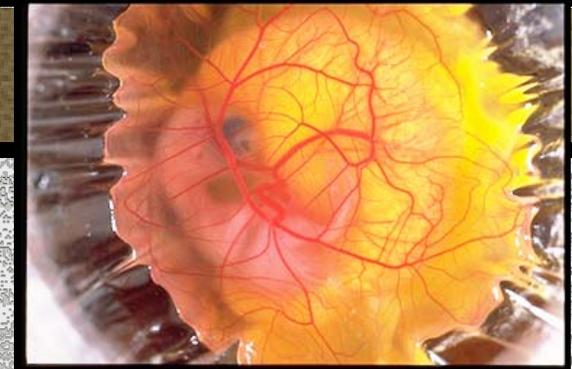
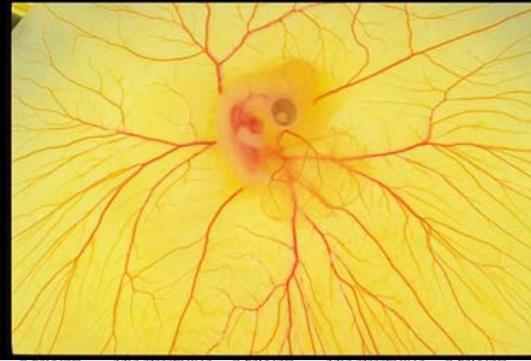


Series for:

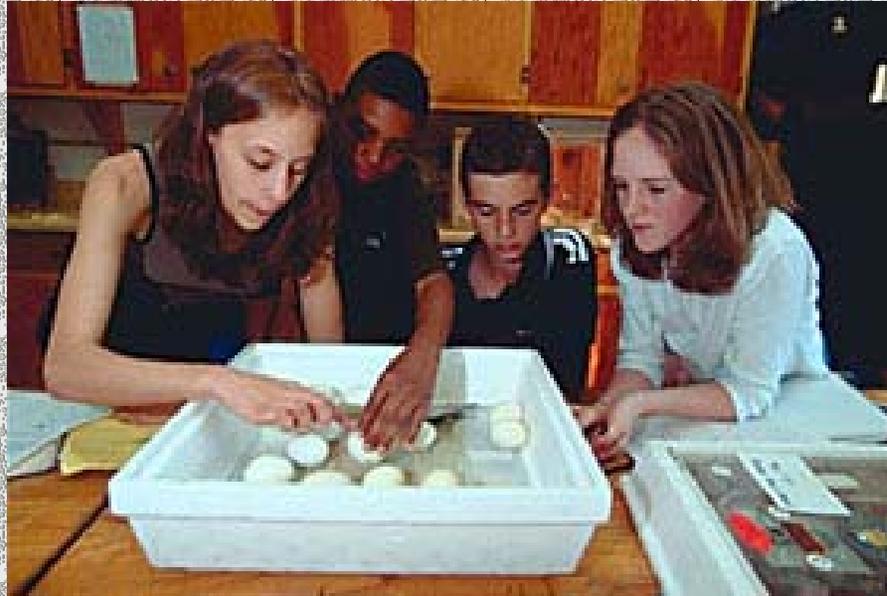
Embryology in the Classroom

"A Closer Look"



