

MS California Condor Literature Dive Lesson Plan

At a Glance

Students practice reading scientific articles to better understand the current scientific research related to the California condor.

Advance Preparation

- Decide how you want students to view articles (on a computer/tablet or printed out).
- The following resources are meant to support your teaching of scientific readings, and are laid out in order of student reading level from youngest to oldest:
 1. *The Vocabulary of Science*: <https://www.readingrockets.org/article/vocabulary-science>

Objectives

- Learn the process of reading a scientific article
- Learn how to pull out relevant information from scientific articles to share with others

Materials

- PDF's of articles for each student to read
- “Check for Understanding” questions for each student (online or print-out)

2. *Supporting Literacy in the Science Classroom*: <https://www.edutopia.org/article/supporting-literacy-science-classroom>

3. The *How to Read a Scientific Paper* infographic can be read individually or gone through as a class. <https://www.elsevier.com/connect/infographic-how-to-read-a-scientific-paper>

Lesson

- Introduce your students to the process of reading a scientific paper, article, or blog utilizing the infographic provided or any other documents that you find helpful.
- Provide your students with the two articles related to the California condor.
- There are vocabulary words provided in the Teacher Summary section. You can introduce them before or after students read the articles, whenever you feel it fits best in the lesson for your students.
- Provide each student with the “Check for Understanding” questions. These questions could be done while reading the article (worksheet style) or after students are done reading the articles (quiz style). We suggest going through the

“Check for Understanding” questions as a class after students have completed individually to see if there are any concepts in the questions that need more clarification.

Teacher Summary

Pre-Lesson Article: Webb (2018). Condor Breeding Season 2018 Begins.²

KEY POINTS:

- Egg laying occurs January through April
- Sisquoc was the first California condor ever hatched in a zoo
- Sisquoc and Shatash have been paired up since 1993 and have successfully hatched 20 chicks, 8 of those were raised by the birds
- The remaining 12 chicks were raised by keepers using a puppet so the condors never “imprint” on humans
- All eggs are artificially incubated so the keepers can document embryonic development and be prepared for any necessary intervention
- Condors are “monogamous” and share all nesting duties
- Incubation takes about 55 days
- We have worked with many partners that have helped to make our program so successful, to date the population is up to over 460 birds

Vocabulary:

- Imprint - (of a young animal) come to recognize (another animal, person, or thing) as a parent or other object of habitual trust³
- Monogamous - having only one mate at a time³
- Incubator - an apparatus used to hatch eggs or grow microorganisms under controlled conditions³
- Broody - wishing or inclined to incubate eggs³
- Incubation - the process of incubating eggs, cells, bacteria, a disease, etc.³

Check for Understanding Questions: (Answers are bolded for teacher reference)

I. Condor incubation includes:

A. Rolling or turning the egg periodically

- B. Sitting on the egg for just a few minutes to a few days at a time
 - C. Keeping the egg at 98° F
 - D. All of the above**
 - E. I don't know
2. Egg incubation lasts about:
- A. 3 months
 - B. 5 days
 - C. 55 days**
 - D. None of the above
3. Sisquoc and Shatash are:
- A. Monogamous
 - B. Have been together since 1993
 - C. Share nesting duties
 - D. All of the above**
4. Explain why Sisquoc's hatching was so important to the program and how it was received by the public.

Answer: Sisquoc was the first California condor ever hatched in a zoo (his egg was laid in the wild and brought to the SD Zoo for incubation). Essentially, the world responded with congratulatory letters from conservationists, zoo, governments, school classrooms, and many individuals, all wanting to help with the condor project.

5. Why do our keepers artificially incubate all of the condors eggs?

Answer: Keepers switch out the real egg with a "dummy" egg to continue the birds' "broody" behavior and place the real egg in an "incubator" where they can monitor and document embryonic development and be prepared for any eggs that may need help in the hatching process.

*Optional Class Activity: As a class, generate one question or comment for keeper Ron (please use your school name in the comment form).

Post-Lesson Article: Ravida (2017). Frozen Zookeeper.¹**KEY POINTS:**

- The Frozen Zoo has many care takers and contributors
- The FZ contains fibroblasts, sperm, oocytes, embryos, blood and reproductive tissues
- Most samples are collected postmortem (after an animal passes)
- The tanks contain liquid nitrogen to keep everything frozen, and contain thousands of tiny vials with cells and tissues
- They use a computerized inventory
- Over 400 species' reproductive cells and tissues are represented in the FZ from over 1700 individuals

Vocabulary:

- Fibroblasts - a cell in connective tissue which produces collagen and other fibers³
- Diverse - showing a great deal of variety; very different³
- Vapor - a substance diffused or suspended in the air, especially one normally liquid or solid³
- Liquid nitrogen - made by distilling liquid air; boils at -195.8°C and is used as a coolant (our tanks are kept at -196°C)³
- Vials - a small container, typically cylindrical and made of glass, used especially for holding liquid medicines³

Check for Understanding Questions: (Answers are bolded for teacher reference)

I. The Frozen Zoo®:

- E. Contains thousands of tiny vials
- F. Has frozen cells and tissue samples
- G. Uses a computerized inventory

H. All of the above

I. I don't know

2. Currently, there are _____ individuals that have contributed reproductive cells and tissues.
 - A. 25
 - B. 300
 - C. 1700**
 - D. 8000
 - E. I don't know
3. **True** or False - These cells could be called upon to save a species from extinction.
4. The author mentions caring for the Frozen Zoo is one of the most important jobs she has, why do you think she feels this job is so important?

Answer: To care for and expand the Frozen Zoo collection. The Frozen Zoo has many care takers and contributors and we work as a team to make sure the world's largest and most diverse collection of fibroblasts, sperm, oocytes, embryos, blood and reproductive tissues is kept safe and, most importantly, frozen.

5. Explain why the author feels a “roller coaster of emotions” working in Reproductive Sciences.

Answer: Our job begins most often when an animal's life has ended. We are heavy-hearted when we hear an animal has passed away but then we are excited for the idea that we could collect and freeze its reproductive cells to create life in the future.

*Optional Class Activity: As a class, come up with one question or comment to the author, Nicole Ravida. Be sure to list your school on the comment form.

References

1. Ravida (2017). <http://institute.sandiegozoo.org/science-blog/frozen-zookeeper>.
2. Webb (2018). <https://zoonooz.sandiegozoo.org/2018/02/28/condor-breeding-season-2018-begins/>.
3. <https://en.oxforddictionaries.com/>