

Incubation and Embryology

Ken Koelkebeck, Ph.D.
Extension Specialist, Poultry

I ILLINOIS[™]

Extension

College of Agricultural, Consumer and
Environmental Sciences

Save



JOIN 4



Embryology

[Home](#) / [Programs](#) / [Animal Sciences](#) / [Embryology](#)

What is more fascinating than seeing a fully developed baby chick emerge from an egg? Just three weeks of incubation transforms a seemingly lifeless chicken egg into an active, living being. 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.

FOR TEACHERS: This course is designed to provide elementary and high school teachers with knowledge on the chicken's egg, its importance to man, and its role in reproduction of the species. Course content will be oriented to train teachers to conduct classroom incubation and embryonic development projects. Detailed information on the stages of embryonic development and the preservation of embryos will be included. Instructional methods will include lectures, discussions, demonstrations, and visual aids. Suggestions on how to use classroom incubation and embryonic development projects to enhance programs in science, language arts, mathematics, social studies, and art will be offered. This hands-on project is designed to give your students the opportunity to hatch chicks in their own classroom. During the 21-day incubation period, students learn to prepare eggs, set up an incubator, record progress, turn eggs, and test eggs for fertility. The project aligns with state learning standards.

KEY CONCEPTS: Poultry, Embryology, Local Foods, Agriculture

FOR CLASSROOM YOUTH GRADES K – 8th



REQUEST PROGRAM

Box File of Resources from Tonight's Training

<https://uofi.box.com/s/0msck5edq1up0mru63fkj3t1d9zhn7hs>



Incubator

- Still Air (No Fan) Incubator
- Circulated Air Incubator
- Order incubator early
- Assemble and try out 2 weeks before starting
- Start 2 days prior to setting eggs
- Wash (1 teaspoon Clorox to 1 gal water) or mild dishwasher soap



Incubator – Thermometer/Heating

- Thermometer

- Calibrate or purchase more reliable (meat, oven, science classroom, digital)



Thermostat wafer

- Expand/contract
- Buy additional wafer (spare) if incubator > 3 yrs. old



Incubator – Set-Up



- 1- 2 days prior to setting eggs
- corner of room, non-draft, away from windows
- 70-75°F room
- Sign – Experiment in Progress
- Adjust temperature over 2 hr. periods

Incubator

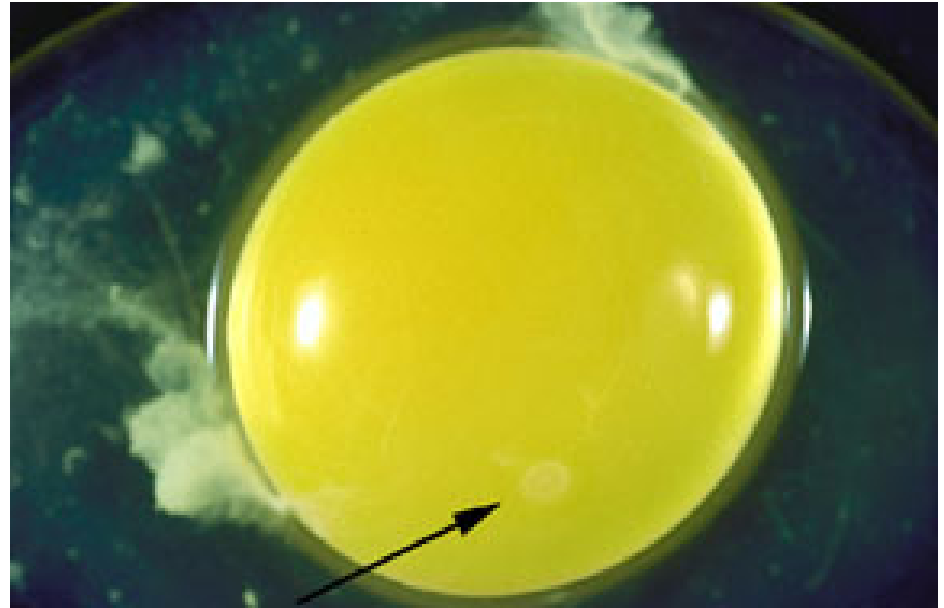


- Assembly
 - Bottom – vent holes for circulation
 - Grate
 - Top (red light, arrows, wing nut)
 - Heating Element
 - Electrical plug (sign, janitor)
 - Vent Plugs



Principles of Incubation

- Fertile eggs
- Temperature
- Humidity
- Ventilation
- Turning of eggs



Fertile Eggs



- Have incubator up and running
- Set eggs (Tuesday if possible)
- If stored, keep at 55-60° F (veggie section)
- Do not wash eggs, if dirty clean with fine sand paper
- Allow eggs to warm to room temperature prior to setting (30 min – 2 hrs)

Temperature

- 99-100° F – circulated/still
- automatic and manual turn
- Too high – 103°F – 4 hrs –
- high mortality
- Too low-- slows development
- Two thermometers preferred
- Digital?





