



Grades		
4–6	2	60–90 minutes

**Actividad práctica con un huevo**

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**Purpose**

Students will identify the structures and functions of a chicken egg.

**Materials**

For each pair of students:

- Raw chicken egg
- Warm water
- Clear glass container or 500ml beaker
- Shallow bowl or petri dish
- Newspapers to protect the table and floors
- Hand lenses (optional)

For each student:

- Student Activity Sheet

**Concepts**

- Egg shells are shaped so they are less likely to roll out of the nest.
- Egg shells are designed for strength and gas exchange.
- Inside the egg are structures that help nourish, cushion, and keep the chick from drying out.

**Conceptos**

- La forma de los huevos minimiza el riesgo de que rueden y se caigan del nido.
- El cascarón del huevo es duro y permite el intercambio de gases.
- La estructura del huevo permite que el polluelo se nutra, actúa como protección y mantiene la humedad para que no se seque.

**Safety**

Raw eggs can carry *Salmonella* bacteria, which can cause food poisoning. Tell students to handle the egg carefully, minimize contact with the liquids inside the egg, avoid touching their mouths, and wash their hands thoroughly when they are finished.

### **Vocabulary**

Pores  
Calcium carbonate  
Shell membrane  
Albumen  
Chalazae  
Yolk  
Blastodisc

### **Vocabulario**

Poros  
Carbonato de calcio  
Membrana del cascarón  
Albúmina  
Chalaza  
Yema  
Disco germinal o blastodermo

### **In Advance**

Gather materials and copy Student Activity Sheets. Put warm water into the glass containers, leaving room for one egg to be placed inside during the activity.

### **Procedure**

#### *1. Set-up*

Tell students they will be learning all about eggs by closely examining the structures of a chicken egg. Divide the class into teams of two and give each pair an egg, a container of warm water, a shallow bowl, and a hand lens (if available). Explain how to handle a raw egg safely.

#### *2. Look at the egg's shell*

Ask students if they know why eggs are oval rather than round. After several guesses, tell students to gently roll the egg on the table and observe what happens. (It will probably not roll straight.) Can students guess why this rolling pattern might be a good adaptation for an egg to have? (Interesting fact: The ledge-dwelling murre lays a single pear-shaped egg. Its very pointy end allows it to roll in a very tight circle. This decreases the chances of the egg rolling off the cliff.)

Next, have students look closely at the surface of the egg shell (with a hand lens if possible). Can they describe what the surface looks like? Have students gently place the egg into the container of warm water and watch what happens. After a short time, tiny bubbles should begin to escape the egg, especially from the flatter end of the shell. Do students have any ideas why this happens?

### 3. *Experiment with egg shell strength*

Over the newspapers and with arms outstretched, place an egg end to end with the ends resting in the palm of each of your hands. Lace your fingers together and squeeze the ends of the egg between your hands as if you are trying to crush it. Unless the egg has a crack, it should not break. Be sure to tell students this only works if the egg is held end to end, not around the middle.

Now, offer students the chance to try it one at a time over the newspaper. Be sure they hold the egg end to end in their palms. Check the egg for cracks in between tries. (You may want to have an apron available, in case the egg develops cracks that go undetected and the egg breaks.) When everyone has had a chance, ask students why they think the egg is so strong. Use the “Why It Happens” section of this activity to discuss egg shell strength.

### 4. *Look inside the egg*

Give each student a copy of the Student Activity Sheet. Tell them they will be cracking the egg open to look at the structures inside. The Student Activity Sheet will help them keep track of the structures and functions as you discuss each one.

Tell students to carefully crack open their egg and let the insides pour into the shallow dish. Instruct them to try not to break the **yolk** and to touch the inside of the egg as little as possible.

Now that the eggs are open, identify the parts of the egg one at a time. Ask students to guess what the function of each structure is before explaining them to students. Use the “Why It Happens” section to guide your explanations. Tell students to draw each part and explain its function on the Student Activity Sheet.

### 5. *Clean up*

Collect the eggs, shells, and other materials. Clean all work areas with warm water and bleach to prevent the growth of harmful bacteria.

## **Questions to Ask During the Activity**

1. Why are eggs oval shaped? (The shape of the egg helps it to roll in a circular pattern, so they are less likely to roll out of the nest.)

2. Why does more air escape from the flatter end of the egg when they are put in warm water? (The egg has an air sac on the flatter side. When the chick is ready to hatch, the sac is broken and the chick can breathe and stretch before breaking through the shell.)
3. What is the **albumen** for? (It keeps the developing chick from drying out and acts as a cushion.)
4. What is the yolk? (The yolk is the actual egg cell. It provides food for the developing chick.)

### **Preguntas sobre el tema de la actividad**

1. ¿Por qué tienen forma ovalada los huevos? (La forma del huevo le permite rodar en círculos, minimizando la posibilidad de que se caiga del nido.)
2. ¿Por qué se sale el aire más fácilmente del lado plano del huevo cuando está sumergido en agua tibia? (El huevo tiene una cámara de aire en el lado plano. Cuando el polluelo está listo para salir, se rompe la membrana y el polluelo puede respirar y estirarse antes de romper la cáscara.)
3. ¿Para qué sirve la **albúmina**? (Evita que el polluelo se seque y actúa como cojín.)
4. ¿Qué es la yema? (La yema es la célula del huevo y es la fuente de alimento para el polluelo en desarrollo.)

