

A close-up photograph of a chicken's lower legs and feet. The chicken has light brown, fluffy feathers. Its legs are a pale yellowish-brown color, and its feet are a darker yellowish-brown. The chicken is standing on a white surface. The text "POULTRY ROCKS 101" is overlaid in a large, bold, black serif font across the middle of the image.

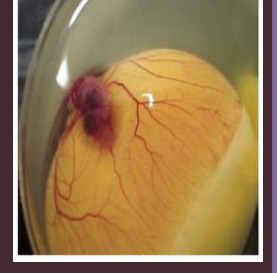
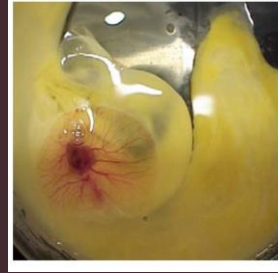
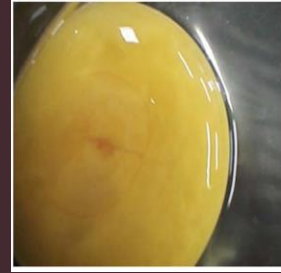
# POULTRY ROCKS 101

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**VCE 4-H/ANR Extension Educator**

# EMBRYOLOGY

## LESSON 1

### DAYS 1-7



# Lesson Focus Points

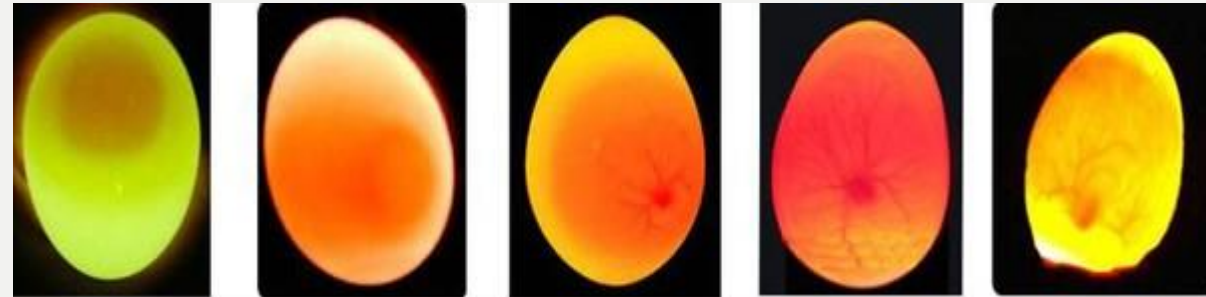
- Identify poultry breeds
- Identify poultry products and uses
- Identify poultry related careers
- Locate VA poultry facilities



























# What is Embryology?

- The study of chicken(poultry) development within the egg.
- This is a process that takes 21 days for the embryo to develop inside the egg.
- Week 1:
  - *Development of vital organs and blood vessels*
- Week 2:
  - *Development of body parts like wings, beak, toes, feathers, and ears.*
  - *Candling will occur between day 11-15.*
- Week 3:
  - *Preparing for the arrival of your chicks!*





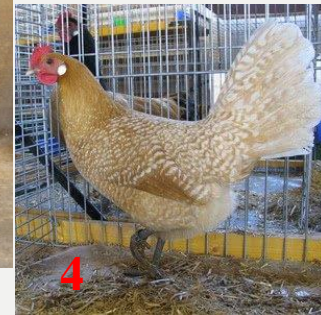
## CHICK EMBRYO DEVELOPMENT

						
INFERTILE • No development.	DAY 1 • Appearance of tissue development.	DAY 2 • Tissue development very visible. • Appearance of blood vessels.	DAY 3 • Heart beats. • Blood vessels very visible.	DAY 4 • Eye pigmented.	DAY 5 • Appearance of elbows and knees.	DAY 6 • Appearance of beak. • Voluntary movements begin.
						
DAY 7 • Comb growth begins. • Egg tooth begins to appear.	DAY 8 • Feather tracts seen. • Upper and lower beak equal in length.	DAY 9 • Embryo starts to look bird-like. • Mouth opening appears.	DAY 10 • Egg tooth prominent. • Toe nails.	DAY 11 • Comb serrated. • Tail feathers apparent.	DAY 12 • Toes fully formed. • First few visible feathers.	DAY 13 • Appearance of scales. • Body covered lightly with feathers.
						