Temperature

- When first placing the eggs, expect a temperature drop
- Do not adjust heat upward first 48 hrs
- Do not overheat first 48-72 hrs
- This cooks the embryo



Humidity

- For circulated and still air incubators – read instructions on where to add water
- If condensation forms inside of window, remove 1 plug



Humidity

- Circulated air – add water to outer trough (Days 1-17); both troughs Days 18-21 (add sponges)
- Still air (No fan) – add water to inner trough (Days 1-17); both troughs Days 18-21 (add sponges)
- Use turkey/meat baster – warm water



Humidity

- How to check
- Make wet bulb thermometer
- Place cotton wick (tennis shoe lace) on bulb and stick in water channel
- Days 1-17 = 87° wet bulb = 60% R.H.
- Days 18-21 = 90° wet bulb = 70% R.H.



Ventilation/Humidity

- Vent holes bottom of incubator
- Allows oxygen in - carbon dioxide out
- Incubators – 2 plugs (remove 1 during hatch and both after chicks have hatched)

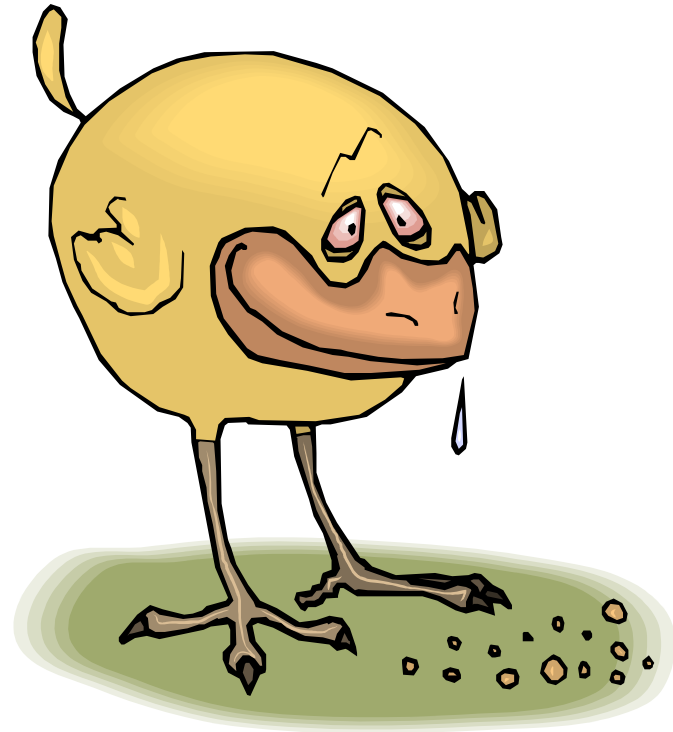
Turning



- Lay eggs flat
- Mark **X** on one side; **O** on other with PENCIL
or wax crayon
- Number on each large end
- Turn eggs odd number of times each day – 3
times a day (end of day) until Day 17
- Do not turn eggs last 4 days!!!

Reasons for Poor Hatch

- Infertile eggs
- Temperature
- Humidity
- Ventilation
- Turning



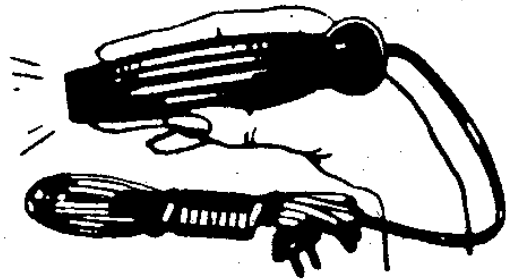
First and Second Weekend

- Optional take eggs home or leave in classroom
- Take eggs home (1/2 hr trip)
- Think about classroom conditions
- If the incubator stays at the school, **must** visit classroom once each day



