

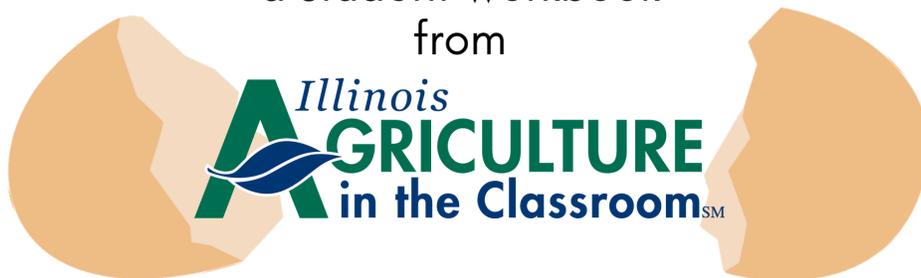
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# EMBRYOLOGY EXPLORATION

K-2 Edition



a student workbook  
from



# TABLE OF CONTENTS

Hatch Prediction.....	1
<b>Egg Anatomy &amp; Dissection.....</b>	<b>2</b>
Daily Incubation Observation.....	4
<b>Shell Porosity Experiment.....</b>	<b>7</b>
Bird Beak Lab.....	8
<b>Chicken Life Cycle Terminology.....</b>	<b>10</b>

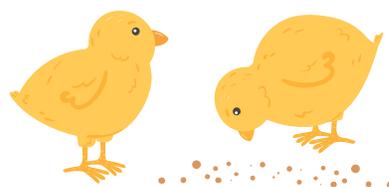
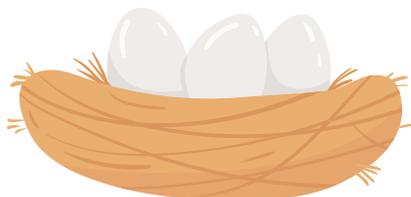
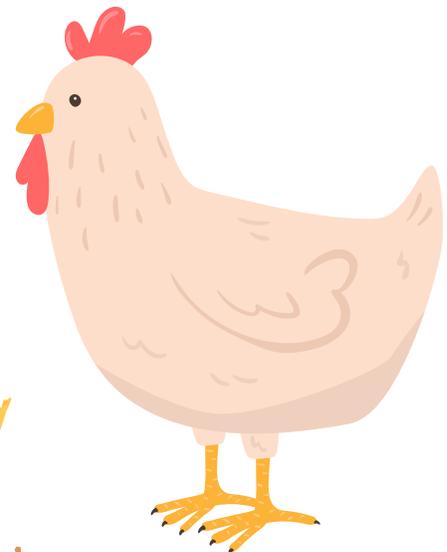
## POULTRY FAST FACTS

The average American eats 91 pounds of chicken and about 250 eggs per year.

Illinois has over 5 million chickens that produce nearly 128 million dozen eggs each year.

You can tell which color egg a hen will lay by the color of her earlobes.

Each hen lays approximately one egg a day, or 300 eggs a year.



# HATCH PREDICTION

Predict the number of eggs that will hatch!

**Hatch rate** refers to the number of eggs that hatch from a “set” placed in an incubator at one time. Because not all eggs in a set were laid or fertilized at exactly the same time, and because not all incubators provide perfect conditions 100% of the time, there is no guarantee that every egg placed in an incubator at once will hatch.

Number of eggs we placed in the incubator:

Number of eggs I think will hatch:

Number of eggs I think will hatch:

Number of eggs placed in the incubator:

out of

eggs will hatch.

Write one complete sentence about your predicted hatch rate (*I predict that...*):

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Compare your prediction to a classmate’s prediction. Write  $>$ ,  $<$ , or  $=$ .

