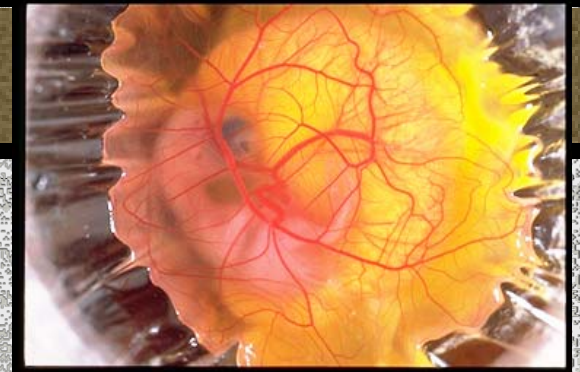


Series for:

Embryology in the Classroom

"A Closer Look"



Embryonic Development

By: Phillip J. Clauer
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4-H Youth and Specialty Poultry
The Pennsylvania State University



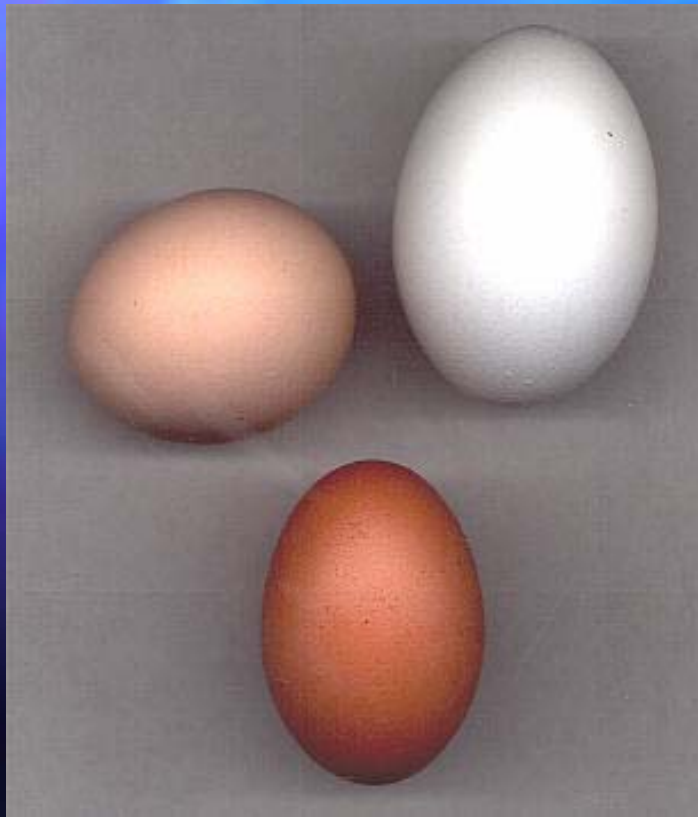
Embryo Development and Observation

This PDF PowerPoint should help you learn:

- 1. How the embryo develops**
- 2. What the developing embryo looks like**
- 3. What to observe at the various stages of development**