Embryonic Development

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



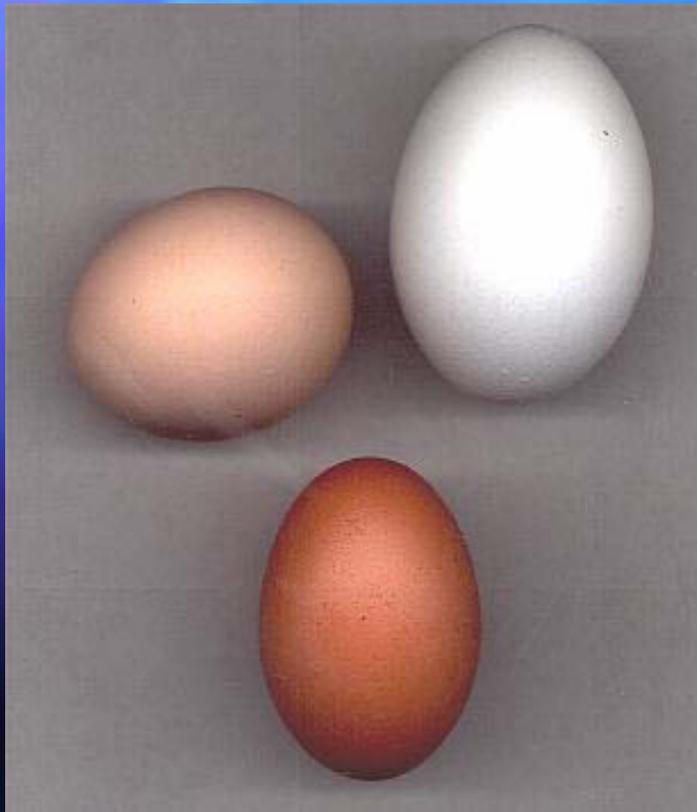
Embryo Development and Observation

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**

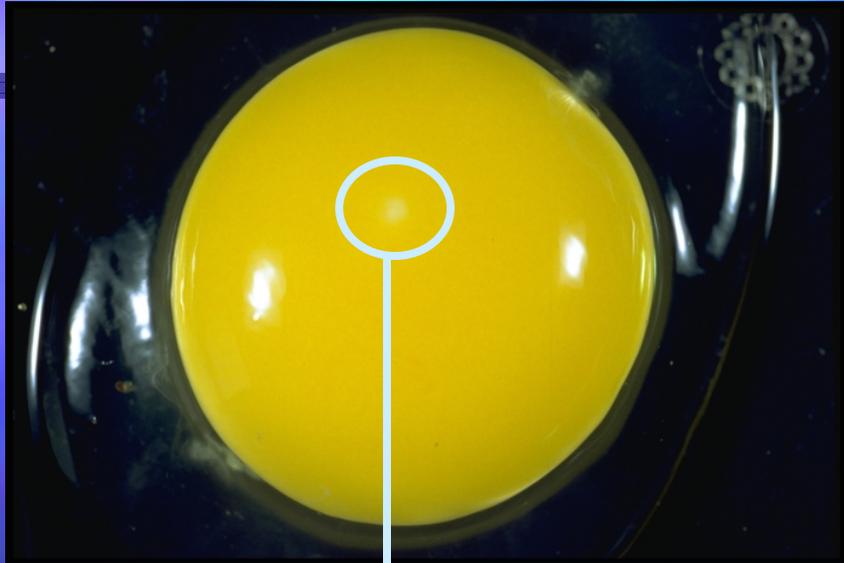


It Starts With Quality Fertile Eggs

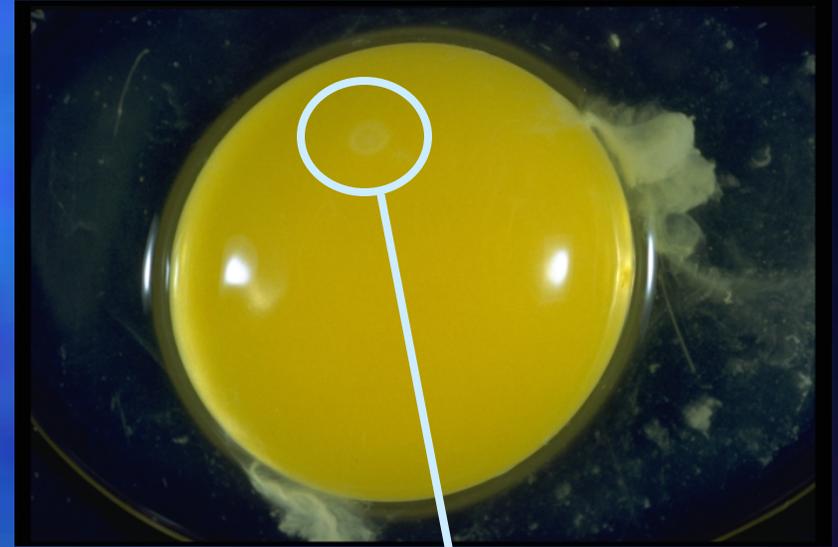


- Proven Egg Source
- Proper Collection and Storage Techniques
 - 45-55 degrees F.
 - 70 percent humidity
 - 7 days maximum
- Other Factors
 - Nutrition & age of birds
- Consider Sampling Fertility
- Chicken Eggs are best for school projects

Fertile or Not Fertile?



