

Chapter 7

Eggs



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 to wash your hands after touching raw eggs and never eat raw eggs.

Enjoy your adventures with excellent eggs!

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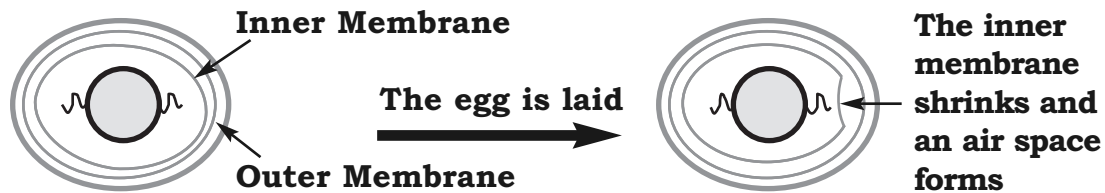
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Egg-ceptional Eggs

Did you know that eggs have more parts than just the shell, white and yolk?

Eggs have many parts surrounded by a shell. These parts include an outer membrane, inner membrane, white, vitelline membrane, yolk and chalazae. The egg shell is porous, which means it has thousands of tiny pores or holes. The tiny holes are almost invisible. But air and smells can still move in and out of eggs through the pores.

Right under the shell are two thin skins or membranes that surround the egg white. They are called the **outer** and **inner membranes**. After an egg is laid, the inner membrane shrinks but the outer membrane doesn't shrink. A gap or air space forms between the two membranes.



The **egg white** is high in protein and lies right under the inner membrane. A third membrane is called the **vitelline membrane**. It separates the egg white from the egg yolk.

The **yolk** looks like a small yellow ball in the center of the egg. All of the fat of an egg is found in the yolk, plus some protein and other nutrients. The **chalazae** are two thick white strings that stick out of both ends of the egg yolk. They hold the yolk in the center of the egg. Today, you will explore the parts of an egg.

DOODLE BUGS

In the reading, underline the sentence that lists many parts of an egg.

Draw a picture of a porous egg.

Which part has the most fat? (Circle one.)