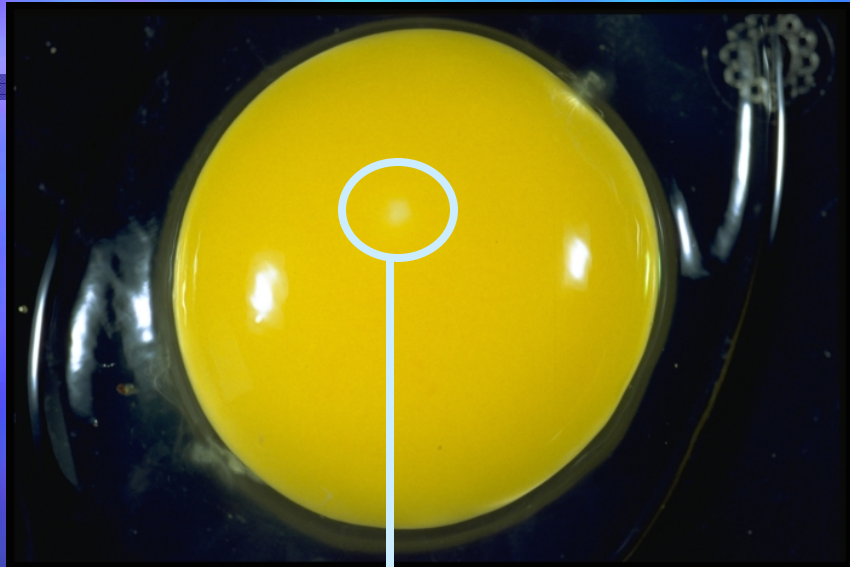


It Starts With Quality Fertile Eggs

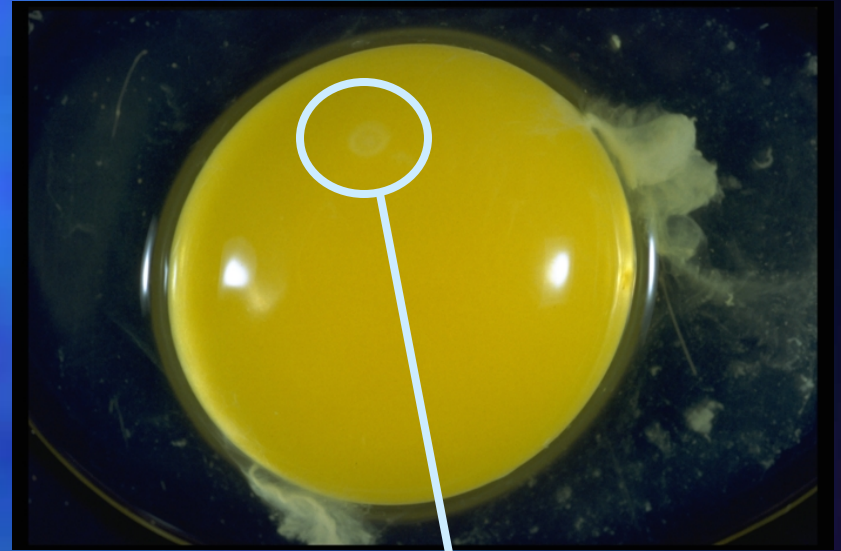


- **Proven Egg Source**
- **Proper Collection and Storage Techniques**
 - 45-55 degrees F.
 - 70 percent humidity
 - 7 days maximum
- **Other Factors**
 - Nutrition & age of birds
- **Consider Sampling Fertility**
- **Chicken Eggs are best for school projects**

Fertile or Not Fertile?



Not Fertile
Solid white spot

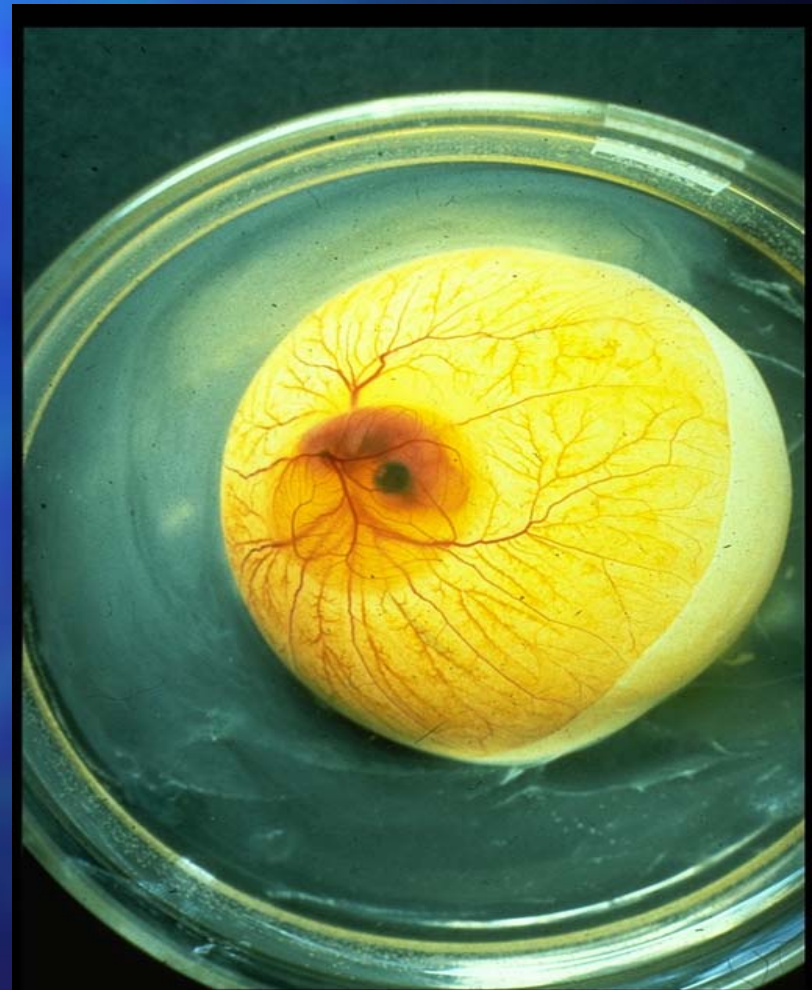


Fertile
Darker outer circle



Function of Each Embryonic Membrane

- **Yolk Sac**
 - Food
- **Amnion**
 - Protection
 - Exercise
- **Chorion / Allantois**
 - Respiration
 - Handles Waste
 - Minerals from shell