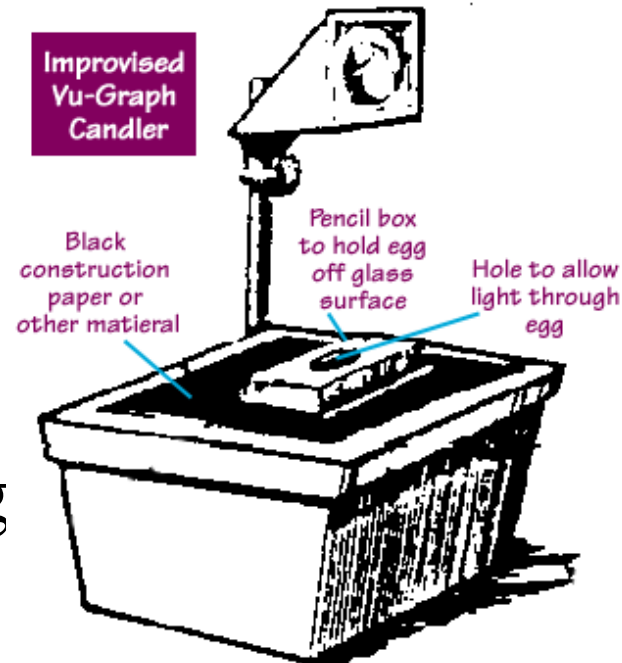
Candling

- Commercially
 - Determine quality and grade
 - See if there are cracks
- During Incubation
 - See if there are cracks
 - See growth of embryo



Candling

- Candle once; between days 6 and 10
Candle a few (3 – 4) different eggs each time
- If your primary goal is live chicks; candle 5-6 eggs only
- Don't keep eggs out of incubator more than 5 minutes
- Don't get eggs too close to heat source
- Wash hands before/after handling



Lets Candle Some EGGS!!

Preparation for Hatch



- End of Day 17
 - Add 3 sponges for extra humidity
 - Add cheese cloth or handi-wipes to top of grate
 - Hereafter, **Do not** turn eggs

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

Hatching



- Remove chicks from incubator when they are dry and fluffy (22 days from start). If the chicks are not dry at the end of the school day leave the chicks in the incubator until the next morning.
- Plan on removing chicks from the incubator once a day.
- If incubator has good humidity levels, chicks may not dry. Place in brooder to dry.
- Remove and discard all unhatched eggs 60 hr after first chick hatches
- Clean and disinfect incubator when done

Power Outage



- Place large cardboard box over top of incubator
- Extreme circumstances, place candles under box
- Embryos can survive at 70° F for short period
- Some can survive at temp below 90° F for up to 18 hr
- Do not give up

Brooder



- Container
- Litter source
- Feeder and feed
- Waterer and water
- Heat source
- Chicken wire



Brooder

- Temperature

Place the thermometer from the incubator in brooder box. Temperature should be approximately 85-90 degrees F. May have to adjust the height of the lamp (60 watt) to maintain temperature. Do not add a higher wattage bulb!



Long-Term Brooding



- Requirements – heat, space, litter, feed, water, environment
- Temperature – 85-90° F (1st week)
80-85° F (2nd week)
- Leave heat lamp on 24 hr/day
- Feed – chick starter – jar lids, egg cartons, tuna type cans

Long-Term Brooding



- Water – fresh daily – marbles in dish
- Litter/Bedding – Use pinewood/cedar shavings – replace wet/dirty with dry/clean as needed (daily)
- Space – enough to move around
- Environment – no drafts, isolation, no direct light from outside

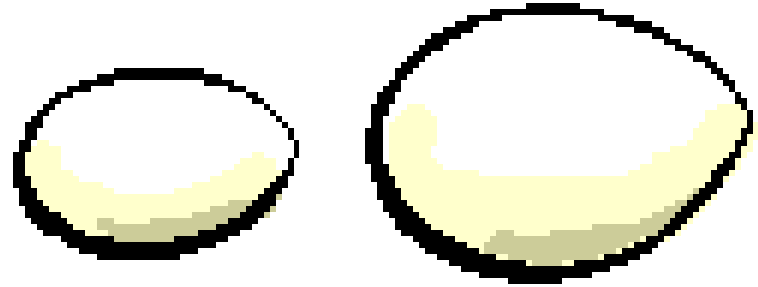
Long Term Chick Care

- Illinois Humane Animal Act
- Proper facilities
 - Delivery
- Survival of the fittest



Support

- Support
 - Local University of Extension Office
 - Ken Koelkebeck, PhD kkoelkeb@illinois.edu
 - Questions
 - Web sites
 - **Other teachers**





QUESTIONS?



Embryonic Development