The Egg White

The Egg Yolk

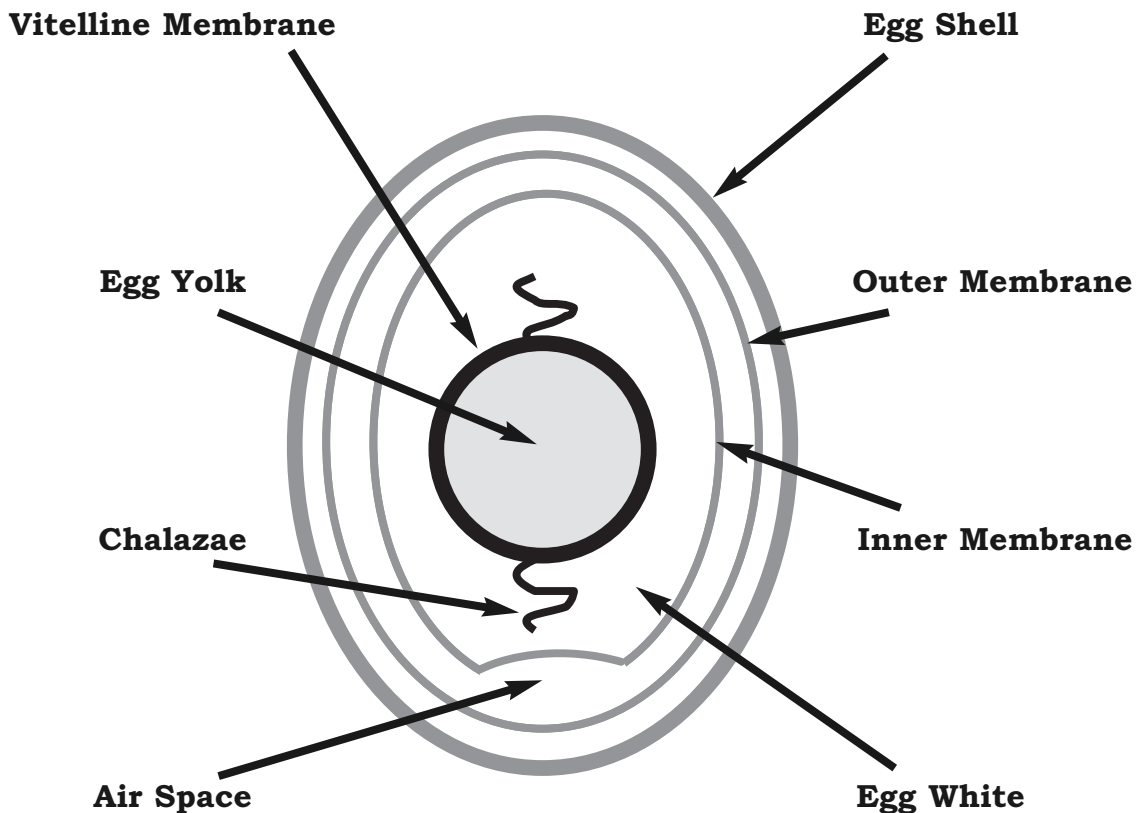
SCIENTIFIC INQUIRY: **Egg Facts**

Your group will need:

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

First, study this picture of the parts of an egg! Find the shell, egg white and yolk. Then search for the outer and inner membranes around the egg white. Next find the vitelline membrane around the egg yolk. Look for the chalazae or white strings at both ends of the yolk.



SCIENTIFIC INQUIRY:

Egg Facts (continued)

Your teacher will break a raw egg onto a plate or bowl. Do not touch or taste the raw egg. Salmonella in raw eggs can make you sick. Remember to wash your hands after touching raw eggs and after this lab! Use a hand lens to study the egg. Then fill in the table below.

Raw Egg Facts

Egg Part	Color	Shape (circle, square, oval, liquid blob)	Picture (draw a detailed picture with colored pencils)
Whole egg (unbroken)			
Egg white			
Egg yolk			
Chalazae			



Next, your group will measure the weight, height and circumference of your boiled egg. Then peel the boiled egg over a plate. Carefully separate the egg white and yolk. Place the white and yolk on the plate. Measure the weight of the egg white. Then carefully measure the circumference and weight of the egg yolk. Record your measurements and units in the table below.

Boiled Egg Facts

Egg Part	Measurement Facts (weight, circumference and/or height)	Picture (draw a detailed picture with colored pencils)
Whole egg (unbroken)	Weight: Circumference: Height:	
Egg white	Weight:	
Egg yolk	Weight: Circumference:	

Can you see the chalazae of the boiled egg? Yes No

Tell one way the egg white changed after it was boiled.

Tell one way the egg yolk changed after it was boiled.

TRY THIS AT HOME:
Creamed Eggs



You will need:

3 eggs, hard boiled
2 teaspoons margarine
1 teaspoon flour, all-purpose
Dash of salt

PREP TIME: 10 minutes

Dash of pepper
3 tablespoons milk
Help from an adult

Whip up eggs for a creamy dish!

1. Peel the hard boiled eggs. Set aside for a later step.
2. Melt margarine in a saucepan over medium heat.
3. Add flour, salt and pepper to the sauce pan. Stir until smooth.
4. Heat over medium heat for about 2-3 minutes.
5. Gradually add milk to the saucepan, while stirring constantly with wire whisk or fork. Cook until it simmers and is thickened.
6. Slice or quarter hard-cooked eggs on a plate.
7. Pour hot sauce over eggs. Mix carefully and serve.
8. Reheat to serving temperature.

SERVING SIZE: 1 1/2 eggs, serves 2

Fun Fact

Raw eggs can have Salmonella inside them or on the outside of their shell. This dangerous organism can make you sick if don't cook your eggs or wash your hands after handling them. Never eat raw eggs, partially cooked eggs or uncooked foods made from raw eggs (like some homemade mayonnaise). Don't buy or use cracked or dirty eggs either.

Fantastic Foams

Did you know you can make fluffy egg white foams?

Have you ever tried beating egg whites? Egg whites start as a liquid but become foamy when beaten. **Egg foams** are used for making puffy omelets, fluffy pancakes and foamy cookies and candies.