Embryonic Development

■ Day One

- Development of Pellucida and Opaca
- Appearance of Blood Island

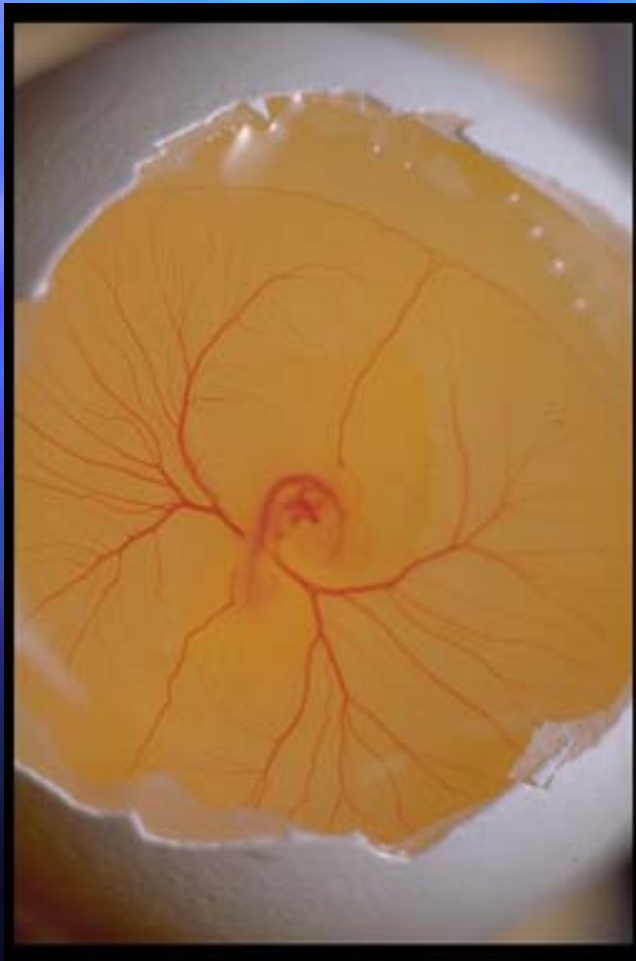
■ Day Two

- Blood vessels appear on yolk sac





3 Day Embryo

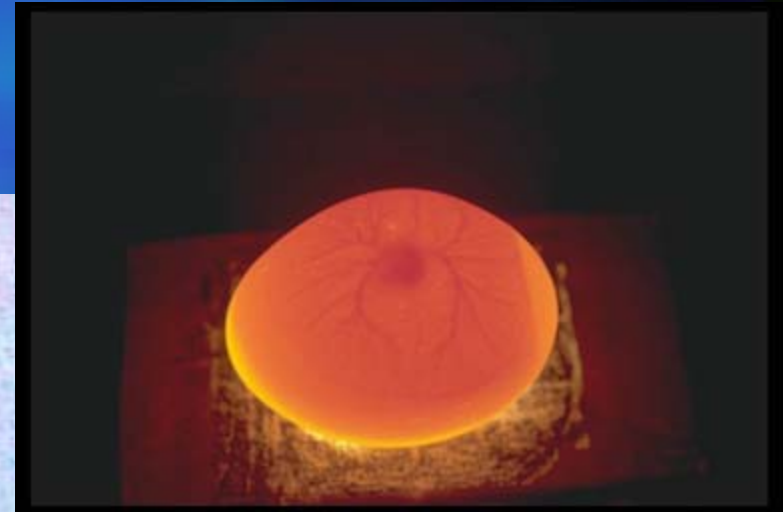


- Heart Visible
- Vertebrae Column - Question Mark Shape
- Amnion Complete
- Brain and Head Visible



