

Lesson Plan 8: Graphing Life and Death in California condors

Unit Question: What role does the California condor play in the California ecosystem, and how do changes in the ecosystem impact condors over time?

Science and Engineering Practices:

- Analyzing and Interpreting Data
- Engaging in argument from evidence

Teacher Prep: Download and print/share [Mortality](#) and [Population Data](#)

Warm up: [Watch](#) long time condor conservationist, Jan Hamber, talk about the history and origins of the California Condor Recovery Program

- Have students write what they wonder on post it notes for the question board

Lesson: *(two class periods)*

Day 1

1. Warm up: [Watch](#) long time condor conservationist, Jan Hamber, talk about the history and origins of the California Condor Recovery Program

- Have students write what they wonder on post it notes for the question board

2. Intro

- Based on the GIS data, could humans and California condors interact? What do you wonder about how they are connected?
- Like condor biologists at the SB Zoo and Fish and Wildlife Service, we are going to use data as evidence to engage in argument about human impacts on California condors. Jan Hamber helped collect some of this historic data!

3. Jigsaw Activity

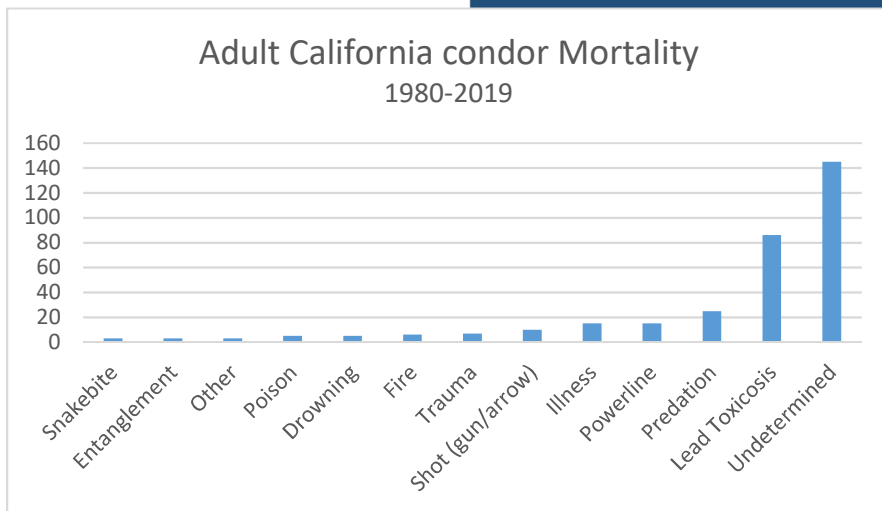
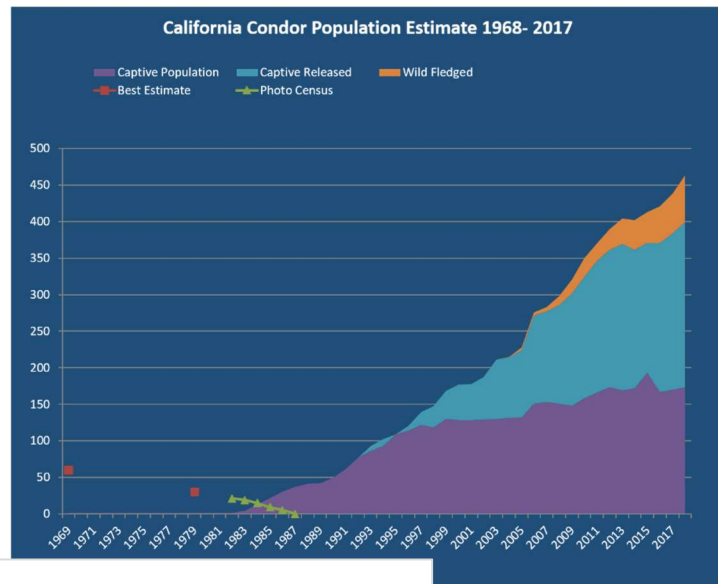
- Assign students to two categories: 1) population; 2) mortality
- In groups of 3 or 4 students from the same category, look over the data tables on population or mortality. Students should discuss how they could represent their data visually, what it means, and what they wonder about it.
- After 10 minutes in their expert groups, instruct them that they will convert their data into graphs: line graph for population over time, and a bar graph for types and amount of mortalities.
- Students will work in their expert groups to draw the graphs.
- Start by labeling the x, and y-axis, then plot points, then connect the dots, or draw the bars

4. Making the Graphs

- Graph must have a TITLE identifying what the graph is about.
- Both the X-axis and Y-axis must have a TITLE identifying what the data is.
- Both the X-axis and Y-axis numbers must have a pattern and CANNOT be random.
 - Numbers must be ascending (counting UP) and not descending (counting down)
- ONLY connect the data points on the graph when making a LINE graph. DO NOT connect the line back to ZERO (unless you have data for zero) or past the last data point.

- Use a straight edge or ruler to connect the data points. Sloppy graphs are NOT acceptable.
- When making a BAR graph, the bars DO NOT touch. (If they did, it would be called a histogram, and we are not making those.)
- The Graph should take up most of the available graph space. Plan ahead when graphing!

This population graph is more detailed than what the students will produce. They will only show one graph for the total population.



5. Sharing the Data

- After students have created their graphs in their expert group, instruct them to partner with one student from the other expert group to share their graphs
- Students should trade graphs and review them independently for 5 minutes and write down/draw what they notice and wonder.
- One at a time, students explain the graph they created, and try to answer their partner’s questions.

Reflection

Based on the graphs, what kind of impacts can we see: positive, negative, direct, indirect?

**This topic will be addressed again in Lesson Plan 12.*

***Students should be able to explain that lead is the leading cause of death for condors (indirect negative impact) and that is why the population graph declines to zero. The conservation efforts of the FWS and California Condor Recovery Program (direct and indirect positive impact) are the reason for the growth of the population after reintroduction of the species in 1992.**