### **Why It Happens/More on the Topic**

#### The Shell

*Shape and Size* - The oval shape of an egg causes the egg to roll in a circular pattern. As it rolls, it returns to where it started. This adaptation prevents it from easily rolling out of the nest.

*Porosity* - The egg shell has tiny openings, called **pores**, which allow gases to exchange as the chick develops.

*Egg strength* - The shape of the egg and the evenly distributed force prevented the egg from breaking when it was squeezed. When the egg is cracked against a pan, it is easily broken because the force is not evenly distributed. Eggs are also strong and

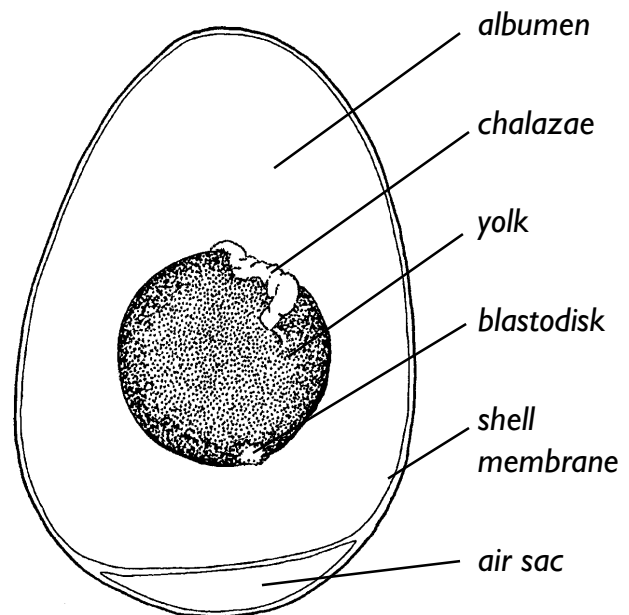
hard because they are made of **calcium carbonate**. As the chick grows, the chick uses some of the calcium. When the chick is ready to hatch, the shell is thinner than it was when the egg was laid.

### The Insides

**Shell membrane** - The **shell membrane** lines the inside of the egg, except at the flat end of the egg. The membrane keeps moisture in and germs out while still allowing gases (oxygen and carbon dioxide) to be exchanged. The air sac at the flat end of the egg is broken when the chick is ready to hatch. The chick can breathe and stretch before breaking through the shell.

**Albumen** - (pronounced “al-byu-men”) The **albumen** is the egg “white.” It keeps the developing chick from drying out and acts as a cushion. It is mostly made of water, but also contains 10% protein and some minerals.

**Chalazae** - (pronounced “kuh-la-zee”) The **chalazae** are two slimy, white rope-like structures attached to each side of the yolk. These are the twisted ends of the albumen’s inner layer. The egg receives the albumen as it descends down the oviduct (or egg tube). The egg turns as it descends, causing the chalazae to thicken and twist.



**Yolk** - The yolk is the actual egg cell. (It is all one cell!) The yolk is the food source for the developing chick. It is made of proteins, fats, and carbohydrates and is a complete food source for the chick during its 21 days of development inside the egg. The chick even uses a small amount of the yolk after it hatches.

**Blastodisc** - The **blastodisc** is a tiny white spot, sometimes called a “snowflake,” found on the surface of the yolk. This is where the egg is fertilized and where the chick begins to develop.

## Algo más sobre el tema...

### El cascarón

**Forma y tamaño** - La forma ovalada del huevo le permite rodar en círculos y al rodar vuelve a la posición original. Con esta adaptación se le hace más difícil caerse fuera del nido.

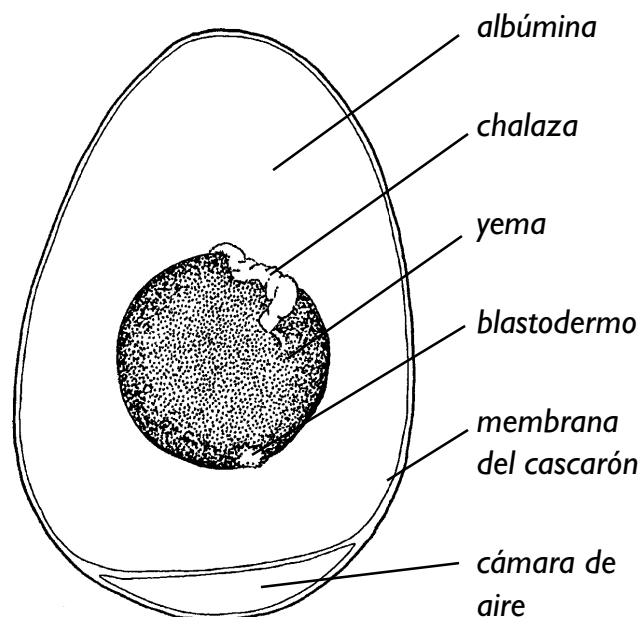
**Porosidad** - El cascarón tiene aberturas diminutas, llamadas **poros**, que permiten el intercambio de gases durante el desarrollo del embrión.