Beating adds air to egg whites, making them light and fluffy. Beating also changes the egg white proteins to make them stronger. The strong proteins will form **peaks** (little mountains) when you pull a hand mixer straight up out of the egg foams. You can make soft peaks by beating less or stiff peaks by beating more. Many recipes call for egg whites beaten to medium stiff peaks. Medium stiff peaks will stand up with just their tips falling over. They will be smooth and a shiny white. Be careful not to over-beat egg foams or they will get cracked and dry.

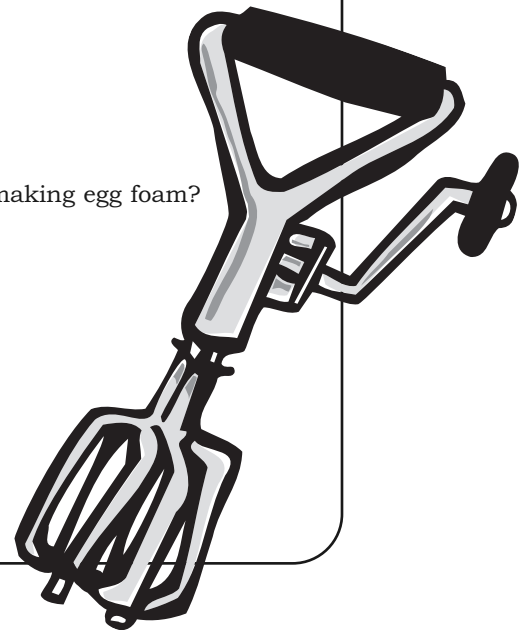
Adding different ingredients to egg white foams can change their foaminess. Fats like butter, oil and egg yolks keep egg whites from turning into foam. Adding sugar slows down the change from liquid to foam. Adding an acid, like cream of tartar, makes the egg whites stronger.

DOODLE BUGS

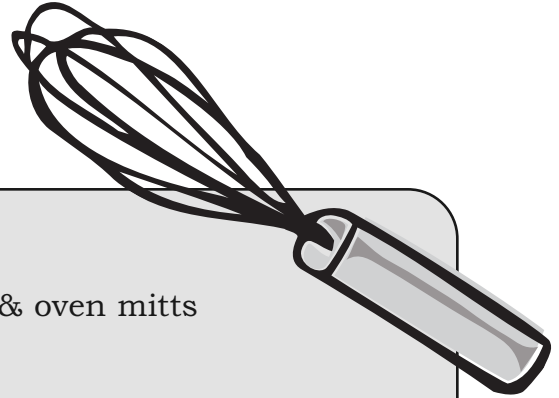
In the reading, circle three things you can make with an egg foam.

Underline a sentence that tells what medium stiff peaks look like.

Why do you need to keep egg yolks separate from egg whites when making egg foam?



