

CURRICULUM SUPPLEMENT

EGGSPLORATORY SURGERY

AN EGG DISSECTION ACTIVITY

For use with the **Results** section of *Eyes on Eiders*

Overview: Students will discover that the ordinary egg is a lot more than meets the eye.

Learning Objectives:

The student will:

- **Identify** the different parts of an egg.
- **Understand and be able to explain the functions** of the different parts of an egg.

Standards Addressed:

Alaska Science GLES:

<https://education.alaska.gov/akstandards/standards/standards.pdf>

5th: SA1.1, SA1.2, SA3.1

6th: SA1.1, SA1.2, SA3.1

7th: SA1.1, SA1.2, SA3.1

8th: SA1.1, SA1.2, SA3.1

Next Generation Science Standards:

<https://education.alaska.gov/akstandards/standards/standards.pdf>

There are no direct standards for hands on use of an apparatus. However due to the way in which the NGSS is constructed this activity is supported by the theme of several standards.

Materials/Location Needed:

- *This lesson can be done in the classroom or lab setting.*
- *The chicken eggs from the candling experiment, enough chicken eggs for each student or group (if you have a local connection and can obtain fertilized eggs we recommend you do so!) otherwise unfertilized eggs from the grocer's will suffice. This activity is designed for the dissection of unfertilized eggs. Fertilized egg dissection activities can be obtained from your local university extension office or local 4H club office.*
- *Lab trays if available, 2 per student or group. Disposable paper bowls will work as well; again 2 per group or student.*
- *1 pair of Tweezers per student or group.*
- *1 magnifying lens per student or group.*
- *1 empty and clean plastic drink bottle per student or group (either water or soda – it must have a narrow neck and opening – your standard Evian bottle or similar will work).*
- *Electronic scale (it doesn't have to be a lab scale, a kitchen scale will work just fine)*
- *Copies of Egg Diagram found on page 4 of this lesson, either printed for each group or displayed on board for entire class to consult.*
- *Student worksheet found on page 5 of this lesson.*

Teaching Time: 45 minutes.

Preparation Time: 30 minutes.



CURRICULUM SUPPLEMENT

Background:

The collection of data is one of the fundamental building blocks of science. As we have just seen in the **Results** video Dr. Counihan and her staff collect a lot of data, from a lot of eggs! By looking at and measuring the different parts of each egg the Eider team can gain an understanding of the overall health, not only of individual eggs but of the overall population.

The bird egg is a marvel of nature. A self-contained life support system that only requires a little warmth and humidity to develop this reproductive strategy has been a success for millions of years on our planet. Starting with the shell we find a wonder of natural engineering, efficient in shape, built for strength to protect the contents, while it also provides protection from many forms of microbial contamination and yet it's also porous to allow for the exchange of gas and water from the growing embryo inside!

Using the *Egg Diagram* you can see that on the inside the shell is lined with two membranes to further protect contents and an air supply (air space) for the embryo to use as it hatches. Food and water for the growth and development of the embryo (albumen & yolk) and finally a security belt (chalazae) to keep the embryo in a central and safe place during development.

Directions:

1. After completing the **Results** section of *Eyes on Eiders*, explain to your class that they are going to identify the parts of their eggs by dissecting them.
2. Before you have your students crack open the shells let them take a few moments to explore the outer part of the shell. Using the magnifying lens ask them what they see on the eggs surface. Have them place the egg in their palm and close their fist around it. Without digging a fingertip into the shell see how hard they can squeeze the egg. What observations do they make about the egg's strength?
3. Have your students crack their egg into one of the trays. Be sure to remind them that they will need the shell so don't crush or dispose of it just yet.
4. Using the *Egg Diagram*, have your students fill out their worksheet as they identify the different parts of their egg, including the parts that remain inside the shell.
5. Ask your students to use their tweezers to separate the chalazae from the yolk and look at it closer using their magnifying lens. Have them record their observations on their worksheets.
6. Next have them use the tips of their tweezers to find the air space inside the shell membrane. What end of the egg is the air space in? Is this the same answer for the other groups as well? Next have them use the tweezers to pull the membrane from the shell wall. Have them record their observations on their worksheets.
7. Now it is time to separate the yolk from the egg. Using their empty bottle have them gently squeeze the bottle and hold it against the yolk, when they release the squeeze the yolk should be sucked into the bottle and then can be placed into the separate tray.