DAY 14 • Embryo turns head towards large end of egg.	DAY 15 • Gut is drawn into abdominal cavity.	DAY 16 • Feathers cover complete body. • Albumen nearly gone.	DAY 17 • Amniotic fluid decreases. • Head is between legs.	DAY 18 • Growth of embryo nearly complete. • Yolk sac is still on outside of embryo. • Head is under the right wing	DAY 19 • Yolk sac draws into body cavity. • Amniotic fluid gone. • Embryo occupies most of space within egg (not in the air cell).	DAY 20 • Yolk sac drawn completely into body. • Embryo becomes a chick (breathing in air cell). • Internal and external pip.

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# Egg Laying Breeds

1. Ameracaunas lay pale blue eggs
2. Araucanas lay blue eggs.
3. Australorp is primarily a laying and meat bird. They lay brown eggs.
4. Friesans lay small white eggs. Producing roughly 150-180 eggs per year.
5. Hollands are a dual purpose fowl for meat and egg production. They lay white large eggs.
6. Leghorns produce white eggs. The majority of eggs found in grocery stores come from this breed.
7. Brahmans will keep the egg cartons full of large, medium brown eggs.
8. Delaware is primarily used for eggs and meat. This fowl lays around 100 to 150 eggs per year laying dark brown eggs.
9. Jersey Giant is a dual-purpose fowl for meat and eggs laying 150 - 200 eggs per year. This fowl lays brown colored eggs.
10. The Orpington is a dual-purpose fowl for eggs and meat. Orphingtons lay brown colored eggs.
11. Plymouth Rocks are a good farm chickens laying brown eggs.
12. Rhode Island Reds are a great dual purpose breeds. Laying brown eggs, 150 - 200 per year.





# Meat Breeds



# Guess That

- There are many poultry products that lay in plain sight and aide us in our daily activities.
- Can you guess that product or your favorite chicken dish?

## Chicken Dining Dishes

BBQ Chicken

Skinless Ground Chicken

Caribbean Jerk Chicken

Chicken Patties

Chicken Breasts

Chicken Stir Fry

Chicken Fajita

Teriyaki Chicken

Boneless Stuffed Chicken

Italian Stuffed Chicken Breasts

Caprese Stuffed Chicken Breasts w/Prosciutto

Whole Frying Chicken

Chicken Cordon Bleu

Cut Up Frying Chicken

Chicken Drumsticks

Chicken Wings

Chicken Kabobs



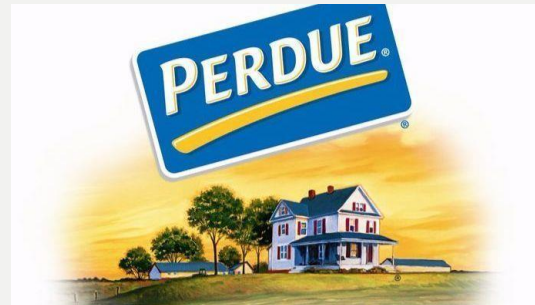


# VA Poultry Facilities

- Cargill
- George's Foods
- Tyson Foods
- VPGC, LLC
- Pilgrim's Pride
- Perdue Farms
- New Market Poultry
- Shenandoah Valley Organic



Keep it real.  
Keep it Tyson.