Not Fertile
Solid white spot

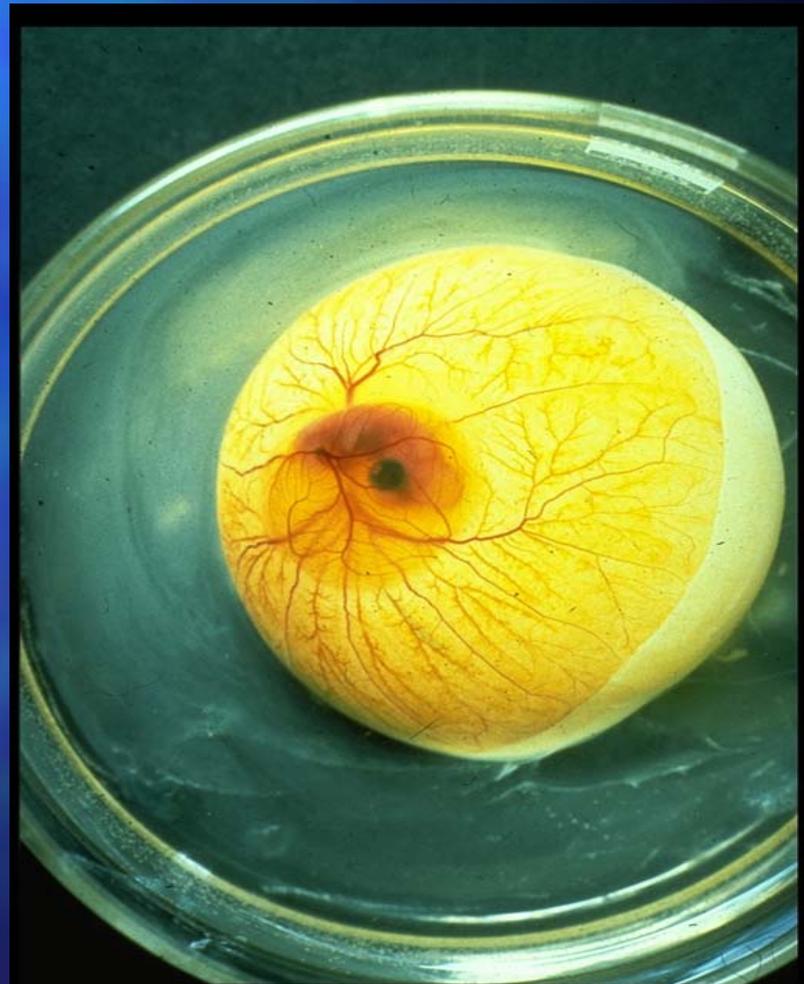


Fertile
Darker outer circle



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

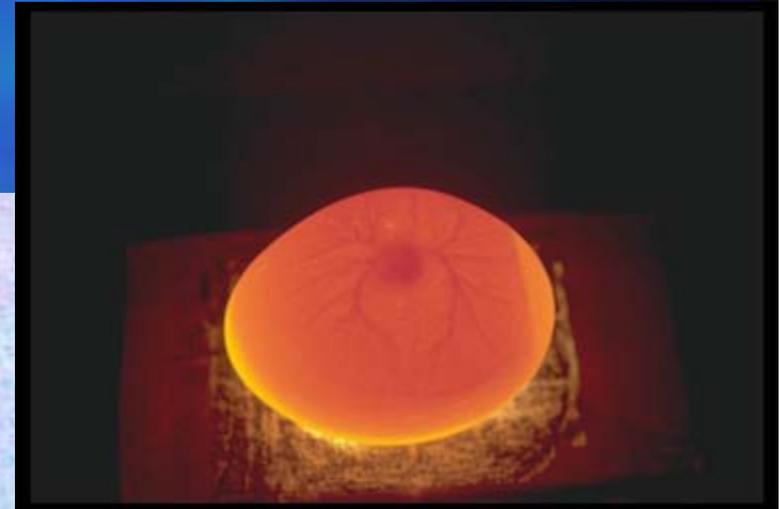


- Heart Visible
- Vertebrae Column - Question Mark Shape
- Amnion Complete
- Brain and Head Visible



