.