SCIENTIFIC INQUIRY: **Peaks, Peaks, Peaks**



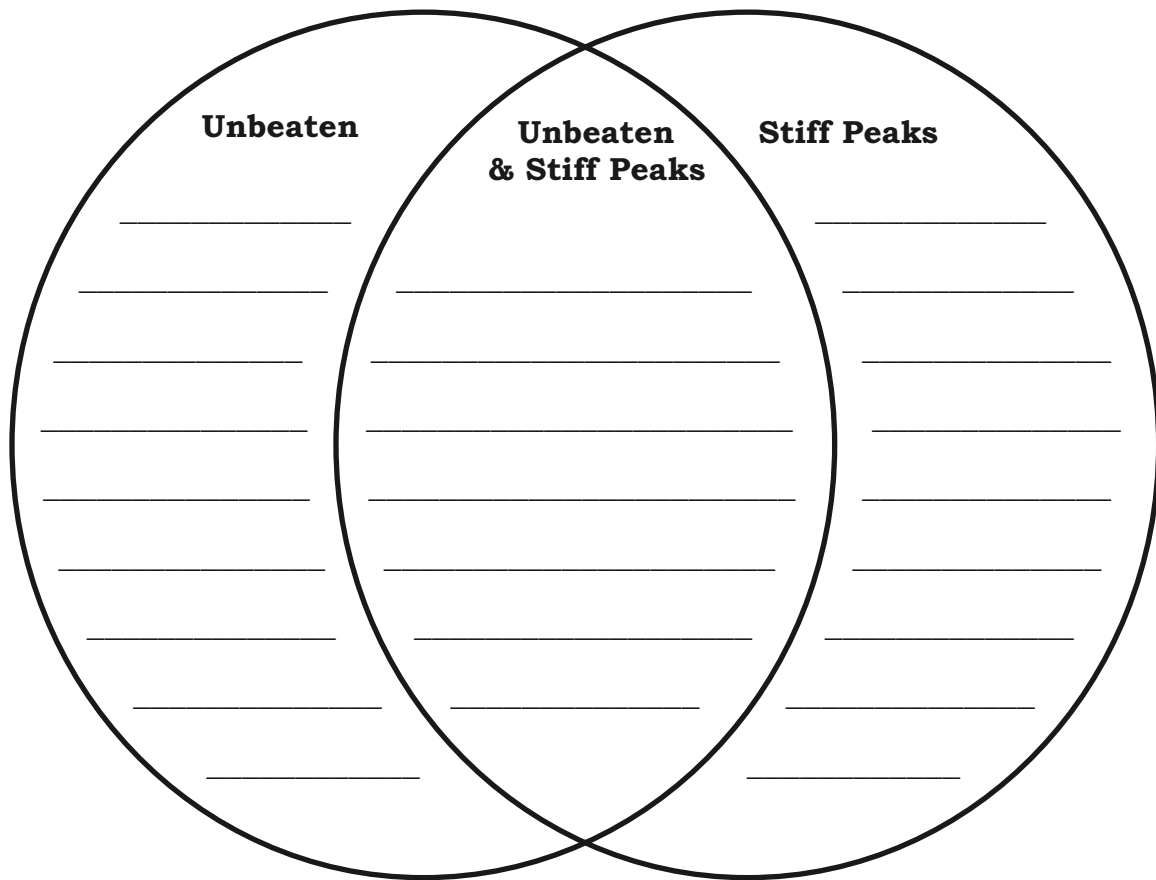
Your class will need:

Toaster oven	Pot holders & oven mitts
1-2 toaster oven cookie sheets	Spatula
1 egg separator	24 napkins
1 mixing bowl	Cooking spray
1 table knife	3 eggs
1 small bowl	1/8 teaspoon cream of tartar
1 set measuring spoons	1/2 teaspoon vanilla extract
1 set dry measuring cups	2/3 cup sugar
1 hand mixer	1 tablespoon cocoa powder (unsweetened)
2 spoons	1/3 cup chocolate chips (semisweet)

1. Preheat the oven to 300 degrees Fahrenheit. Spray the cookie tray with cooking spray.
2. Hold the egg separator over the mixing bowl. Carefully crack three eggs into the egg separator. Let the egg whites fall into the mixing bowl. Pour the egg yolks into a small bowl and set aside.
3. Add cream of tartar and vanilla to the egg whites.
4. Using the hand mixer, beat the egg whites to soft peaks. Check for soft peaks by turning the hand mixer off and pulling the beaters straight up out of the fluffy egg whites. Soft peaks stand up at first and then fall over into little loops of foam. If your eggs are still runny or bubbly, keep beating them to get soft peaks.
5. Continue beating while slowly adding sugar. (Adding too much sugar at one time will flatten your egg whites.)
6. Beat the egg whites to stiff peaks. Stiff peaks will stand up with just the tips falling over. Stiff peaks will be glossy.
7. Fold in cocoa and chocolate chips.
8. Drop teaspoonfuls on cookie sheet. Bake in oven for 25 – 30 minutes.

Venn Diagram

Write details that tell how the unbeaten egg whites and stiff peak egg white foams are alike where the circles overlap. Write details that tell how they are different in the outer circles. Think about size, shape, states of matter, color, nutrients and more.



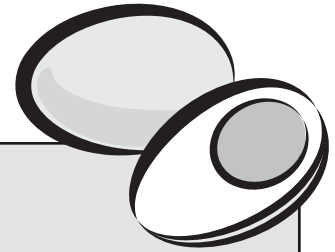
Tasting Time:

My cookie tastes _____. (Fill in the blank.)