4 & 5 Day Embryo

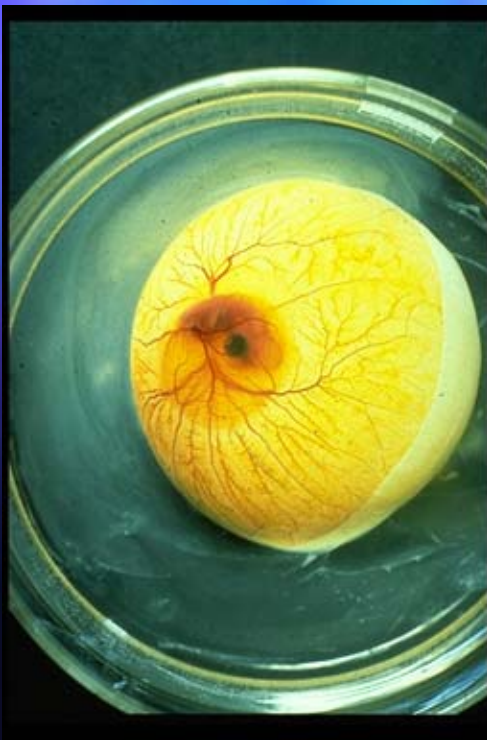
- Embryo is completely separate from yolk sac
 - Amnion clearly visible
- Formation of reproductive organs by 5th day - Sexual Division





6 Day Embryo

- Voluntary movement begins
- Everything is present
 - Organs
 - Main division of limbs
 - Beak and egg tooth starts





7 to 9 Day Embryo

- **Abdomen more prominent because of viscera development**
- **Feathers begin to form**
- **Mouth opening appears**
- **Embryo looks like a bird by ninth day**





10 to 13 Day Embryo

- Beak and bones begin to harden
- Skin pores visible
- Digits completely separated
- Egg very full and air cell is larger



13 to 17 Day Embryo



- **Scales, claws, and feathers visible**
- **Small intestine taken into body**
- **Begins to prepare for hatching**



15 to 19 Day Embryo

After 15 days, it is very hard to observe the embryo by candling



18 to 20 Day Embryo

- Growth complete
- Yolk sac is drawn into body cavity
- Embryo becomes a chick when it
 - Breaks the amnion
 - Internal Pip (Into air cell)
 - Starts breathing



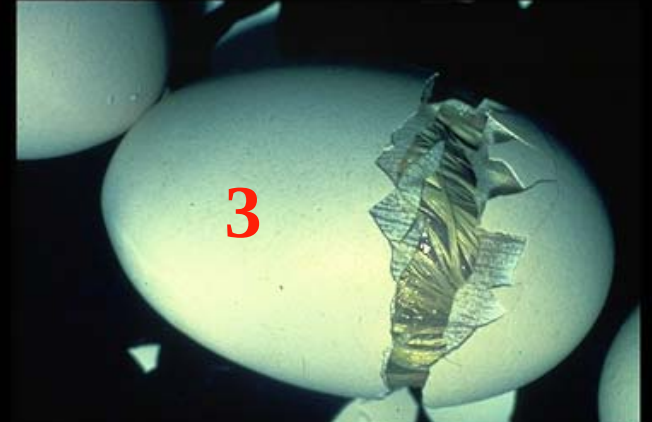
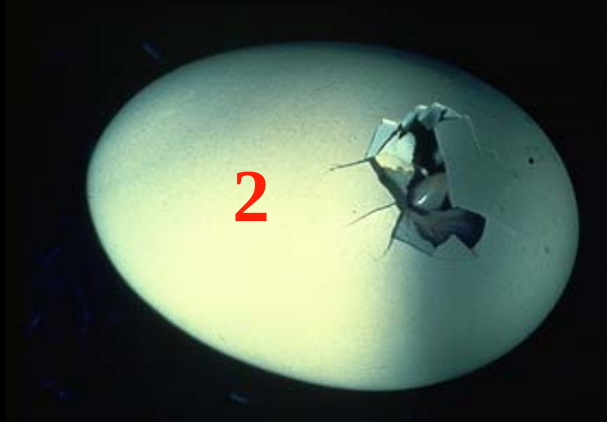
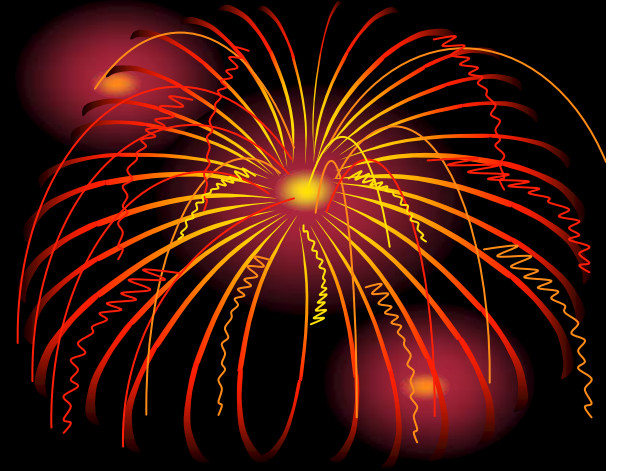
19 to 20 Day Embryo



- Can observe chick inside air cell once they pip through the inner shell membranes and take first breath.