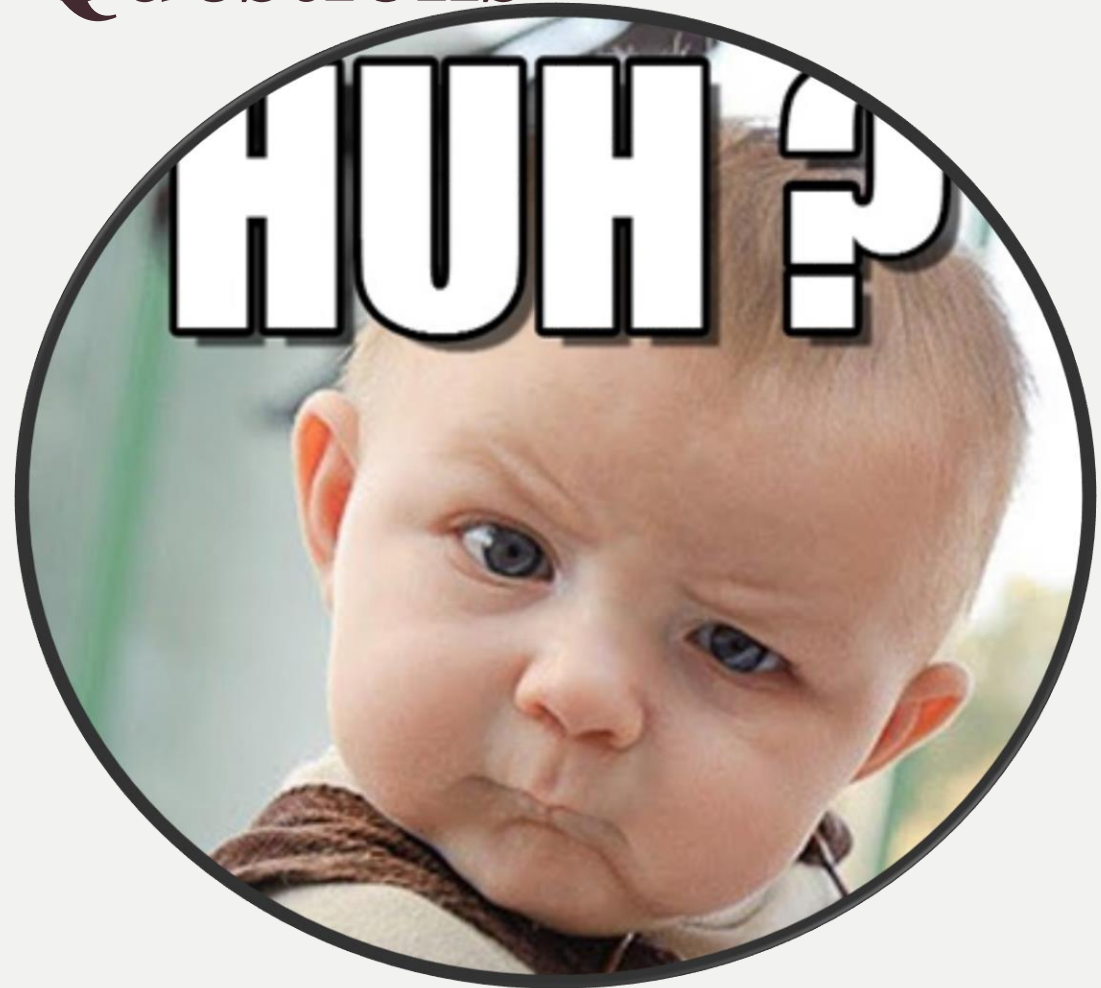


# Poultry Vocabulary

- Comb
- Earlobe
- Hackle
- Saddle
- Wattles
- Shank
- Spur
- Hock
- Feathers
- Vent
- Albumen
- Air Sac
- Yolk
- Humidity
- Brooder Box
- Pipping
- Fertile
- Infertile
- Amnion
- Allantois
- Candling
- Incubator
- Chick

# Review Questions

- **True or False**
  - *Chickens can be dual purpose. Meat and egg production*
- **True of False**
  - *VA has 8 poultry facilities*
- **True of False**
  - *Poultry careers range from producing grain to inspecting and grading meat*
- **True of False**
  - *All chickens will have a comb, beak, and feathers*



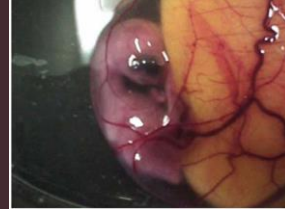
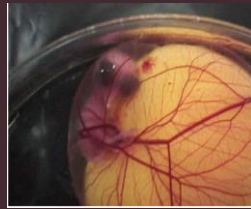




