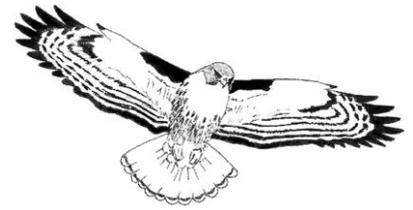




# The Incredible Egg



## Great Horned Owl

With a range stretching from the Arctic Tundra to South American rainforests, including deserts and suburban areas in between, Great Horned Owls are one of the most widespread and common owls in North America. Great Horned Owl males attract females by hooting and when paired up, the male and female will often hoot together. The male's call is usually deeper than the females, despite the fact that females are typically larger than males. Great Horned Owls use a variety of nest sites, including trees, buildings, and cliffs, but they do not make their own nests. Instead, they generally take over nests made by other bird species. Females lay 1-5 eggs per clutch. The newly hatched chicks are covered in white down and are extremely vulnerable to predation.

At Hawks Aloft, we have two Great Horned Owls among our education birds. Aztec is a female who hatched in 1995 or 1996. She has a broken wing at the radius & ulna, possibly a result of being hit by a car. Aztec often serves as a foster mom for young Great Horned Owls that have been orphaned, caring for them until they are mature enough to be released.

### Background Information:

Although bird eggs come in many different shapes and sizes, they all share some common characteristics. In this lesson, students will learn about the features and anatomy of chicken eggs and how these egg adaptations help baby birds to grow and develop.

## EGG LAB

### Learning Objective:

To understand the parts of an egg and how the egg's design helps the baby birds safely develop inside.

### Grade Levels:

3 – 6

### Time Required:

45-60 min

### Subject(s):

Science

### Materials:

- chicken eggs (one per student or pair)
- warm water
- beaker
- rain poncho or lab apron
- newspaper
- paper bowls (one per student or pair)
- tongue depressors (one per student or pair)
- gloves (optional)

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## **EGG LAB TEACHER GUIDE**

In this activity, students will learn about the different parts of a chicken egg and how the egg's design helps the baby bird developing inside to survive. This lesson has the potential to get messy, so have clean-up supplies near by. Depending on your students, this lesson can be done as a demo (i.e. everything done by the teacher) or as a lab exercise (i.e. each student or pair performing all tasks).

### **Materials:**

Chicken eggs (one per student or pair)  
Warm water  
Beaker (large enough for an egg)  
Rain Poncho or lab apron  
Newspaper  
Paper bowls (one per student or pair)  
Tongue depressors (one per student or pair)  
Gloves (optional)

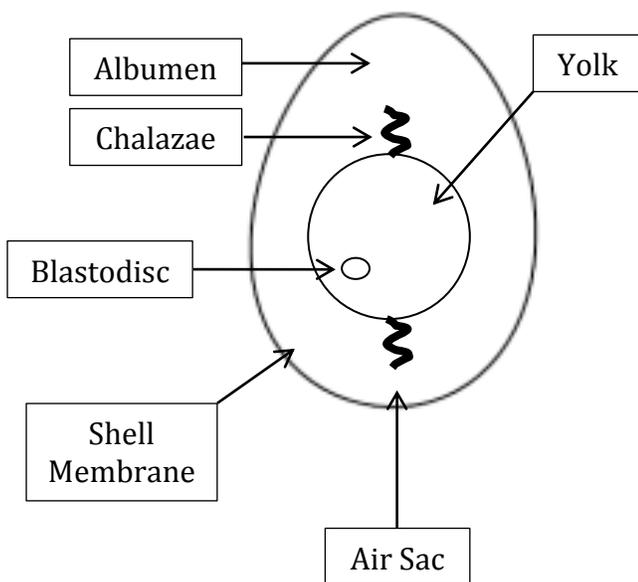
### **Procedure:**

1. Begin by asking students what they already know about eggs. Explain that today we are going to learn about the different parts of the egg and how they help the baby bird growing inside. Also remind them that the chicken eggs they buy in the grocery store, just like the ones used in this lesson, are unfertilized and therefore do not have a baby growing inside of them.
2. At this point, if your students will be executing the lab, pass out an egg to each student or pair.
3. **Shape & Size:** Ask the students to describe the shape of the egg. Why are eggs oval? Have the students GENTLY roll their egg on the table. The eggs should spin in a circle. How is this an adaptation for survival? (Since birds typically nest in high places, having eggs that can't roll out of the nest is very advantageous).
4. **Porosity:** Eggs may look solid, but shells actually have little holes that allow gases to move in and out as the baby bird develops. Gently drop an egg into a beaker of warm water. Have the student's try to predict what will happen. After about a minute, tiny bubbles will start to form on the shell as air escapes from the egg. Note that most of the bubbles are escaping from the flat end of the egg... we will find out why later in the lesson.

