

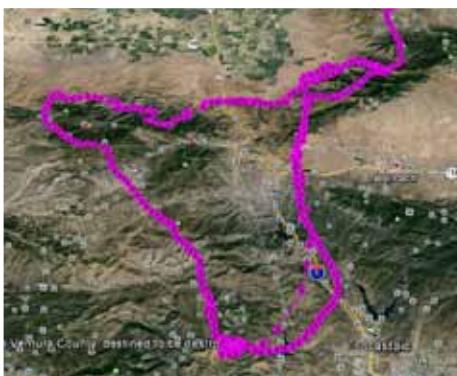


CondorKids

Helping kids fall in love with the California Condor



**CURRICULUM
PACKAGE**



CONDOR KIDS CURRICULUM

The Condor Kids Curriculum Package was designed with active learning in mind. All lessons are aligned to Next Generation Science and Common Core standards and organized with the EQUIP framework. They are teacher-friendly enrichment additions to existing curriculum.

This curriculum development is part of a much broader conservation partnership between U.S. Fish & Wildlife Service (USFWS) and the Santa Barbara Zoo. Initially designed with Fillmore Unified School District (FUSD) students in mind, the project includes the development of this curriculum, nest monitoring strategies (with live streaming cameras), as well as student visits to Bitter Creek National Wildlife Refuge, Hopper Mountain National Wildlife Refuge, and the Santa Barbara Zoo.

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PROJECT OUTLINE NGSS PERFORMANCE EXPECTATIONS

ESS3.B: Natural Hazards	<p>A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts (3-ESS3-1). Note: this Disciplinary Core Idea is also addressed by 4-ESS3-2.</p>
ETS1.A: Defining & Delimiting Engineering Problems	<p>Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success and how well each takes the constraints into account. (3-5-ETS1-1)</p>
LS1.B: Growth and Development of Organisms	<p>Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)</p>
LS2.C: Ecosystem Dynamics, Functioning, and Resilience	<p>When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce; others move to new locations; yet others move into the transformed environment; and some die. (secondary to 3-LS4-4)</p>
LS2.D: Social Interactions and Group Behavior	<p>Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Note: moved from K–2 (3-LS2-1)</p>
LS3.A: Inheritance of Traits	<p>Many of an organism's characteristics are inherited from its parents. (3-LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)</p>
LS4.C: Adaptation	<p>In any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)</p>
LS4.D: Biodiversity and Humans	<p>Populations live in a variety of habitats, and changes in those habitats affect the organisms living there. (3-LS4-4)</p>

PROJECT OUTLINE COMMON CORE

RL 3.1

Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RL 3.2

Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.

RL 3.5

Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as *chapter*, *scene*, and *stanza*; describe how each successive part builds on earlier sections.

RL 3.6

Distinguish their own point of view from that of the narrator or those of the characters.

RI 3.7

Use information gained from illustrations (e.g. maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., D1:F16 when, why, and how key events occur).

PROJECT OUTLINE CONDOR KIDS

NGSS Crosscutting Concepts	1. Patterns 2. Cause and Effect 3. Scale, Proportion, and Quantity 4. Systems and System Models 5. Energy and Matter 6. Structure and Function 7. Stability and Change
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BIOLOGY

Learning Set Events	NGSS Disciplinary Core Ideas	NGSS Scientific and Engineering Practices	Artifact Development
Unique physical features: <ul style="list-style-type: none"> Literature folklore/story-time around wing color “Rainbow Bridge” Wing span/biology of flight for distance (paper airplanes) Feeding behavior and physical adaptations/socialization and beak/head adaptations X-ray investigation; labeling body parts, identifying lead, skeletal puzzle, biofact exploration, skulls 	LS 3.A LS 3.B LS 2.D Details of connectiveness on individual lesson overviews	Asking questions and defining problems; developing and using models; planning and carrying out investigations; using mathematics and computational thinking; obtaining, evaluating, and communicating information	Visual of physical features and skeletal system: <ul style="list-style-type: none"> Flight simulator/paper airplanes Food web Skull sketch Observation journal entries
Behaviors: <ul style="list-style-type: none"> Reproduction: parents and chicks/teaching with puppets. Replacement clutching, egg transferring, nest monitoring activity Role play family dynamics: hatchling, juvenile, adult 	LS 1.B LS 2.D LS 3.A Details of connectiveness on individual lesson overviews	Asking questions and defining problems; developing and using models; planning and carrying out investigations; constructing explanations and designing solutions; obtaining, evaluating, and communicating information	Observation journal entries, nest replicas, feeding observation chart, engineering solutions to nest events
System and changes: <ul style="list-style-type: none"> Biological systems, web, scavenger 	LS 1.B Summary of connections on individual lesson overview	Asking questions and defining problems; developing and using models; analyzing and interpreting data; obtaining, evaluating, and communicating information	Food web creation, artwork illustrations of change, observation journal entry