# EMBRYOLOGY

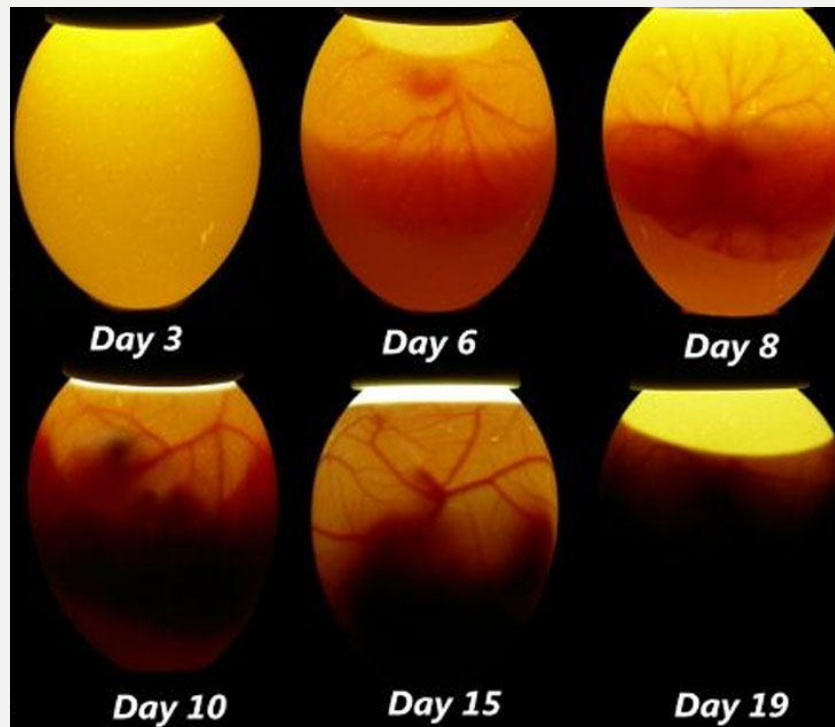
## LESSON 2

DAYS 8-14



# Lesson Focus Points

- Candling sessions
- Egg experiment
- Scientific method
- POULTRY BINGO



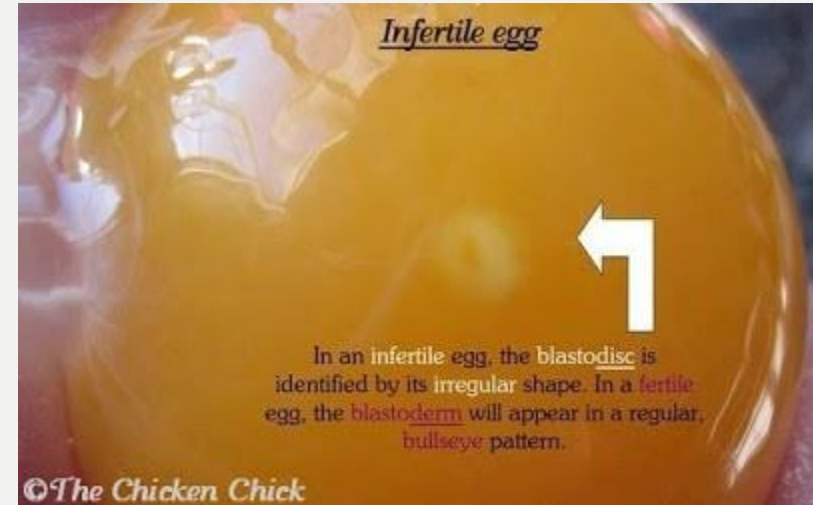


# Candling = Fertile or Infertile?

## ■ Fertile Eggs

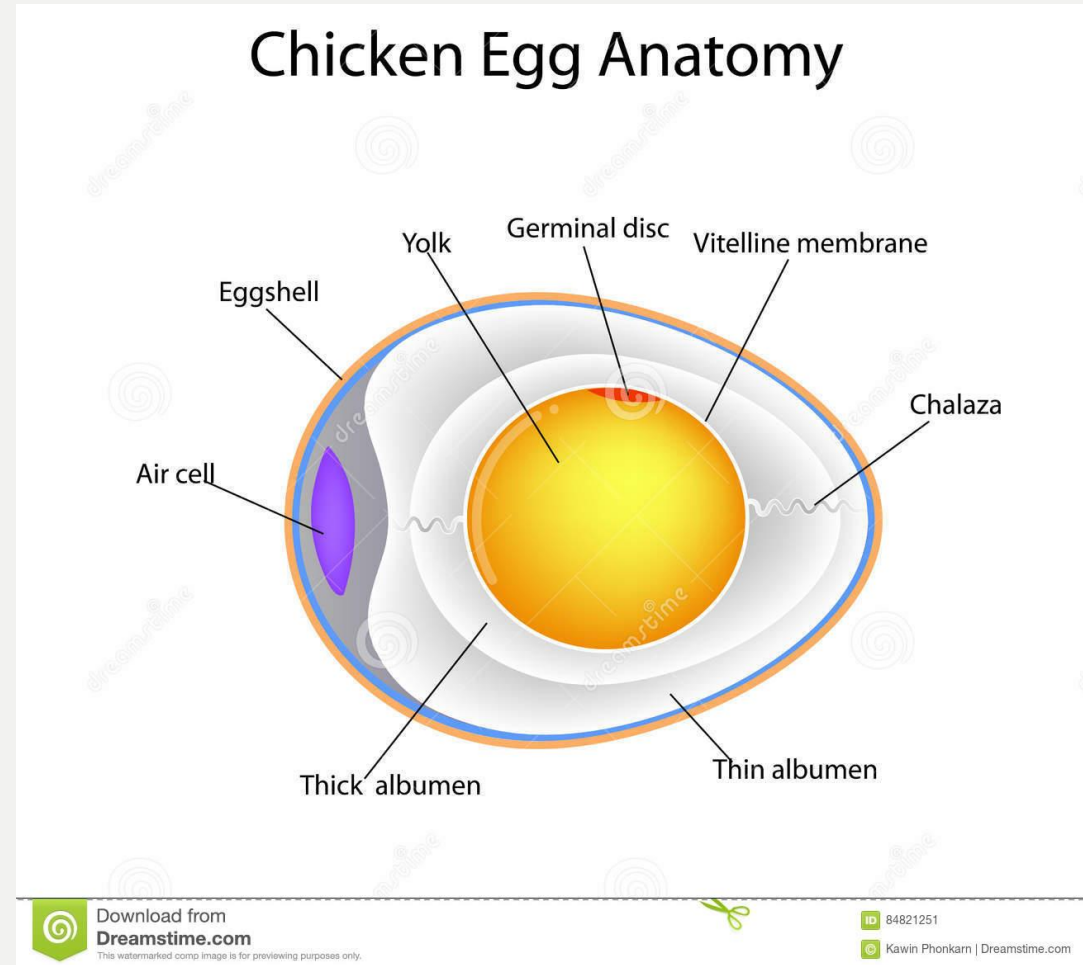


## ■ Infertile Eggs



# The Egg Has Parts?

- Air Cell
  - *Located in the top of the egg to hold air.*
- Albumen (Egg White)
  - *Egg section that is clear before cooked and turns after cooking.*
- Chalazae
  - *Extend from the yolk to the lining membrane; two spiral bands.*
- Germinal Disc
  - *Small, circular white spot on the egg yolk, AKA blastodisc.*
- Membranes
  - *Lining; boundaries*
- Vitelline Membrane
  - *Egg membrane*
- Yolk
  - *Houses embryo and provides nutrients to developing embryo.*





FOR SCIENTIFIC  
INQUIRY



# What's Going On?

## Incredible Egg Geode

### Directions:

- **Materials**
  - Clean Eggs
  - Small Paintbrush
  - White Glue
  - Food Coloring
  - Alum Powder
  - Water
  - Sharp Scissors
  - Paper Towels
  - Bowl
  - Glass Jar
  - Spoon
  - Pushpin
  - Epsom Salt (alternative to Alum Powder)
- **Step 1:**
  - Wash eggs **BEFORE** use and poke two holes carefully with pushpin in top and bottom of egg to drain out yolk. Blow egg yolk into drain or bowl.
- **Step 2:**
  - Cut the egg shell in half and rinse the shell with warm water. Pat lightly with paper towel to dry.
- **Step 3:**
  - Apply 3 drops of glue to egg shell halves and spread the glue with a paintbrush for equal coverage.
- **Step 4:**
  - Sprinkle alum powder to glued section of shells and tap gently to remove excess powder. Dry overnight.
- **Step 5:**
  - Use two cups of boiling water, add food coloring, stir, add  $\frac{3}{4}$  cups of alum powder, stir and let cool for 30 minutes.
- **Step 6:**
  - When cool, place shells in solution, powder side up and **GENTLY** push to bottom of jar. Allow to sit for 12-15 hours.
- **Step 7:**
  - Remove shells to see what size crystals have formed. If you desire bigger crystals, leave shells in solution mix longer.....**ENJOY!**