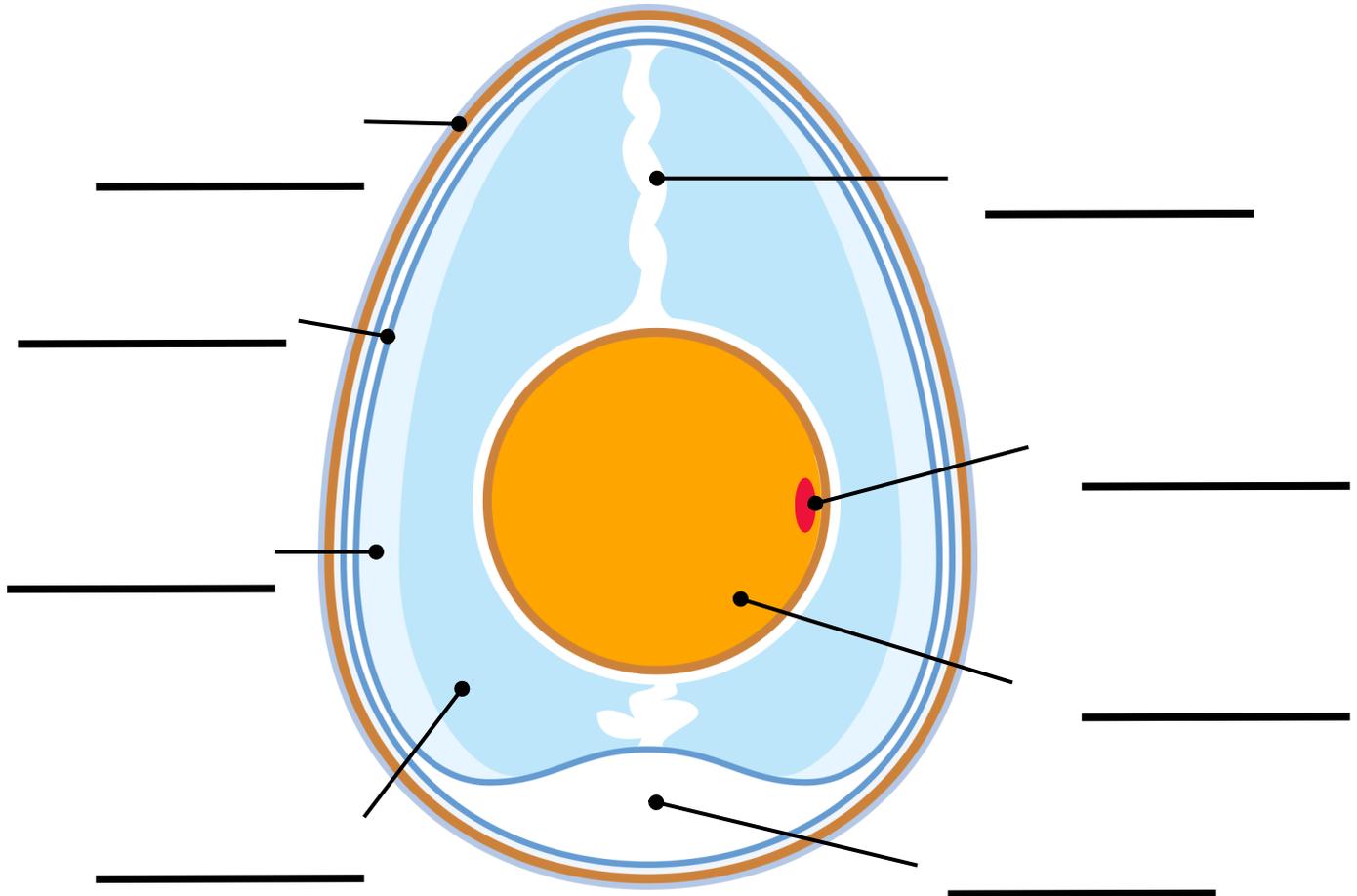
Number of eggs I think will hatch:

$>$ ,  $<$ , or  $=$

Number of eggs someone else thinks will hatch:

# EGG ANATOMY

Read the passage below and complete the egg anatomy diagram by writing the number of the terms on the lines.



An egg has eight basic parts. The **shell(1)** is the hard outer surface that protects the inside. The color of the eggshell depends on the breed of chicken that laid it. Just inside the shell is a thin, flexible **shell membrane(2)** that protects the egg against outside bacteria. The clear liquid inside the egg - sometimes called the "egg white" - is called the albumen. The **thick albumen(3)** directly surrounds the yolk, and the **thin albumen(4)** provides an extra barrier between the thick albumen and the shell.

