**5E** [**CondorKids**](https://www.youtube.com/watch?v=PyzKqUm-97M) **Middle School Unit**

By USFWS Hopper Mountain National Wildlife Refuge Complex, Teachers from Fillmore Unified School District and Santa Paula Unified School District: Laurie Merrill and Cynthia Martin, and support from Oxnard School District Science Instructional Specialist Sarah Raskin (template adapted from Annie Ransom)

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| **Standards** |
| **MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]**MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.** [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]**Partially addressed:****MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.\*** [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.] **MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem**.[Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]**SEP: Asking Questions, Developing and Using Models, Analyzing and Interpreting Data, Using Mathematics and Computational Thinking, Constructing Explanations, Engaging in Argument from Evidence, and Obtaining, Evaluating, and Communicating Information** |
| **Environmental Principles & Concepts** |
| ~~Principle 1 - People Depend on Natural Systems~~ Principle 2 - People Influence Natural Systems ~~Principle 3 - Natural Systems Change in Ways that People Benefit From & Can Influence~~  | Principle 4 - There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing Between SystemsPrinciple 5 - Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors |
| [EP&Cs Flyer](https://www.californiaeei.org/media/1422/epandcs-flyer.pdf) [EP&Cs Infographic](https://www.californiaeei.org/media/1407/infographic_californias-environmental-principles.png) |
| **Essential Question** |
| **What role does the California condor play in the California ecosystem, and how do changes in the ecosystem impact condors over time?** |
| **Engage – Anchor Phenomenon and Preliminary Model****1 Day: 45 minutes** |
| **Lesson 1 – Intro and Preliminary Model*** Engage: **Condor Feeding Frenzy Videos** [**Condors feeding on deer carcass**](https://www.youtube.com/watch?v=245wa0_rjc4)
* Optional videos: [**Condor Eats Deer Heart**](https://www.youtube.com/watch?v=TuGpuxlb0dw), [**Condors Eating a Pig**](https://www.youtube.com/watch?v=9BE1JP284_Y), [Condors Supplemental Feeding Central Cal](https://www.youtube.com/watch?v=GgXo8gQURAU)ifornia**,** [**Condor vs Eagle**](https://www.youtube.com/watch?v=IYRYc30XUgk)
* **Create a** [**preliminary model**](https://amarshall477.wixsite.com/condorkids/lesson-aides) **of how the condor interacts with its environment**
* **Gallery Walk**
* **Revise Models**
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| **Explore/Explain #1 – GIS Tutorial and Week 1 GIS Lab****2 days: 60/45 minutes** |
| **Lesson 2: GIS Tutorial and Activity 1****Day 1:*** **Warm-Up**
* **GIS Activity Tutorial**

**Day 2:** * **Warm-Up**
* **Intro and assign groups a condor to monitor**
* **GIS Data Sheet – Week 1 (Habitat)**
* **Class Discussion**
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| **Explore/ Explain #2 – Week 2 GIS Lab & Hopper Mountain Food Web****2 days: 45/50 minutes** |
| **Lesson Plan 3 – GIS Activity 2*** **Warm-Up**
* **Re-watch Anchor Video**
* **GIS Data Sheet – Week 2**

**Lesson Plan 4 – Developing the Hopper Mountain Food Web Model*** **Warm-Up**
* **Gather Information/ Research**
* **Building a Hopper Mountain Food Web Model**
* **Class Discussion**
* **Revising the Food Web Model**
* **Revise Preliminary Model**
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| **Explore/ Explain #3 – Week 3 GIS Lab and Scavenger Success****2 Days: 45/40 minutes** |
| **Lesson Plan 5 – GIS Week 3*** **Warm-Up**
* **Class Discussion**
* **GIS Activity Week 3**

**Lesson Plan 6 – Scavenger Success*** **Deer Decomposition Video**
* **Close Reading of article**
* **Re-watch Anchor Video and Discussion**
* **Revise Model**
* **Reflection**
* **Optional Homework**

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| **Explore/ Explain #4 –GIS Lab Week 4 and Graphing Human Impacts****2 Days: 45/45 minutes** |
| **Lesson Plan 7 – GIS Week 4*** **Warm-Up**
* **GIS Activity Week 4**
* **Reflection**

**Lesson 8: The Life and Death of California Condors – Graphing Human Impacts*** **Warm-Up**
* **Jigsaw Activity**
* **Making Graphs**
* **Sharing the Data**
* **Claim-Evidence-Reasoning**
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| **Explore/ Explain #5 – The Condor’s Shadow and Do the Math!****1 Day: 60 minutes** |
| **Lesson 10: The Condor’s Shadow and Do the Math!*** **Watch Condor’s Shadow video**
* **Do the Math Activity**

**Lesson 11:*** **Warm-Up**
* **Question Formulation Technique** *\*Guest speaker is not guaranteed. Video or written question responses can be substituted.*
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| **Explore/ Explain #6 – Expert Answers and Microtrash Madness****1 Day: 45 minutes** |
| **Lesson 12: Microtrash Game** |
| **Elaborate – Public Service Announcements****2 Days: 30/30 minutes** |
| * Create a PSA/ Billboard/ Sign/ Video/ Poster encouraging people how to prevent microtrash or lead from entering the condor’s environment.
* Share with FWS Park Ranger for possible showcase on Facebook or Websites

[**Funny video example**](https://www.youtube.com/watch?v=vSCALpmxnLE)[**Serious video example**](https://www.youtube.com/watch?v=E8d_JvMpoY4&list=PL5WqtuU6JrnXjsGO4WUpJuSVmlDcEgEYb&index=2)[**Kid made signage**](https://ca.audubon.org/downloadable-beach-signs) |
| **Evaluate – Claims, Evidence, and Reasoning****1 Day: 30-45 minutes** |
| * **[CER](https://drive.google.com/open?id=1OqWXVmYAl2_bXxVcnDx3_6w73FBWiP43)**
* **[Rubric](https://drive.google.com/file/d/17n0nUYJcKH8S8WcElDBA6FEm5A4lOf__/view?usp=sharing)**
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*Estimated time to complete: lesson plans 30-60 minutes; 15 lesson days (50-minute periods)*