**TADAH  
!!!!!!**



# What's Going On?

## Rubber Egg/A Matter of Weight

### ■ Materials

- Clean Eggs
- Cup(s)
- White Vinegar

### ■ Directions:

#### ■ Step 1:

- *Clean eggs and place in glass jar.*

#### ■ Step 2:

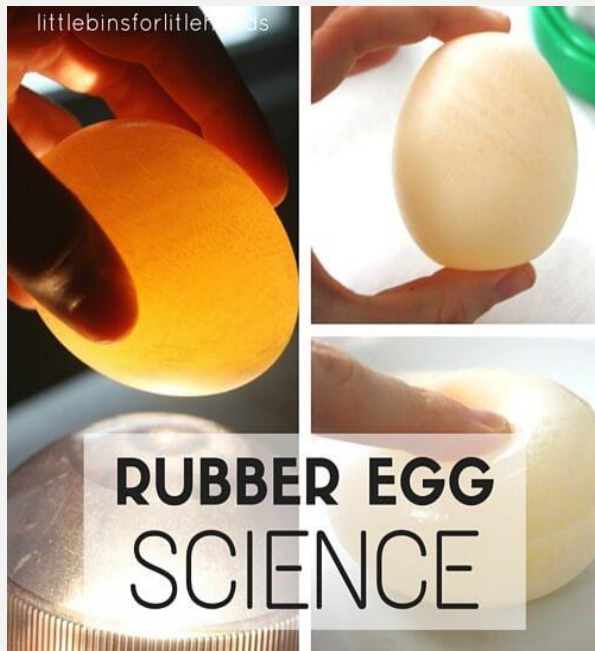
- *Pour white vinegar into jar to fully cover the egg. Let soak for 3 days.*

#### ■ Step 3:

- *Remove egg from jar and make sure shell has been fully dissolved. Rinse with water and set to dry for two days.*

#### ■ Step 4:

- *After egg is COMPLETELY dry, try bouncing it to see how high it will go without breaking. Record your findings. ENJOY!*



# What's Going On?

## Staying Afloat.....

### ■ Materials

- Egg from Bouncing egg....if left
- Corn Syrup
- Water

### ■ Directions:

#### ■ Step 1:

- Fill glass with corn syrup and place shell-less egg inside.

#### ■ Step 2:

- Allow to sit for 24hrs and recording findings.

#### ■ Step 3:

- Remove egg from solvent and record findings.

#### ■ Hmmm.....

- Did the egg float to the top of the solution?
- Why did the egg appear smaller or shrink?
- If the egg stays in the corn syrup for 48hrs instead of 24hrs, will the yolk leak out?







