**4-H Embryology: Hatching Chickens Resource Guide**

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*The majority of this information is found in the Hatching curriculum and within the resource links provided. However, we like to give teachers a shorter, more condensed list of instructions and other guidelines so that they can keep it handy throughout the project to refer to. Some teachers choose to post this document beside where their incubator is placed so that anyone involved has access.*

* Place incubator away from doors, windows, and any drafty heat/air vents
* Make sure outlet used is ***not*** disconnected after hours or on weekends.

**Must be a live outlet at ALL times!**

* Incubator Temperature: **99.5 – 101 degrees F** at **all** times.
  + To change or adjust the temperature up or down in the incubator use the dial on the top of your lid. This dial is very sensitive so when trying to adjust by a few degrees simply start with a quarter of a turn. Wait until your incubator light goes off (signaling that it has reached its desired temperature) and then check the thermometer reading. Depending on your reading you may have to make another quarter turn right or left to adjust your temperature (up/down and turn position are marked on your lids). If you have a wing nut style dial, loosen the nut before turning as to not warp the temperature gauge (loosen, adjust, and retighten).
  + Be sure to cover (small bathroom cup works well) and/or make a sign to make students and any other visitors that may be in your rooms aware of the incubators presence. The temperature dial used for turning to adjust temperature up and down is ***very*** sensitive and if a student or someone bumps it and/or purposely moves it – the temperature will fluctuate and can cause a drastic change in hatch rate. Just keep a watchful eye that once set to correct temperature that your dial does not get moved. If the red light comes on/goes off it simply means that the incubator is self-regulating (returning back to temperature after lid was removed).
* Water in canals (check for consistent moisture content)
  + Fill **all** canals with water. Depending on the kind of incubator you have you may have a canal insert and ventilation holes on the side, others do not have an insert and ventilation holes in the bottom. Pour carefully as any water that splashes into any of these holes in the bottom of the incubator will spill out onto counter. Essentially with the insert and/or the built in canals – you will fill all canals that do not have a hole in them. \*For lid coverage, align the notches in lid and base.
* Humidity Level: 45-55% recommended
  + The most crucial tips surrounding humidity is to just check the water level every 2 days to make sure your canals are still full with water. Should you begin to see any ‘beading’ on your incubator windows this is an indicator that your humidity level is too high. At which point you should remove lid to let some of the moisture evaporate off the windows. To remove excess water you can simply place a paper towel in and let it wick up some of the water. Be sure **not** to leave incubator lid off for too long. Typically, as long as canals are full the humidity is fine.
* To adequately prepare your students and enable them to better understand the embryology life cycle, we suggest that prior to beginning the project or during the course of the project it is recommended to have one of a couple conversations with your students so that they can “accept” some of the unfortunate things that can happen/occur during hatching. Granted, we always think positive and typically have great hatch rates, however, at this volatile age it is also helpful to help ease them into the other sides of life cycles in the event you should have a low or zero hatch rate, have deformed chicks, or a prominent display of the pecking order occurring (larger chicks pecking/’bullying’ smaller).
  + For teachers comfortable discussing death as part of the life cycle you may want to talk with students about the possibility of loss and hatch rates.
  + For teachers who feel that ‘survival of the fittest’ is an appropriate biology discussion to have with their students may do so. This can be related to hatch rates as well as post-hatch deformities and other related possibilities.
  + For teachers who would rather not lead discussions on the above we suggest taking the math route and talk about hatch rates in the terms of probability and/or ratios with your students as they relate to hatching.

# Mark eggs with #2 pencil (X on one side, O on the other)

* + Eggs are porous so do not use any kind of ink because of harmful effects to eggs when leaked inside the shell. Lead pencils are ok since they do not leach inside the shell and are largely carbon based/animal friendly.

# Turn eggs three times each day, twice on weekend (once on both Sat & Sun.)

* + Students should **NOT** wash their hands before turning eggs. Soap and antibacterial agents can contain alcohol and other harmful components that can leach into shells causing damage. After turning then students ***must*** wash their hands. For younger students you may want to review best hand-washing practices to ensure maximum cleanliness after egg handling.
  + Eggs should be turned a ***minimum*** of two times a today but **three times is ideal**. Be sure to make sure the eggs after turned are staying in place on the wire floor and not rolling. You may wish to break students into groups/teams who take turns turning so that you have a smaller # working to turn so that the incubator lid is not open for very long during each turn.
  + As for turning on weekends you must make sure someone has access to the building on weekends. Please make weekend turning arrangements amongst teachers/admins prior to receiving your eggs. The first two weekends during the cycle are **most** crucial. If at all possible, please continue turning 3x/day but if not – at LEAST 1-2 times a day, each day of the weekend. If you have a teacher workday or weekend plans, please make plans to switch off with another teacher to ensure that the eggs will get turned! The turning of eggs is **vital** to success.
  + Chickens have a 21 day hatch cycle. **Day 18 is the last day eggs should be turned.** On days 19-20 eggs must **not** be turned so that the chicks can get into their correct hatching position by day 21 in order to hatch.
* For candling we tell teachers that one trick is to utilize any of the old overhead projectors that may still be hanging around some of your schools, surprisingly these provide great light and a way to look into your eggs. However, for those who no longer have access to one we suggest using a bright LED flashlight at the base of your egg and then place an empty toilet paper roll on the other end to channel the light all the way through the egg, enabling students to see inside.
  + When candling, should you find any “bad eggs” it is suggested you go ahead and remove and/or dispose of those eggs as leaving them in the incubator can actually affect the rest of your good eggs. Refer to the embryology egg development stages PDF as a guide as to what you and your students should be seeing depending on which day you candle your eggs. Do **not** candle after day 18 as at this point the chick’s eye has begun forming and the bright light could actually inhibit/damage eye development. \*Take note of air pocket, blood vessel formation
* Pull out and/or uncover ONE ventilation plug/hole after the first 1-2 chicks have “pipped” (beaks are beginning to break through their shells) then once 1-2 have hatched and others are beginning to hatch go ahead and open BOTH plugs (some incubators have larger holes that are taped over, simply remove the tape as instructed; other incubators have the red ventilation plugs – simply remove and keep in a safe place so that you can put them back in after hatching.) The other smaller holes that may be on the top of your incubator are part of the ventilation system – do NOT cover any of those holes, keep only the larger holes taped over until it is time to uncover them before the chicks begin hatching.
* If you have a few chicks hatch early and dry off sooner than the others it is ok to go ahead and reach in to remove them so they do not overheat. As a rule of thumb it is recommended to leave all chicks in incubator until dried/fluffed out.
* The classroom brooder box can be made from a plastic tub, aquarium, or cardboard box. Please keep in mind that you return the chicks so the box should be transportable. Use a flexible lamp(s) for heat. For this, we suggest a ‘clamp on’ flexible desk lamp with an older style, *INCANDESCENT* bulb for heat as the newer, energy efficient bulbs do **NOT** give off the heat needed. Lastly, it is suggested schools use pine shavings as the bedding material down inside the brooder box for the chick’s footing. \*This year our vendor has graciously provided items for brooder boxes including feed and shavings. There will also be some feeders/drinkers available for use instead of jar lids.
* The birds do not necessarily need food for the first day (the absorption of the yolk provides their first nutrients). However, you must keep adequate **water** in the brooder box (use a mayo or equivalent sized jar lid/drinker). Please use the provided food only.
* All birds should be removed from the classroom within 3-5 days of hatching.
* Email or fax class list to 4-H office for certificates if desired for your students.
* Please email, fax, or return evaluation with whomever is bringing your hatched chicks and incubators back to the 4-H office upon completion of program.