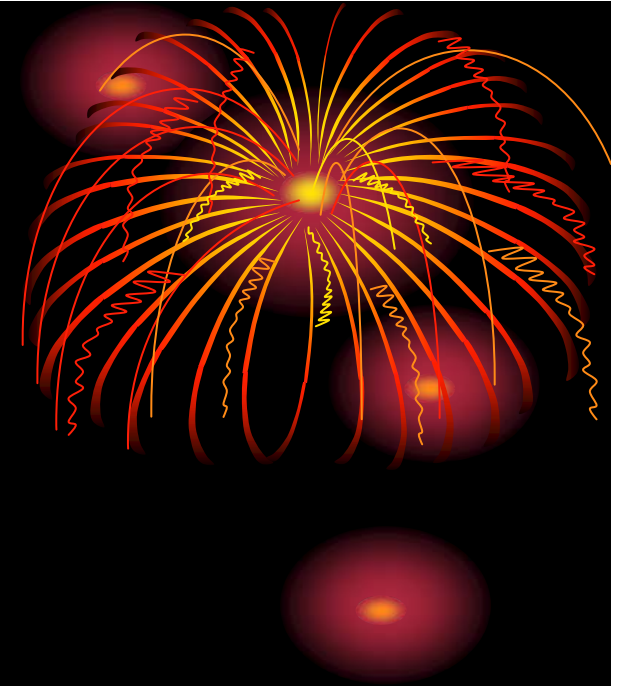


Day 20



Something Happens

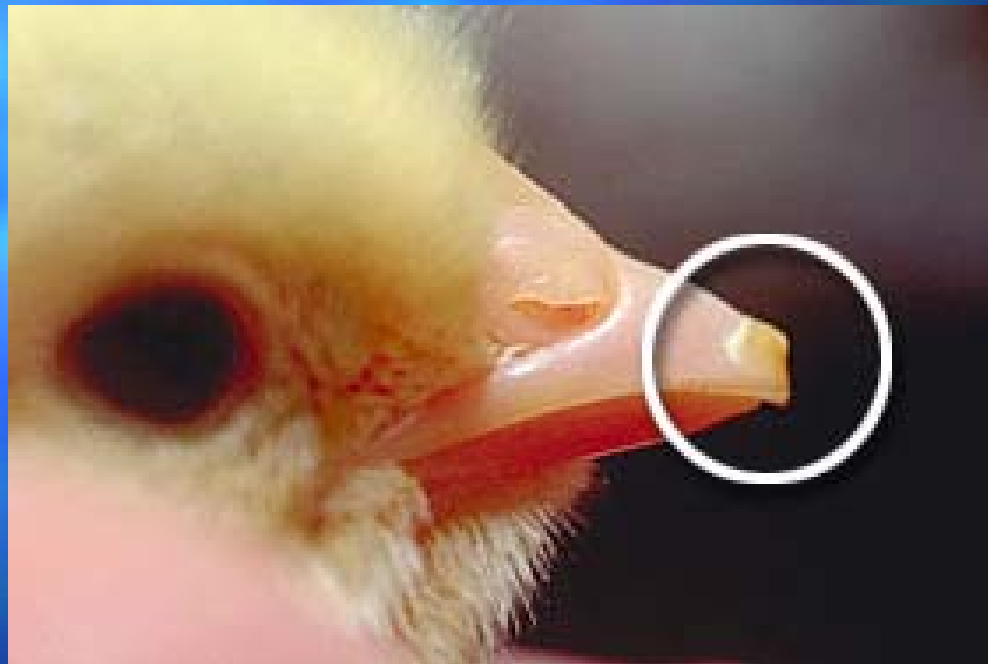
21 Days



The Chick Hatches



Observe the Egg Tooth



It is only there for first 12 to 24 hours.

How to Sex Chicks

- **Sex-linked genes are used in some strains of chickens to make sexing easier.**
 - **Feather Sexing**
 - Female feathers longer
 - **Plumage Color**
 - Males and females different colors
- **Vent Sexing is very difficult.**

Feather Sexing



male

female

National 4-H Embryology site:

<http://4Hembryology.psu.edu>





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