**BINGO**

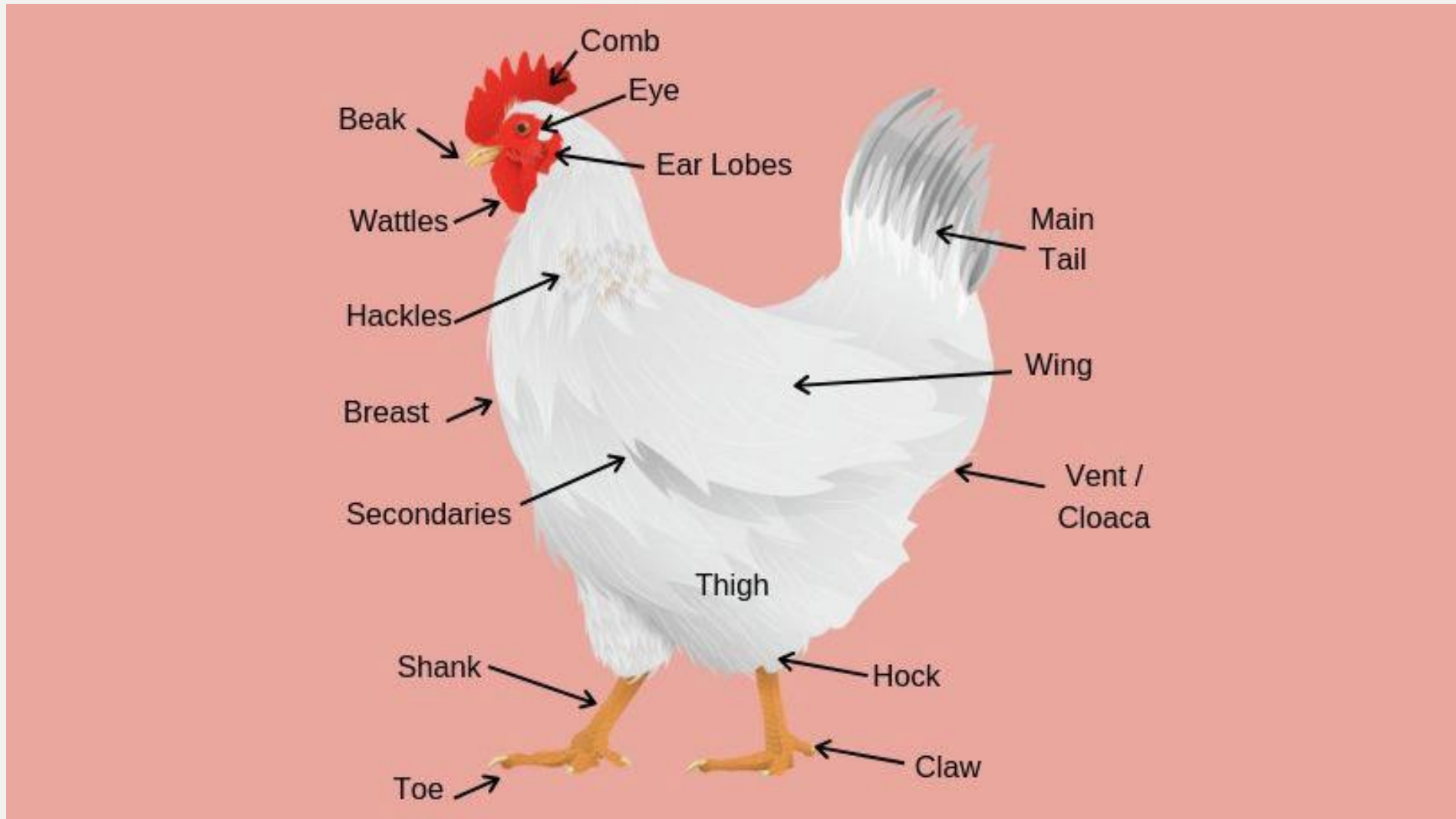
POULTRY  
BINGO O O O O O O O O

I will read the definitions and you will mark the **CORRECT** item/word on your BINGO card. The first person to correctly call back BINGO wins!

# Poultry Bingooooooooo

1. This part of the chicken is located on the top of the head. Red and looks like a crown.
2. This part is located behind the eyes and allows the chicken to hear.
3. I am the section between the wattles and the chest.
4. I am the section between the shoulders and the tail feathers.
5. Roosters are the ONLY ones that have these shark items on their legs.
6. I am the red section DIRECTLY under the beak.
7. I am the section located between the foot and the thigh.
8. I am the section located between the shank and the thigh.
9. The chicken is covered in these that are different colors.
10. I am the section that pops out the eggs.
11. I am known as egg whites.
12. I am the section in the egg used for air.
13. FREE SPACE
14. I play an important role in hatching chicks. I have to be between 35-55% during incubation and 60-80% during hatching.
15. I am yellow and provide nutrients to the chicks inside the egg.
16. I am the place where the chicks will spend their first week before going to their new home.
17. This is done when the chicks began to break through the egg.
18. If an embryo is seen inside the egg, this means the egg is \_\_\_\_\_.
19. If an embryo is NOT seen inside the egg, this means the egg is \_\_\_\_\_.
20. The process of shining a light through the egg is called what.
21. I am the membrane that protects the embryo.
22. I grow around the embryo.
23. The eggs are currently housed inside this object.
24. Once the eggs hatch, we will come out. What are we called?
25. \_\_\_\_\_ has to be 99.5 degrees Fahrenheit in order for the chicks to grow.

# Poultry Bingoooooooooooo



# EMBRYOLOGY

## LESSON 3

### DAYS 15-21



alamy stock photo



# Lesson Focus Points

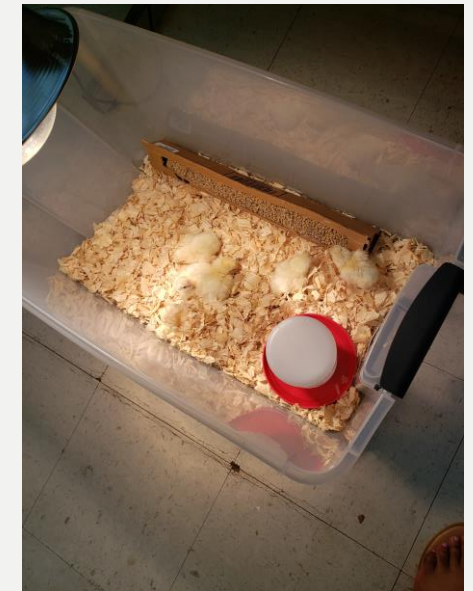
- Chicken needs
- Male or Female
- Care & Handling
- Youth Survey give to each class
- Hatch Observation worksheets