PROJECT OUTLINE CONDOR KIDS

GEOGRAPHY

Learning Set Events	NGSS Disciplinary Core Ideas	NGSS Scientific and Engineering Practices	Artifact Development
Habitat change: • Nest Sites: highlighting different geographic features of the area with photographs of nest sites • Create 3-D habitats out of clay (basic topography), illustrate changes in the environment	LS 2.C LS 3.A LS 4.C LS 4.D Details of connectiveness on individual lesson overviews	Asking questions and defining problems; analyzing and interpreting data; using mathematics and computational thinking; constructing explanations; obtaining, evaluating, and communicating information	3-D theater of condor habitat
Range mapping and fluctuation: • Rope activity effects of fluctuation of territory, following condors' new areas • Arrange maps of condor territory in sequence • Flight of condor 513: follow flight on larger scale, set up visit sites, place photos of corresponding geographic features in order of flight	LS 2.C LS 3.A LS 4.C LS 4.D Details of connectiveness on individual lesson overviews	Asking questions and defining problems; developing and using models; analyzing and interpreting data; using mathematics and computational thinking; constructing explanations	Chart of condor territory

HISTORY

Learning Set Events	NGSS Disciplinary Core Ideas	NGSS Scientific and Engineering Practices	Artifact Development
Cause and effect: • Timeline pockets activity (reference)	LS 4.D Details of connectiveness on individual lesson overview	Developing and using models; using mathematics and computational thinking	Timeline of various people groups
Perspectives: • Exploring authors Koford, Clark, Hamber, Synders video chat/interview; answer questions as detectives: who wrote source? Can we trust author? Why did the author write this? • Symbolism project A. Tasked to change impressions B. Interview family, friends, community C. Research any organizations	ETS1.A Details of connectiveness on individual lesson overview	Asking questions and defining problems; developing and using models; analyzing and interpreting data; engaging in argument from evidence; obtaining, evaluating, and communicating information	Observation journal entries, create representative symbols, interview, research

PROJECT OUTLINE CONDOR KIDS

HISTORY

Learning Set Events	NGSS Disciplinary Core Ideas	NGSS Scientific and Engineering Practices	Artifact Development
Diverse populations and cultures: • Tribes representing different cultures, periods of time, influence on area and condors; create KWL(q) chart, take on roles individually or group, make background poster present	LS 4.D Details of connectiveness on individual less	LS 4.D Details of connectiveness on individual less	KWL, create image to represent people group, create characters/dialogue to demonstrate differences, class presentations

CONSERVATION

Learning Set Events	NGSS Disciplinary Core Ideas	NGSS Scientific and Engineering Practices	Artifact Development
Humans and condor story: • Hunter-prey-condor race, illustrate lead in environment/sequence of events • Debate natural habitat and city growth, ideas for compromise population decline, graph the population	LS 1.B ESS3.B Details of connectiveness on individual lesson overview	Asking questions and defining problems; developing and using models; using mathematics and computational thinking; constructing explanations and designing solutions; engaging in argument from evidence; obtaining, evaluating, and communicating information	Observation journal entries, population graph
Condors in captivity: • Role of zoos and partners, quality of life in captivity, boundaries and interactions	ESS 3.B LS 2.D Details of connectiveness on individual lesson overview	Asking questions and defining problems; constructing explanations and designing solutions; engaging in argument from evidence	Observation journal entries, discuss pros and cons
Habitat conservation: • Microtrash investigation: finding trash in school yard, determine items, analyze path to condor • Hunter/prey/condor race	ESS 3.B Details of connectiveness on individual lesson overview	Asking questions and defining problems; developing and using models; planning and carrying out investigations; constructing explanations and designing solutions; engaging in argument from evidence	Observation journal entries, field investigation

FURTHER RESOURCES WEBSITES, BOOKS & ARTICLES

Websites

1. U.S. FISH & WILDLIFE SERVICE CONDOR HOME

<http://www.fws.gov/cno/es/calcondor/Condor.cfm>

2. NATIONAL PARKS ON LEAD

<http://www.nps.gov/pinn/learn/nature/leadinfo.htm>

3. VULTURES FOR KIDS FROM NATIONAL GEOGRAPHIC

<http://kids.nationalgeographic.com/explore/nature/vultures/>

4. CONDOR INFO AND CONDOR BIOGRAPHIES

<http://www.mycondor.org/index.html>

5. SB ZOO AND USFWS CONDOR FACEBOOK PAGE "CONDOR CAVE"

<https://www.facebook.com/TheCondorCave>

6. HOPPER MOUNTAIN NWR MAIN PAGE

http://www.fws.gov/refuge/Hopper_Mountain/

7. MICROTRASH VIDEO

<https://vimeo.com/74893443>

8. SAN DIEGO ZOO CALIFORNIA CONDOR PAGE

<http://animals.sandiegozoo.org/animals/california-condor>

9. BIRDS IN CHUMASH CULTURE

<https://www.sbnature.org/research/anthro/chbirds.htm>

Books and Articles

1. ALAGONA, PETER S.

"Biography of a Feathered Pig." Journal of the History of Biology, Vol. 37, No. 3. (Autumn 2004), 557-583.

