Gold Seal Lesson:

Copernicus Education Gateway

Author(s): *Gail M. Venezio*			***Lesson Title:*** *Embryology*			
Grade Span			***ICLE Application Model***			
K-4	***5-8*** ***X***	***9-12***	***A***	***B***	***C***	***D***

Instructional Focus:

Listening Students listen for a variety of purposes appropriate to the grade level.
Measurement Students use a variety of tools and techniques of measurement in a problem-solving situation. Students communicate the reasoning used in solving these problems.
Writing Students write for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.
Language Arts Integration Students synthesize individual language arts skills.
Habits of Mind Students develop habits of mind including curiosity, open-mindedness and persistence.
Science as Inquiry Students demonstrate knowledge and skills necessary to perform scientific inquiry.

Performance Task

- Discuss the structure of an egg:
  shell
  yolk
  egg white (albumen)
- Discuss the importance of nutrients that sustain life:
  protein, carbohydrates, minerals, vitamins, fats, and water.
- Discuss use of incubator in hatching eggs and requirements necessary for hatch to take place.
- Warm environment-incubator set at 98-102 degrees F.
  moisture, eggs must be turned 3 times a day. Incubation of chicken eggs takes 21 days once introduced into incubator.
- Discussion should take place predicting where developing chicken will get nutrients essential to sustain life while it is developing!
- When discussion has taken place informing the students about proper ways to provide a system to support life, discuss the idea of a fertilized egg, and introduce the eggs to the incubator.
- Have a journal prepared with pictures of different significant stages of development in chick development. Observe development by candling the eggs, and students writing changes in developing chick and also recording incubator conditions
  (temperature changes, who turned the eggs and when, and humidity) and other significant points!
- While chickens are developing students can be studying the embryonic development.
- Study formation of egg - daily changes in weight and form of developing chick.
- Candling the eggs- Start looking for development of chick around 4th or 5th day. Remove any eggs that do not show development by day 10.
- Do other activities that show structure of the egg.
  Soak an egg in vinegar overnight in a glass jar.
  Teacher note: day 1 egg is hard, day 2, egg is very enlarged, and very soft and transparent. The vinegar has dissolved the calcium in the egg! The experiment shows the importance of the membrane in protecting the young chick, and adding support to the egg. Calcium is also a mineral necessary to help support life!
- Wait for hatch- recording and candling the eggs until day #18,when egg turning, and candling should stop to prepare for the hatch on day 21. At this point, line the incubator with cheesecloth, to make soft bedding and keep the bottom

of the incubator clean.
• When hatching takes place, enjoy! Figure out your hatchability rate, try to determine what went, well, what needed to be improved.
• Now you must decide what you need to provide live animals with to sustain life: food, water, brooding box with heat lamp.
• To extend this activity try ducks, turkeys, and geese. All these species have different size eggs, and hatch times! This of course adds great discussion!

Teacher Background Information:
• Structure of an egg: egg is nature's way of reproducing the species.
• To hatch an egg, the egg must contain the following: protein, carbohydrates, minerals, vitamins, fats, and water.
• A deficiency in any 1 of these essential nutrients will reduce hatchability.

Materials Needed:
Incubator, fertile eggs, grocery store eggs for extension activities, thermometers, cheesecloth, journals and handouts, glass jars, food color large cardboard box, heat lamp, candling box, light bulbs, chicken food, food dishes and water bottle, egg dye or food color.

ICLE Essential Skills

Follow oral or written directions. (ela4)
Follow written directions carefully and accurately. (ela6)
Summarize, synthesize and organize information while reading. (ela24)
Understand the best procedures for statistical ***data collection, organization, and display*** including making estimates and predictions and drawing inferences. *(s5)*
Know and apply the principles of scientific inquiry. *(Implicit in this statement are the processes of prediction, estimation, developing hypotheses, drawing conclusions, evaluation, and following ethical principles and professional procedures.) (s114 Not Ranked)*
Plan and apply real or hypothetical models and constructions to facilitate investigation and learning and the solution to practical problems. *(s115 Not Ranked)*
Make observations using senses and instruments. Inferences and interpretations are arrived at based on observations. Classify observable properties and organize observations in a meaningful and logical way. (s5)
Know that reproduction is a characteristic of all living things as a function of cell division and species survival. (s8)
Understand that sexual reproduction involves the union of special sex cells that are usually produced by two separate parents with half of the genes coming from each parent allowing for a high degree of genetic diversity. Most plants and animals use sexual reproduction. (s14)
Exhibit good data management skills by collecting, organizing, and graphing data. (s19)

Scoring Guide:

Rate each of the following characteristic on a 3-0 basis, where 3 is excellent.
3=Excellent quality
2= Satisfactory quality
1=Unsatisfactory quality
0=Does not attempt or does not show skill/knowledge

Characteristic	**Score**
Students can identify structure of an egg.	_____
Students can identify factors that sustain life.	_____
Students can describe items needed to provide a successful hatch.	_____
Students can accurately read thermometers.	_____
Students can keep daily journals and drawings of hatching unit.	_____

Keywords

English Language Arts	Mathematics	Science
Reading Independent Reading,	**Algebra**	**Earth Science**
Writing Diagramming, Journals,	**Geometry**	**Life Science** Anatomy, Genetics, Heredity, Nutrition, Reproduction, Respiration, Scientific Inquiry,
Communications	**Statistics** Data Collection, Measurement,	**Chemistry**
Literature	**Calculus**	**Physics** Temperature
Other	**Trigonometry**	**Other**
	Other	

Picture, Chart, or Graph file name(s):