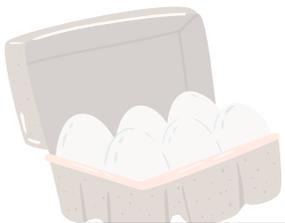
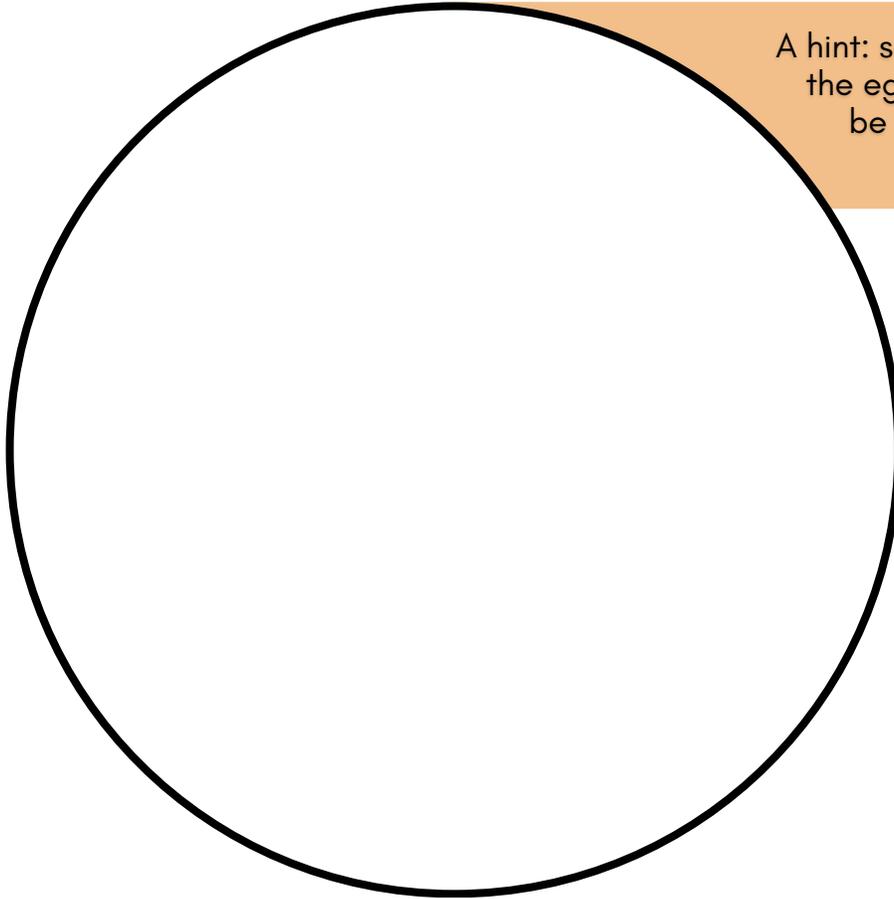
The yellow/orange center of the egg is called the **yolk(5)** and is the major source of vitamins and minerals in the egg. A small spot called a **germinal disc(6)** is found on the outside of the yolk. If the egg is fertilized, the germinal disc is what will go on to develop into a chick. A white cord-like twisted strand called the **chalaza(7)** (pronounced "ka-LAY-za") holds the yolk in the center of the egg. Finally, near the larger end of the egg is an **air cell(8)**, which allows the baby chick to breathe inside the egg.

# EGG DISSECTION

Carefully crack open a grocery store egg and identify and describe the parts.

Draw the contents of your egg in the circle below and label the parts.

A hint: some parts of the egg might only be visible *inside* of the shell!

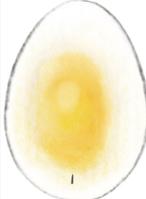
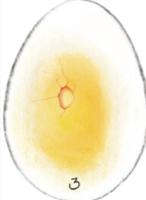
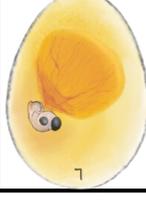


Describe the look and feel of each of the parts of the egg.