CURRICULUM SUPPLEMENT

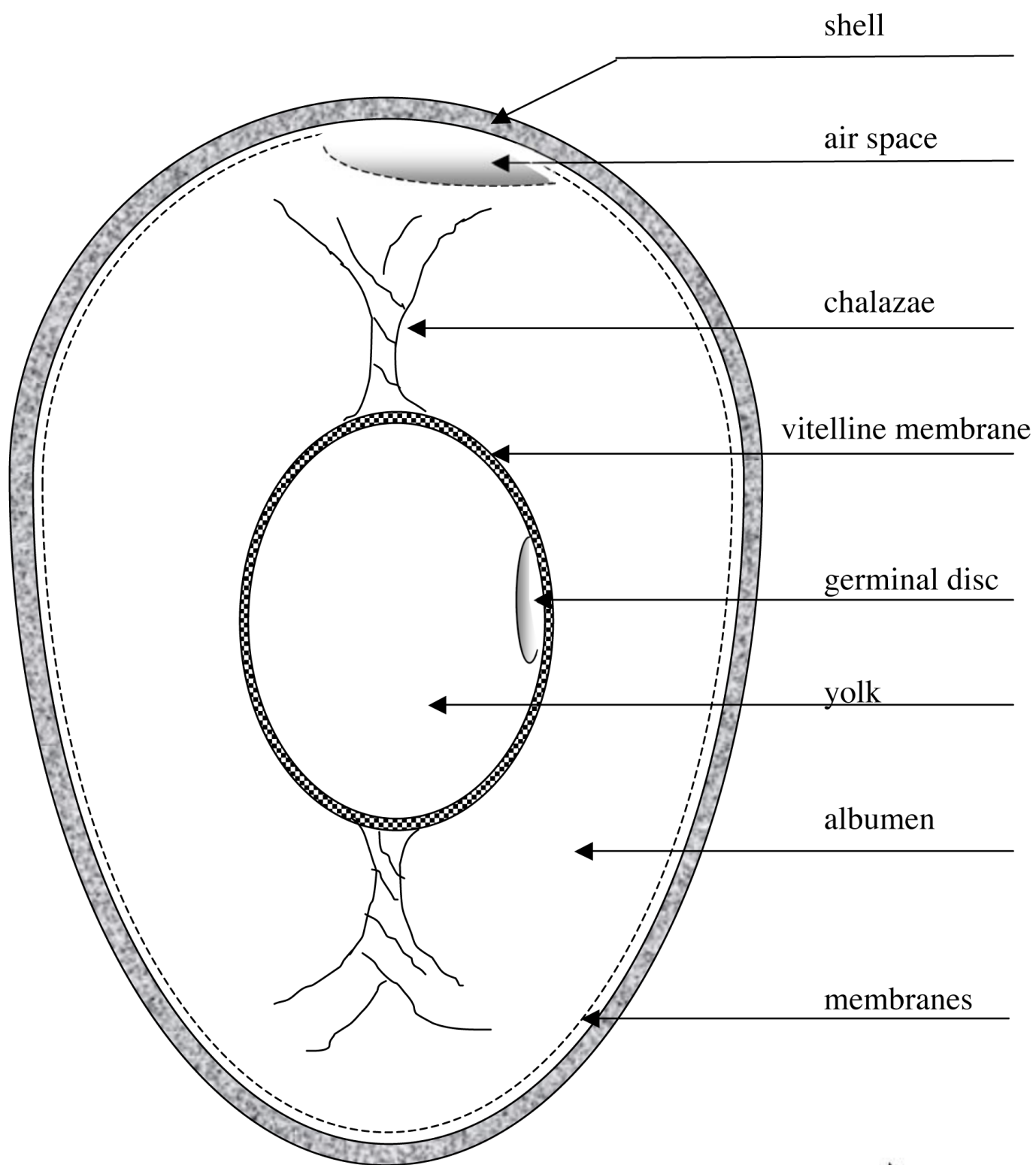
8. Have your students focus on the yolk; ask if anyone knows what the yolk's purpose is inside of an egg (food for the embryo). Some may even have a small discoloration spot on their yolk. This is the germinal disc, or the area where the embryo would be attached to the yolk if this were a fertilized egg.
9. Next have them gently poke the yolk with the tip of their tweezers. If done with enough care the yolk membrane (vitelline membrane) will bounce back. What happens if too much pressure is applied?
10. Finally, construct a simple chart on the board and have each student or group come to the scale and weigh each tray. Record the data for the weights of yolks and albumen on the chart. What kind of trends do they see in the weights? Have them record their observations on their worksheets.

Assessment:

Students can be assessed on participation in many aspects of the activity and/or their success at completion of the worksheet.



CURRICULUM SUPPLEMENT - EGG DIAGRAM



STUDENT WORKSHEET

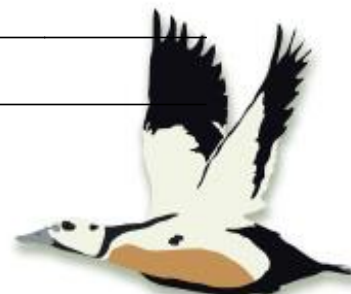
Name _____ Date _____ Class _____

1. Write down your observations as you looked at the eggshell under the magnifying lens.

2. Draw an egg shape and using the diagram label the eight different parts of the egg. Were you able to find all eight on your egg? **YES** **NO**

3. Where you able to remove the chalazae and observe it under your magnifying lens? What do you think the purpose of the chalazae is inside the egg? Write any other observations you made below.

4. Where you able to find the air sac that remained inside the egg shell? What do you think the purpose of the air sac is inside the egg? Write any other observations you made below.



STUDENT WORKSHEET

5. What happened when you poked the yolk membrane with your tweezers? Write any other observations you made below.

6. Record the weight of your albumen and yolk specimen below.

Albumen _____ mg

Yolk _____ mg