# Chicks Need Love

## Preparing for your chick arrival.....

- Chicks will typically arrive between days 21 and 24, so be on alert.
- Between days 20-23 you can hear the faint chirps of baby chicks ready to breakthrough within the egg. Make sure your students are super quiet to hear the babies.
  - *Don't worry your not hearing things, they are REALLY birds in your classroom.*
- By this time, you should have the following:
  - *Brooder box (plastic brooder, cardboard box, or plastic tote)*
  - *Newspaper*
  - *Shavings*
  - *Drinking container*
  - *Food tray*
  - *Heat lamp*
  - *Section to house chicks in class for 5-7 days*
- When removing chicks from incubator to their brooder box, make sure the chicks have stayed in the incubator for 24-48hrs to dry off and encourage body temperature regulation. Also, remove chicks when more than one can go into the brooder box. This will reduce the stress level of entering a whole new world.
- **WASH YOUR HANDS BEFORE & AFTER HANDLING ANIMALS.**
- Make sure that you attach the heat lamp to a surface that allows enough height distance from the box to the lamp. This will provide ample heat for the chicks without burning the box or the chicks.
- **DO NOT**, place brooder box under a direct airway to avoid freezing the chicks.
- You can monitor your heat lamp usage during the school day but make sure the lamp is left on overnight to avoid freezing the chicks.



# Which is Which?

## Gender Identification

- Vent sexing involves holding the chick upside down in one hand, expelling the fecal material and everting (turning outward) the vent area. This process will display the presence of male reproductive organs.
- Feather sexing is possible for some chicken breeds. This process involves looking at the feather pattern while the chick still has their down feathers present as it is easier to identify feather pattern.
  - *Gentle extend the chicks wing and blow gently to space the down feathers out or you can spread them apart using your thumb. This will allow you to see if the chick is male or female based on the feather pattern.*
  - *Females:*
    - Feather pattern is long-short-long-short
  - *Males:*
    - Feather pattern is the same

- **Vent Sexing:**

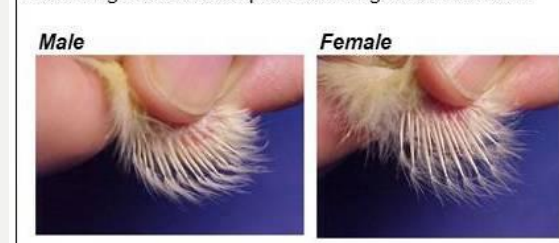
[https://youtu.be/5\\_eJNhzQ2Qk](https://youtu.be/5_eJNhzQ2Qk)



- **Feather Sexing:**

– <https://youtu.be/HZtoFqccOD4>

Figure 7. Comparison of the wing feathers of a slow feathering male and a rapid-feathering female at hatch



# Embryology Resources

- <http://afs.okstate.edu/breeds/poultry/chickens/chickens.html>
- [https://cdn.shopify.com/s/files/1/0650/2997/files/4H167R\\_LookInside\\_4ab820e6-740e-4243-9520-2613b23f8715.pdf?9799019479456577089](https://cdn.shopify.com/s/files/1/0650/2997/files/4H167R_LookInside_4ab820e6-740e-4243-9520-2613b23f8715.pdf?9799019479456577089)
- <http://www.vapoultry.org/resources/facts.cfm>
- [https://fauquier.ext.vt.edu/content/dam/fauquier\\_ext\\_vt\\_edu/files/embryology/beginning-life-pre.pdf](https://fauquier.ext.vt.edu/content/dam/fauquier_ext_vt_edu/files/embryology/beginning-life-pre.pdf)
- <https://www.sites.ext.vt.edu/resources/4h/4hpubs/pdfs/388-801.pdf>
- <https://thechickenhub.com/egg-incubator-guide/>
- <https://web.extension.illinois.edu/eggs/res00-index.html>
- <https://web.extension.illinois.edu/eggs/res32-qa.html#2>
- <https://prezi.com/ve5t7zjp3fwh/by-products-of-chickens/>
- <https://www.agcareers.com/career-profiles/>