4 & 5 Day Embryo

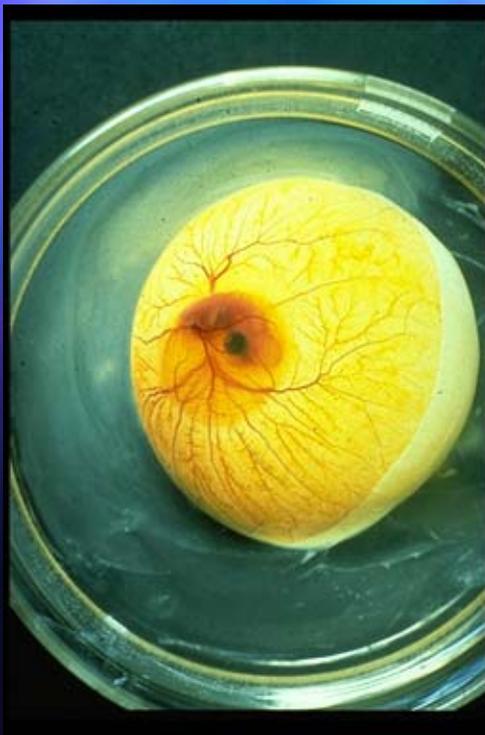
- Embryo is completely separate from yolk sac
 - Amnion clearly visible
- Formation of reproductive organs by 5th day - Sexual Division





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



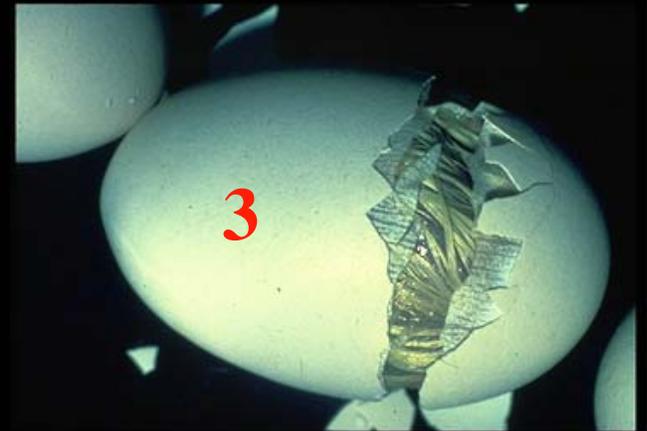
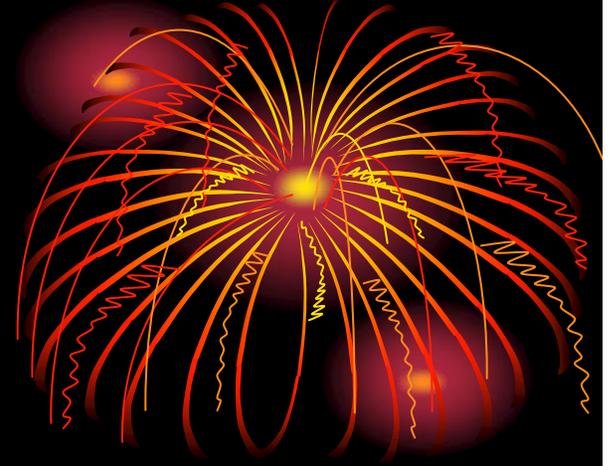
19 to 20 Day Embryo