<b>shell</b>	
<b>shell membrane</b>	
<b>thick albumen</b>	
<b>thin albumen</b>	
<b>yolk</b>	
<b>germinal disc</b>	
<b>chalaza</b>	
<b>air cell</b>	

# DAILY INCUBATION OBSERVATION

Keep a record of incubation information each day.

Day	Date	Temperature	Humidity	Life Cycle Image	Observations
ex.	April 4, 2024	99.5°F	60%		Temperature and humidity are good! Egg 6 looks like it's bigger than the rest. I wonder why...
1					
2					
3					
4					
5					
6					

# DAILY INCUBATION OBSERVATION

Keep a record of incubation information each day.

Day	Date	Temperature	Humidity	Life Cycle Image	Observations
8					
9					
10					
11					
12					
13					
14					
15					

# DAILY INCUBATION OBSERVATION

Keep a record of incubation information each day.

Day	Date	Temperature	Humidity	Life Cycle Image	Observations
16					
17					
18					
19					
20					
21					

## HATCH DAY RESULTS

It's Hatch Day! How many chicks hatched?  
 What are their colors?  
 Keep track of your observations here.

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# SHELL POROSITY

Conduct a fun experiment to learn about an egg shell's porosity.

What does an egg shell look like  
to the naked eye?

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What does an egg shell look like  
under a magnifying lens?

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## Membrane Permeability Observation

	Corn Syrup	Water
<b>hypothesis*</b> <i>(will the egg's weight increase or decrease?)</i>		
<b>beginning weight (g)</b>		
<b>15-minute weight (g)</b>		
<b>30-minute weight (g)</b>		
<b>60-minute weight (g)</b>		
<b>90-minute weight (g)</b>		

Was your hypothesis\* correct? Form a conclusion as to why or why not using the data you have observed on this page.

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# BIRD BEAK LAB

Explore how different birds' beaks have adapted to the food they eat!

There are over 18,000 species of birds worldwide, and many of them have unique beak types that have evolved over time for their survival. For example: hummingbirds have long, narrow beaks to reach deep into flowers to drink their nectar. Ducks have beaks that act like strainers, picking up food and straining out the water. Bird beaks have also adapted to have a sharp "egg tooth" to help them break through the shell during hatching. This "egg tooth" falls off in the first days of life. Learn more about unique bird beaks in this activity!

In this activity, you will use a variety of household objects as makeshift "beaks" to try and pick up a variety of different types of "food."

## "Beak" Objects:

- Tweezers
- Binder Clip or Chip Clip
- Dropper
- Toothpick
- Slotted Spoon

## "Food" Objects:

- Rubber Bands
- Marshmallows
- Rice
- Colored Water
- Sunflower Seeds



In the table below, predict which types of "food" listed above you will be able to pick up with each type of "beak." Then, brainstorm what types of birds you know that might have each type of beak.



	<b><u>Predict:</u> Which foods will I be able to pick up?</b>	<b><u>Brainstorm:</u> What types of birds might have this type of beak?</b>
<b>Tweezers</b>		
<b>Binder Clip / Chip Clip</b>		
<b>Dropper</b>		
<b>Toothpick</b>		
<b>Slotted Spoon</b>		

# BIRD BEAK LAB

Explore how different birds' beaks have adapted to the food they eat!

Record how much of each "food" you can collect with each "beak" in 20 seconds.

	Rubber Bands Collected (# of pieces)	Marshmallows Collected (# of pieces)	Rice Collected (# of pieces)	Colored Water Collected (mL in graduated cup)	Sunflower Seeds Collected (# of pieces)
Tweezers					
Binder Clip or Chip Clip					
Dropper					
Toothpick					
Slotted Spoon					

In this box, identify which type of "food" is best for each type of "beak."

Tweezers:

Dropper:

Toothpick:

Slotted Spoon:

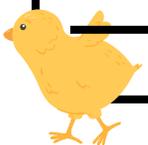
Binder Clip / Chip Clip:

What would happen to a population of birds if their beaks were not able to pick up the food that was available to them?