**5. Egg Strength:** This is the part that can get messy. You may want to have only 1 student do this at a time in a designated “squeezing area” wearing a rain poncho or lab apron and stand on newspaper. In this experiment, the students will learn how strong an egg is. Start by demonstrating the proper way to squeeze the egg. Hold the egg end to end with each end resting in the palm of one hand. **DO NOT** attempt to squeeze the middle of the egg... it will break. While holding the egg end to end, lace your fingers together and squeeze the ends together as if you were trying to crush it. As long as you are applying the pressure in the proper place, the egg should not crack no matter how hard you squeeze. If you are brave, you can let the students attempt this as well.

**Optional Demo:** Eggshells are made out of calcium carbonate, which is what makes them hard and strong. As the baby bird develops, it uses the calcium from the shell to help build strong bones. Therefore, when a chick is ready to hatch, the eggshell is thinner than when the egg was laid. This can be demonstrated by soaking a chicken egg in white vinegar overnight. The vinegar, a mild acid, will react the calcium carbonate, a mild base, and the result is a thinner shell.

**6. What’s Inside:** Now it’s time to crack open the eggs and see what’s inside. Instruct the students to carefully crack their eggs into the paper bowls, making sure not to break the yolk. Give each student/pair a tongue depressor (or other implement) to allow them to gently move the components of the egg without breaking them. Before you reveal each part of the egg, ask the students for their ideas about what the parts might be. As you describe each part, have the students sketch it on the Student Handout.



**Shell Membrane:** Attached to the shell except on the flat end, this is a thin layer that lines the egg and keeps water in and germs out. It allows gases (oxygen and carbon dioxide) to pass through. Notice the air sac at the flatter end of the shell, just before the baby bird hatches it takes it’s first breath of air from this air sac. This air sac is also the reason why the bubbles were forming on the flat side of the egg in the water activity.

**Albumen:** Commonly known as the “white” of the egg, this clear liquid keeps the baby bird from drying out. It is mostly water, but contains 10% protein and some minerals that the bird uses as it develops.

**Chalazae:** Two slimy, rope like structures attached to the yolk. These are the twisted

ends of the inner layer of the albumen. They are similar to the umbilical cord in humans. As the egg was being formed in the female bird's body, the chalazae allowed the albumen to enter the egg.

**Yolk:** This is the actual egg cell (and it's just one cell!). The yolk is the food source for the developing chick. It is made up of proteins, fats, and carbohydrates. It serves as a complete food source for the chick during its 21 days of development inside the egg.

**Blastodisc:** This is a tiny white spot found on the surface of the yolk. This is where the egg is fertilized and where the chick would begin to develop.

**Extensions:**

- Allow your students to observe the development process first hand by hatching chicks. Contact your local feed store to obtain fertile eggs.
- **Have Hawks Aloft, Inc come to your classroom with two live raptors to talk about nesting behavior, mating rituals, or another topic of your choice!**



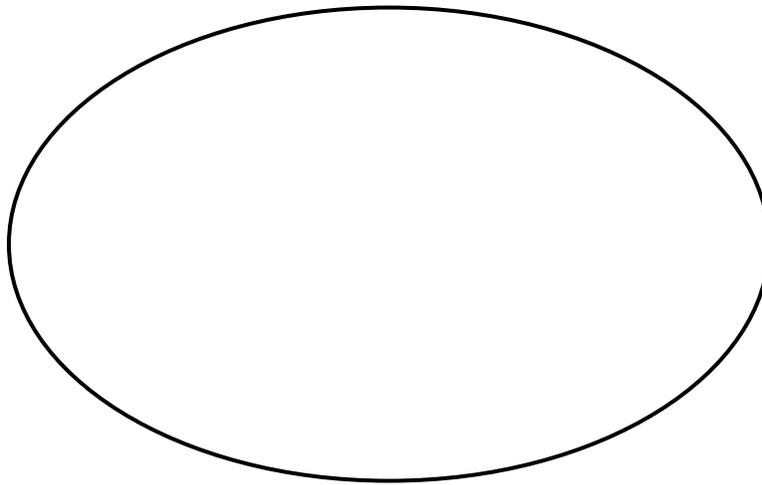
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Date \_\_\_\_\_

**EGG LAB  
STUDENT HANDOUT**

1. What happened when the egg was put into warm water?

2. Draw and label the parts of an egg inside the oval below.



3. Describe what each part of the egg does (its function) in the spaces below.

**Shell Membrane:**

**Chalazae:**

**Air Sac:**

**Yolk:**

**Albumen:**

**Blastodisc:**