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

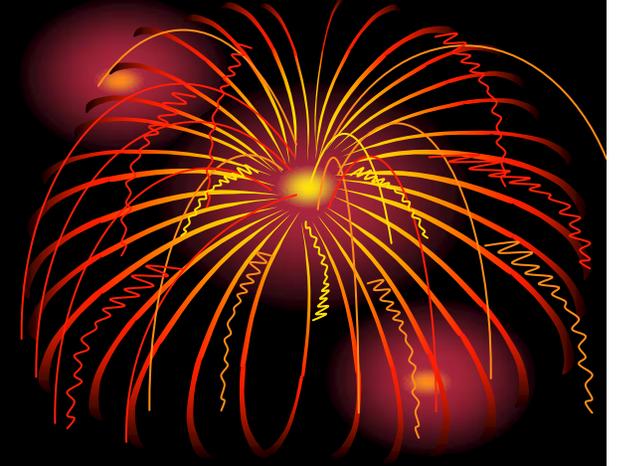


Day 20



Something Happens

21 Days



The Chick Hatches



Observe the Egg Tooth

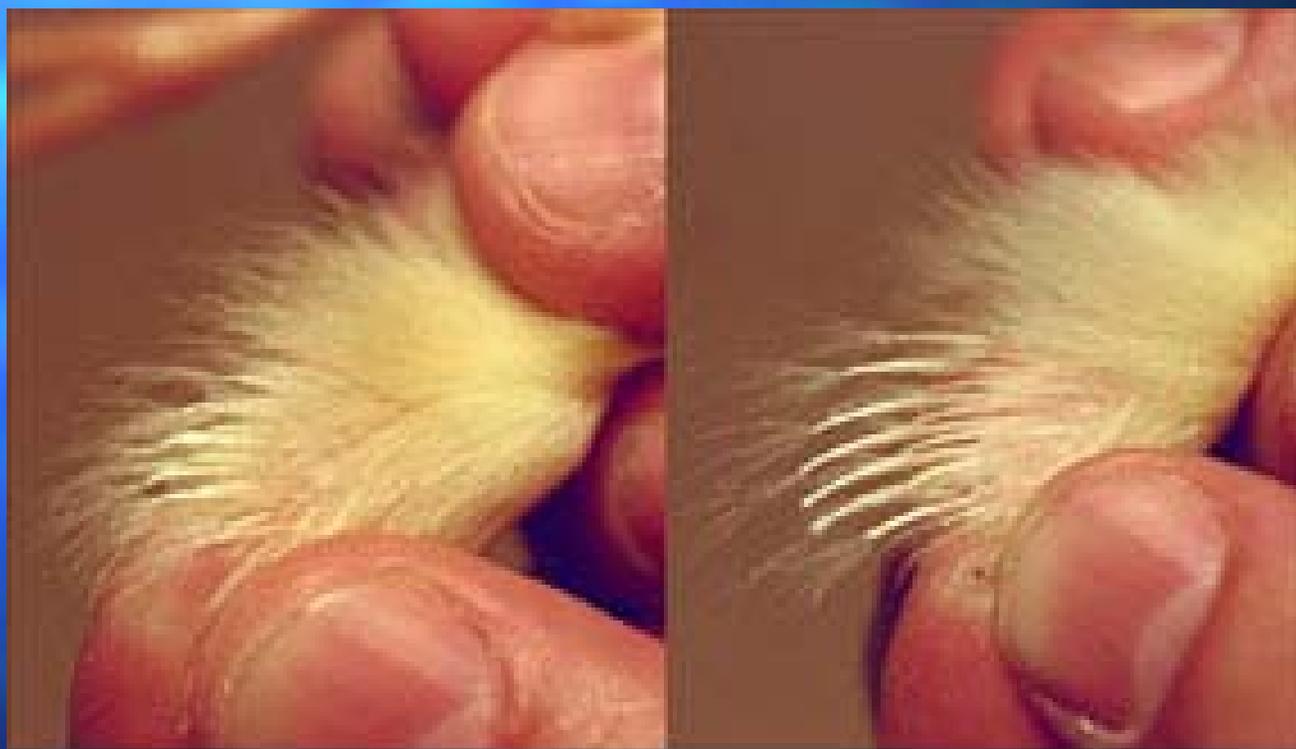


It is only there for first 12 to 24 hours.

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>

4-H Embryology in the classroom - Netscape 6

File Edit View Search Go Bookmarks Tasks Help

http://ulisse.cas.psu.edu/4hembryo/index.html

Home Bookmarks

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Sciences

Embryology
IN THE CLASSROOM

Dear Educator,

This Web site was developed to support the 4HCCS Embryology project material and help you - the teacher, the project leader, or the individual doing an independent study - become more familiar with the details of embryonic development.

Embryology: The Study of Life is designed to provide you with background information and exciting experiential activities dealing with life science for use in your classroom. Each activity is designed to be grade-level appropriate and has been correlated to the U.S. National Science Education Standards.

Children have a natural sense of curiosity about living things in the world around them. Building on this curiosity, students can develop an understanding of biology concepts through direct experience with living things, their life cycles and their habitats. This curriculum was developed with your students in mind. Many believe that students learn best through their experiences and interactions with the world. They learn by listening, observing, experimenting and applying their knowledge to real-world situations. Each activity within this curriculum follows these steps in the experiential learning model.

Teachers' Resources
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Fun for Kids
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4HCCS Embryology
Teacher / Helper
Guides Available

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