**Dureza del huevo** - La forma del huevo junto con la distribución uniforme de fuerza evitaron que el huevo se rompiera cuando fue apretado. Es fácil romper un huevo contra una sartén porque la fuerza no está distribuida de forma uniforme. Otra razón por la cual los huevos son fuertes es porque están formados por **carbonato de calcio**. El espesor del cascarón disminuye a medida que el polluelo se desarrolla y cuando está por salir, el cascarón es mucho más delgado que en el momento en que se puso el huevo.

### Las partes internas

**Membrana del cascarón** - La **membrana del cascarón** está adherida a la superficie interna del cascarón, excepto en el extremo plano del huevo. La membrana mantiene la humedad adentro y los gérmenes afuera, pero al mismo tiempo permite el intercambio de gases (oxígeno y dióxido de carbono). Cuando el polluelo está listo para salir, se rompe la cámara de aire que se encuentra en el lado plano y el polluelo puede respirar y estirarse antes de empezar a romper el cascarón.

**Albúmina** - La **albúmina** es la “clara del huevo”. Evita que se seque el polluelo en desarrollo y además actúa como cojín. La albúmina está



**Algo más sobre el tema (cont.)**

compuesta, casi en su totalidad, por agua pero también contiene un 10% de proteína y algunos minerales.

*Chalaza* - Las **chalazas** son dos estructuras viscosas, con forma de sogas que están adheridas a ambos lados de la yema. Éstos son los extremos retorcidas de la capa interior de la albúmina. El huevo recibe la albúmina a medida que desciende por el oviducto (o tubo del huevo). El huevo gira al descender y al hacerlo las chalazas se tuercen y se vuelven más gruesas.

*Yema* - La yema es en realidad un óvulo. (¡Y es sólo una célula!) La yema es la fuente de nutrición para el polluelo en desarrollo. Está formada por proteínas, grasas y carbohidratos y es una fuente completa de alimentación para el polluelo durante los 21 días de desarrollo dentro del huevo. Cuando sale del cascarón, el polluelo todavía utiliza la pequeña cantidad restante de la yema.

*Blastodermo* - El **blastodermo** es un pequeño punto blanco, a veces llamado “copo de nieve”, que se encuentra en la superficie de la yema. Este punto es el lugar donde el huevo se fertiliza y donde el polluelo comienza su desarrollo.

**Modifications**

The egg lab can be done with younger students by demonstrating each part of the procedure and not using the Student Activity Sheet.

**Extensions**

While the pores in the egg shell are beneficial for gas exchange, they can also cause problems in a polluted environment. To help students understand how an oil spill can affect eggs that are laid on the ground, submerge three hard boiled eggs in a container of cooking oil. (Mix in some food coloring for a more dramatic demonstration). Open and observe one egg after 5 minutes, the second egg after 15 minutes, and the third egg after 30 minutes.

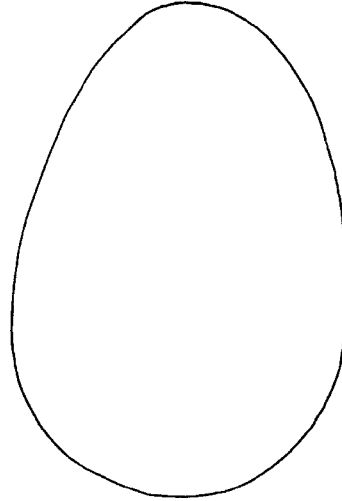
**References**

New Mexico Natural History and Science Museum. Proyecto Futuro Life Science Curriculum, First Edition. Albuquerque, NM, 1996.

## STUDENT ACTIVITY SHEET

### Egg Lab

Draw and label the parts of the egg  
inside the oval shown here:



Describe the function of the following structures:

Shell membrane:

Air Sac:

Albumen:

Chalazae:

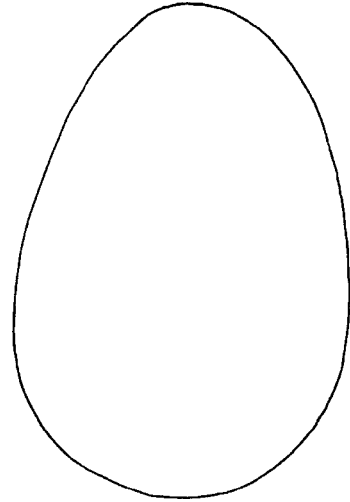
Yolk:

Blastodisc:

## **ACTIVIDADES PRÁCTICAS PARA EL ESTUDIANTE**

### **Actividad práctica con un huevo**

Dibuja y escribe los nombres de las partes del huevo dentro de la siguiente figura ovalada:



Describe la función de las siguientes estructuras:

Membrana del cascarón:

Cámara de aire:

Albúmina:

Chalazas:

Yema:

Blastodermo: