

# Fundamentals of Embryology Programs



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EXTENSION

# 'In an Egg Shell'

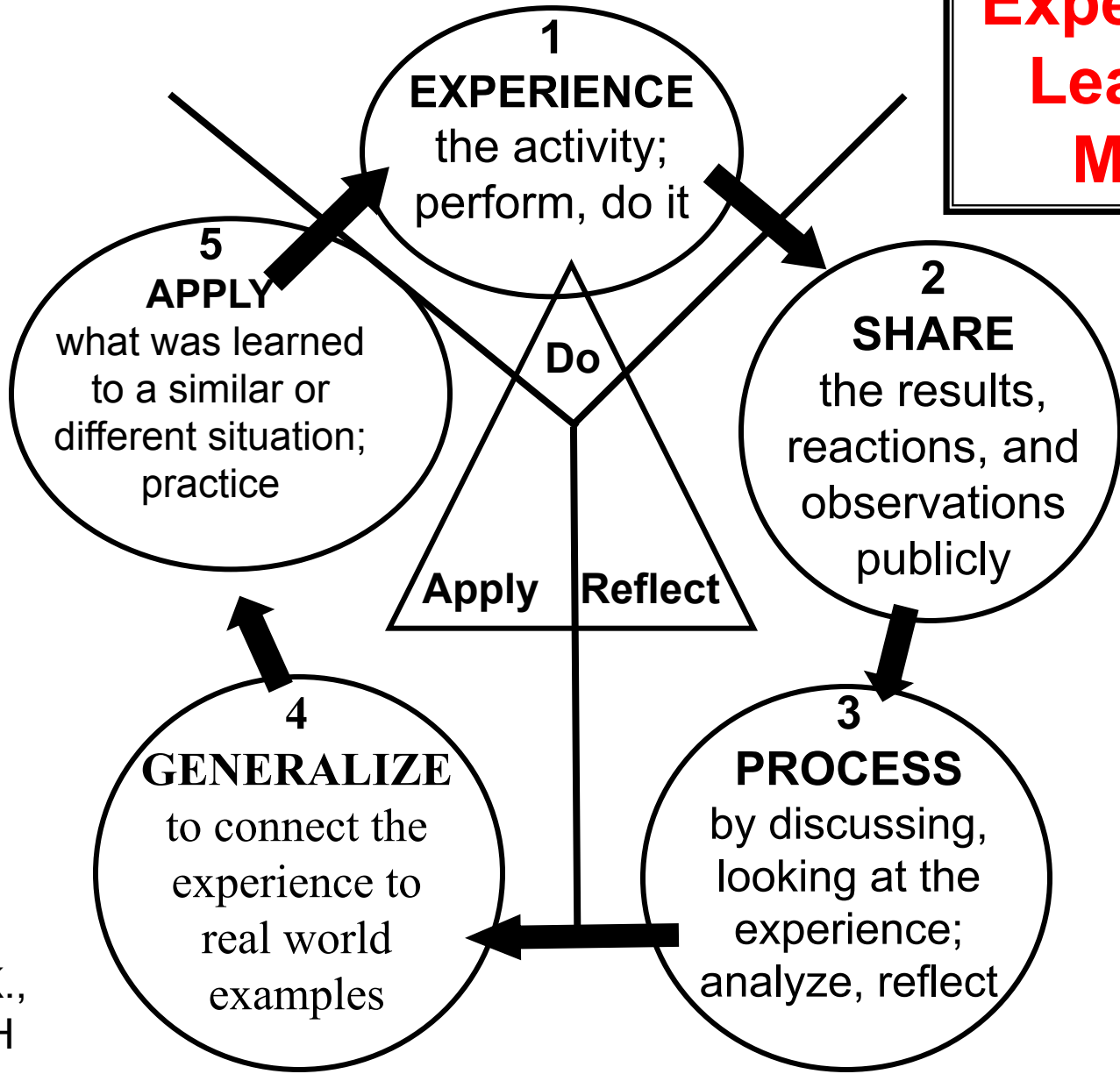
The goal of the embryology project is to teach students the stages of development and growth of chickens from early fertilization through full development and hatching.

NC State University  
Prestage Department of Poultry Science  
Letter of Acknowledgement, 2017-2018



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**Experiential Learning Model**



Jamison, K.,  
Virginia 4-H

# Fundamentals of Embryology Programs

- ✓ Students learn biology:
  - Direct experience with living things & their life cycles
- ✓ Science based, hands-on
- ✓ Helps teach Essential Standards
- ✓ Extension provides educational resources
  - Leaders Manual
  - Suggested Activities
  - Youth Activity sheets
  - Online Resources



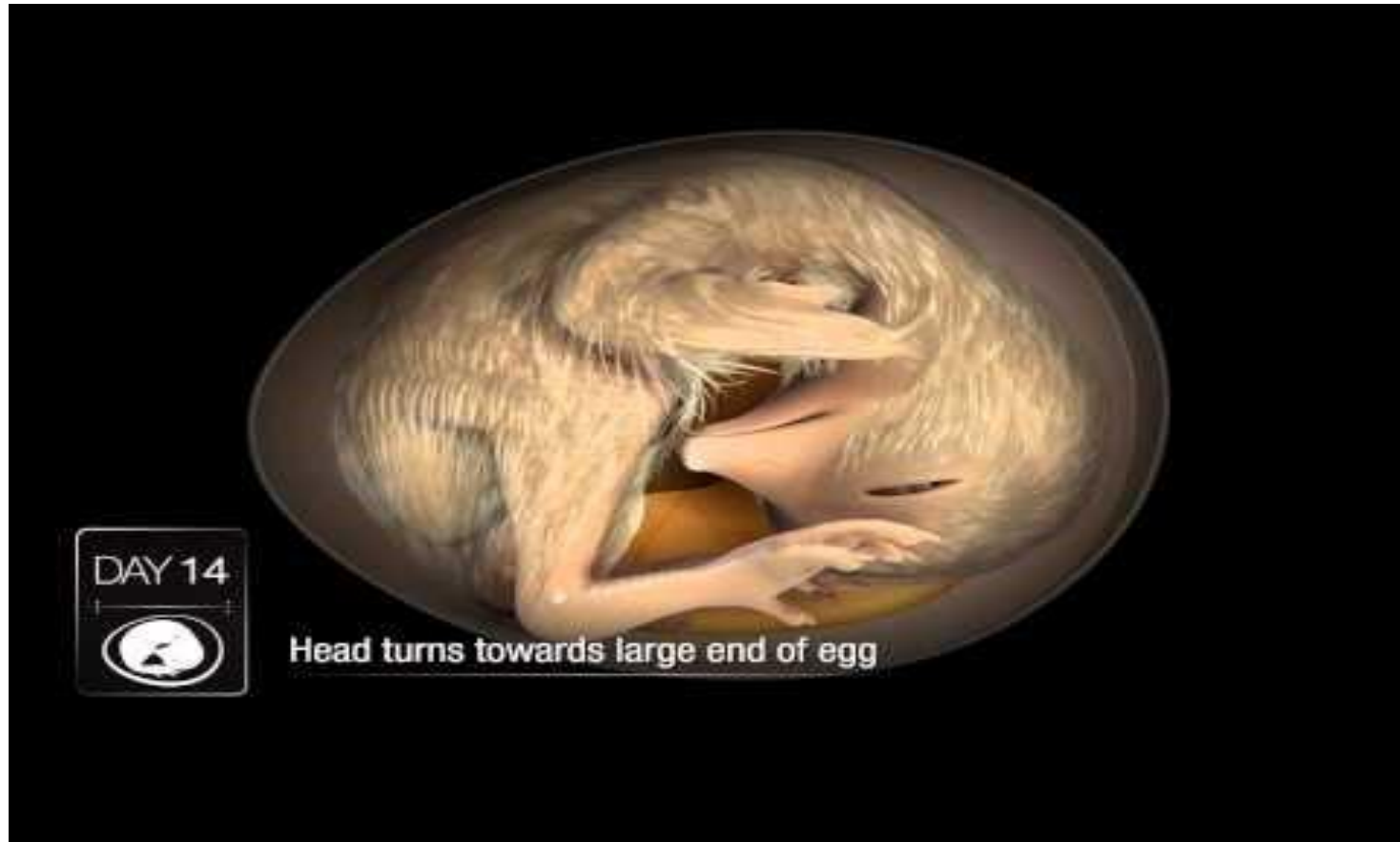
# Let's Start Incubating!



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# Embryology in an 'Egg Shell'



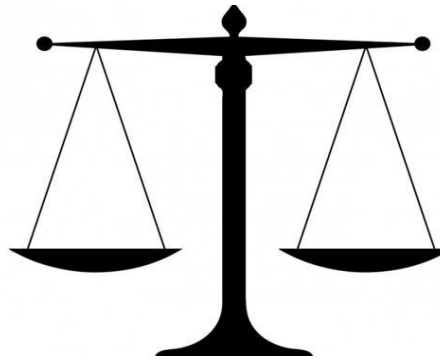
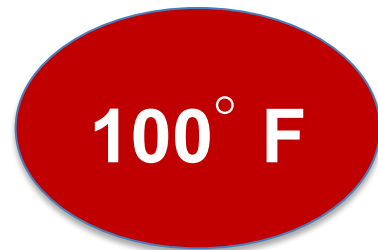
<https://www.youtube.com/watch?v=PedajVADLGw>



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# Incubation

## Temperature and Humidity Balancing Act



**Too Hot**  
**Early Death or Early Hatch**

**Too Cool**  
**Late Hatch**

**Too Humid**  
**“Mushy chicks” or bacterial**

**Too Dry**  
**Poor Hatch or Early Dead**

# Incubator Setup

- Clean Incubator
- Turn on Incubator and allow temperature and humidity to regulate before placing eggs.
- Make sure constant outlet
- Place the incubator in a draft free area
- Place incubator out of direct sunlight



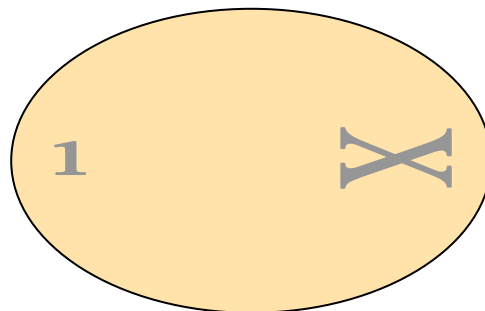
# Incubator Temperature

- Use supplemental thermometer/hygrometer to verify – may need to calibrate
- Temperature SET on 100° F (99.5 – 100.5 ° F)
- Monitor alternates: Actual Temp, Set Temp, Actual Humidity
- Constant light – Incubator Temp is Increasing
- Flashing light – Temp is Constant
- Don't forget to remove vent plug at Day 6



# Placing Eggs In Incubator

- Eggs to room temp 2 hrs before setting
- Eggs small end down
- Keep them at ~65°F until placed in the incubator.
- Using a pencil put a number on large end of each egg (for record keeping)
- Put “X” on one side and an “O” on the other of each egg



# Incubator Humidity

- Humidity Days 1-18 RH 53-55%, 19-21 60%  
double check hygrometer
- Place lukewarm water in #1 trough
- Add water every few days
- As chicks grow, they utilize more water
- When pipping starts increase humidity to ~60%  
by adding water to trough, filling #2 AND #1

# Turning Eggs

- Prevent embryos from sticking
- Wash hands before AND after turning eggs
- Turn eggs 3 X/day. Do NOT turn the eggs an even number of times.
- Stop turning on Day 19 so the chick can get oriented to “which end is up”.
- Do not use hand sanitizer before handling eggs.

# Turning Eggs

Turn the eggs at least once a day on weekends.

If you don't have access to the school:

- gently place your eggs into an egg carton
- remove the water from the bottom tray
- set the egg carton into the incubator
- place the lid back on the incubator
- head STRAIGHT home
- place lukewarm water in tray 1
- place eggs back in the incubator
- turn 3 times a day
- Reverse the process Monday morning



# Candling a Chick Egg at Day 6

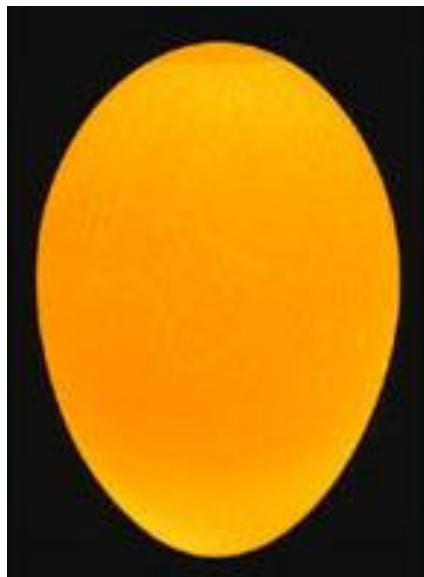
- Air cell
- Blood vessels
- Dark spot-Eye



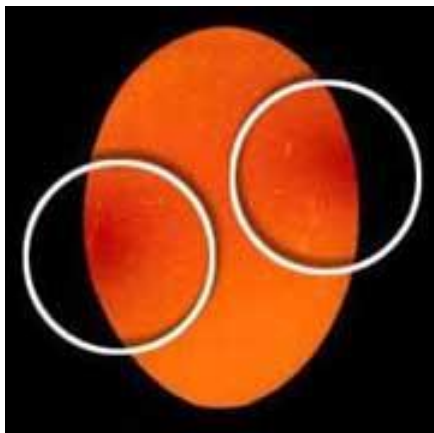
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# Candling

- Observe the shell and the contents of the egg (blood vessels, embryonic development, blood or meat spots, air cell, etc.) through the shell
- Hold the large end of the egg up to a bright light that is focused on and behind the egg shell on day 7 and day 14 (and any days in between) to see vessels and air cell. You can candle around the entire egg.
- Record your observations.
- Throw away any unfertilized eggs.
- You may candle between days 15 and 21, but not for long periods of time.



Good quality hatching egg



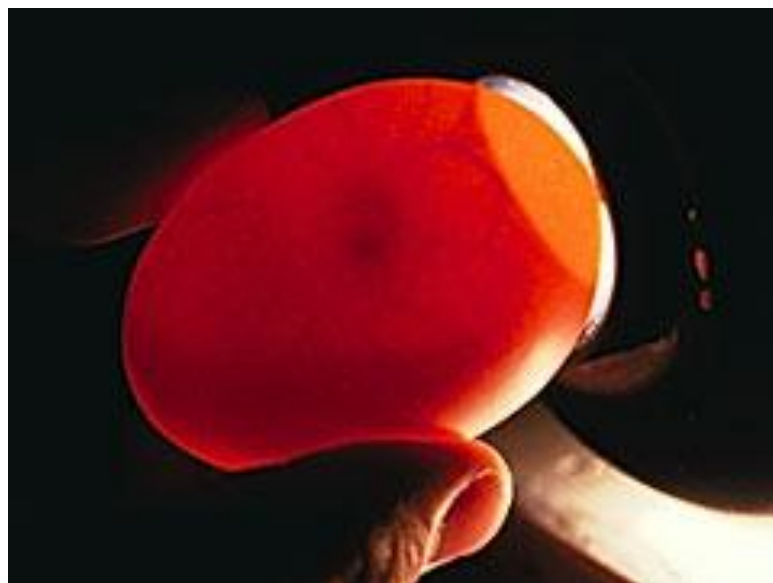
Two Yolks



Cracked



Poor quality large air cell dark yolk





# Incubation Timeline

**Day 7: Remove the red plug to allow the entry of fresh air. Candle eggs.**

- Consider taping the red plug to the top of the incubator so that you don't lose it.

**Day 14: Candle eggs.**

**Day 18: Stop turning eggs.**

**Day 22: Hatching starts. Add water to 2nd trough.**

# Preparing for **AFTER** they Hatch **BEFORE** they Hatch...

- Place most of the provided shavings in the box. (NEVER place chicks on a slick surface like newspapers or the empty tub)
- Save a few shavings for top dressing the box on Thursday or so.
- Attach a lamp to the brood box for heat after they are hatched, and DRY.

# Starting the Hatch Process

- Day 21 - the chicks will start breaking out of their shells or “pipping”.
- This process can take from 10-20 hours.
- Do NOT help the chicks out of their shells.
- Leave the chicks in the incubator until they are fluffy and dry.
- The chicks can stay in the incubator overnight if you are unsure if they are dry

# Brooding

- Once the chicks are dry, place them in the brooder
- Place the lamp to one side. Observe the chicks for signs that they are too cold (huddled under the lamp) or hot (panting and separated out away from the lamp) and move the lamp closer or farther away accordingly.
- After hatching the chicks should be kept at 90° F.

# Food and Water

- Put food and water into containers and place in the brood box.
- Consider adding a brick under the waterer to keep shavings from collecting in the water.
- Never use a large dish of water as the chicks might drown.
- The chicks can go up to 72 hours with no food or water. They are still absorbing nutrients from their yolk sac at this point.

# Twenty-Four Hours After Hatch (by end of day Thursday, March 29)

- Remove and discard shells.
- Clean incubator with mild soap and water.
- Allow the incubator to dry.

# Final Considerations



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# What will you return?

The following will be picked up by 4PM on Friday, March 30:

- Chicks in brooder
- Heat Lamp and metal excluder
- Drinker and feeder
- Clean Incubator (box, cord, & red plug)
- Thermometer





**THANK YOU**  
**for your participation!**



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# Questions or Comments

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