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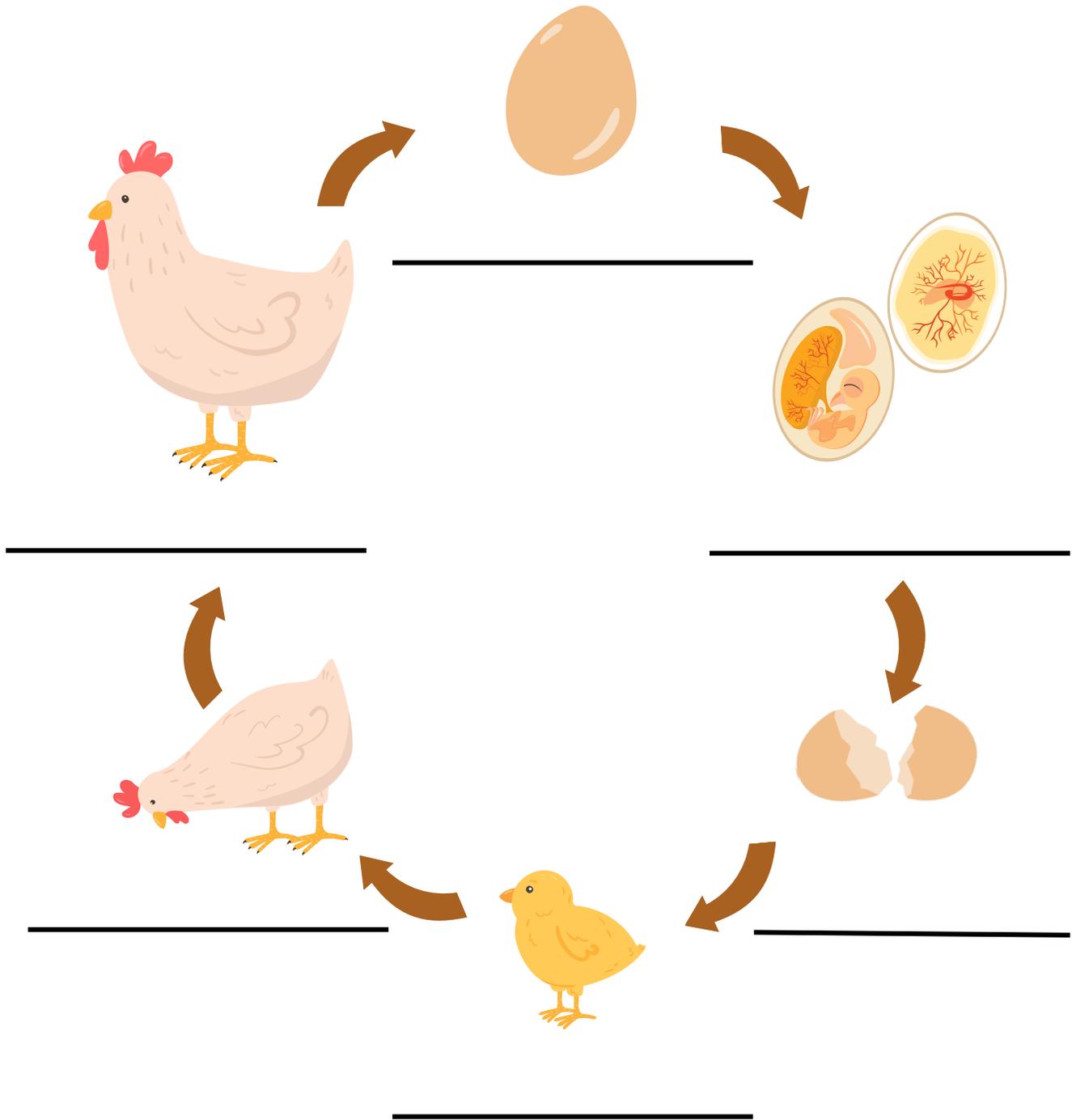


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# CHICKEN TERMINOLOGY

Use the word bank to correctly label each part of the chicken life cycle.



Chick

Egg

Pullet

Embryo

Chicken

Hatch