My cookie looks _____. (Fill in the blank.)

My cookie feels like _____. (Fill in the blank.)

WHILE YOU WAIT: Egg-citing Egg Foams



Your class will need:

- | | |
|----------------------------------|---------------------------|
| 1 egg separator | 1-2 hand mixers |
| 2 mixing bowls (small or medium) | 1-2 liquid measuring cups |
| 1 table knife | 2 eggs |

Egg Whites versus Egg Yolks

1. Make a prediction/guess by circling egg whites or egg yolks:

I think the (egg whites or egg yolks) will foam up more when beaten.

2. Hold the egg separator over one mixing bowl. Carefully crack two eggs into the egg separator. Let the egg whites fall into the mixing bowl. Then pour the egg yolks into a second mixing bowl.
3. Beat the egg whites on medium-high for 3 minutes.

Start time: _____

End time: _____

4. Beat the egg yolks on medium-high for 3 minutes.

Start time: _____

End time: _____

5. Use a liquid measuring cup to measure the volume of the egg whites & yolks.

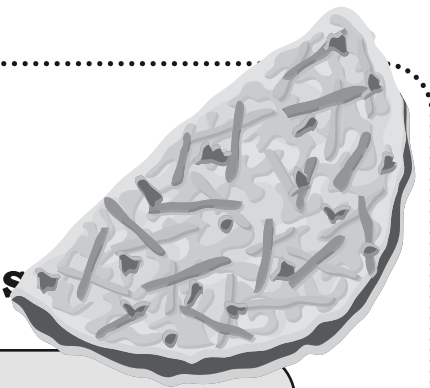
Volume of egg whites: _____

Volume of egg yolks: _____

6. Was your prediction correct? (Circle one.) Yes No

TRY THIS AT HOME:

O-mazing Puffy Omelet Squares



You will need:

PREP TIME: 30 minutes

Non-stick vegetable oil cooking spray

6 eggs

1/4 cup plus 2 tablespoons water

1/2 cup chopped sweet red and/or green pepper

8.5-ounce can cream-style corn (or about half of a 14.75-ounce can)

4-ounce can chopped green chilies

2 tablespoons finely chopped green onion with tops (green part)

3/4 teaspoon garlic powder

3/4 cup prepared taco sauce or salsa

Help from an adult

Enjoy a warm omelet square for breakfast, lunch or dinner!

1. Preheat oven to 350 degrees Fahrenheit.
2. Spray an 8 x 8 inch baking dish with vegetable oil spray.
3. In medium bowl, beat egg whites to stiff peaks.
4. In a second medium bowl, beat egg yolks and 1/4 cup water until thick.
5. Add egg whites to egg yolks. Fold or gently stir using a rubber scraper.
6. Pour egg mixture into baking dish. Bake for 20-25 minutes.
7. While eggs are cooking, add 2 tablespoons of water and peppers to a skillet. Cover and cook over medium heat for about 4 to 5 minutes, stirring occasionally.
8. Add corn, chilies, onions and garlic powder to the skillet. Heat, stirring occasionally.
9. When eggs are done, spoon vegetables over eggs and top with taco sauce.

SERVING SIZE: 1 omelet square

Fun Fact

Eggs are part of the protein foods group. They are a great food for any meal because they are high in protein, iron, phosphorus and B vitamins. Always serve egg dishes immediately or keep them refrigerated until ready to reheat and serve.

Proficiency Questions

Circle the best answer:

1. Which egg part holds the yolk in the center of the egg?

- a. chalazae
- b. yolk
- c. inner membrane
- d. vitelline membrane

2. Is it safe to eat a raw egg?

- a. no
- a. yes
- c. sometimes
- d. once in a while

3. What do stiff egg white peaks look like?

- a. they fall over into a loop
- b. they stand up straight without falling over
- c. they are dry and can be broken off
- d. they are a runny foam

4. How do eggs whites change when beaten?

- a. they change from a liquid to a foam
- b. they change from clear to white
- c. they get bigger
- d. all of the above