2. BLACKBURN, THOMAS C.

December's Child: A Book of Chumash Oral Narratives from writings of John P. Harrington. University of California Press, 1975.

3. JOHNSON, KELLY, AND RIDEOUT

"Lead in Ammunition: A Persistent Threat to Health and Conservation." Eco Health, January 2014.

4. KOFORD, CARL B.

The California Condor. Dover Publications Inc, NY, 1953.

5. MEE AND HALL

California Condors in the 21st Century. The Nuttall Ornithological Club & The American Ornithologists' Union, Cadmas Communication, 2007.

6. SANTA BARBARA MUSEUM OF NATURAL HISTORY

The Chumash People: Materials for Teachers and Students. EZ Nature books: San Luis Obispo, 1991.

7. SANTA BARBARA MUSEUM OF NATURAL HISTORY

California's Chumash Indians. EZ Nature Books, 2002.

8. SYNDER, NOEL AND HELEN

The California Condor: A Saga of Natural History and Conservation. Academic Press: London, 2000.

9. U.S. FISH & WILDLIFE SERVICE

Hopper Mountain National Wildlife Refuge Complex California Condor Recovery Program 2013 Annual Report.

10. WALTERS ET AL

"Status of the California Condor and Efforts to Achieve its Recovery." Auk (127) 4, 969-1001, 2010.

MATERIALS LIST

CONDOR KIDS

BIOLOGY

Biology A

- Sheets of butcher paper (paper must be at least 10 ft long)
- Rulers or tape measures

Biology B

- Straws
- Pencils
- Popsicle® sticks
- Tape
- Glue

Biology C

- Scissors
- Condor Plane Worksheet

Biology D

Rainbow Bridge story

Biology E

- Skulls and eggs (class set might include California condor skull, California condor egg, Western Scrub Jay egg, and a Red-tailed Hawk egg)
- Measuring tape
- String

Biology F

- No extra materials necessary

Biology G

- Supplies to create improv cards as needed

Biology H

- Yarn
- ID cards

Biology I - I

- Event cards
- Box (size depending upon extension use)
- Brown paint or paper, pebbles
- White plastic eggs

Biology I - II

- Event cards
- Data table
- Printed illustrations
- Charting or graphing materials including paper and pencils

Biology I - III

- Event cards

Biology J

- Printed illustration page
- Art materials (crayons, pencils, markers, colored paper, cotton balls, textured material, etc.)

MATERIALS LIST

CONDOR KIDS

GEOGRAPHY

Geography A	<ul style="list-style-type: none">• No extra materials necessary
Geography B	<ul style="list-style-type: none">• Clay or paper for habitat representation. If paper theater: scissors, tape or glue, pencils or crayons, templates if necessary
Geography C	<ul style="list-style-type: none">• Rope
Geography D	<ul style="list-style-type: none">• Enlarged map• Rulers• String
Geography E	<ul style="list-style-type: none">• Poster Post-Its®

HISTORY

History A	<ul style="list-style-type: none">• 11" x 17" sheets of paper• Printed symbols sheet• Art supplies including crayons, scissors, markers, etc.
History B	<ul style="list-style-type: none">• Printed KWL chart• Timeline pocket document previously created• Art supplies including crayons, scissors, markers, etc.
History C	<ul style="list-style-type: none">• Printed interview sheets
History D	<ul style="list-style-type: none">• Butcher paper• Markers or paints• Costumes• Tribe cards• Large lined index cards• 11" x 17" sheets of paper• Sharpies

CONSERVATION

Conservation A	<ul style="list-style-type: none">• Deer and infected deer ID cards• Stopwatch
Conservation B	<ul style="list-style-type: none">• Personal and group trash collection bins• Images
Conservation C	<ul style="list-style-type: none">• White-board materials or poster and markers
Conservation D	<ul style="list-style-type: none">• M&M's• Printed population charts• Data chart organizer

BIOLOGY

Biology

Unique Physical Features

Behaviors

System and Changes

GEOGRAPHY

Geography

Habitat Change

Range Mapping and Fluctuation

HISTORY

History

Cause and Effect

Perspectives

Diverse Populations and Cultures

CONSERVATION

Conservation

Humans and Condor Story

Condors in Captivity

Habitat Conservation

Fall in Love with Condors

Throughout each module, we hope that students are inspired by and make connections with three important themes:

1. California condors are CURIOUS
2. Sometimes, California condors are MISUNDERSTOOD
3. California condors are our NEIGHBORS

CONDOR KIDS BIOLOGY

AMAZING ANATOMY I	BIOLOGY A	15-16
AMAZING ANATOMY II	BIOLOGY B	17-18
PARTNER PARTY	BIOLOGY C	19-21
TRAIT TALK	BIOLOGY D	22-24
BIOFACT BRAINSTORM	BIOLOGY E	25-26
FEEDING FRENZY	BIOLOGY F	27-28
FEEDING FRENZY II	BIOLOGY G	29-32
WACKY WEBS	BIOLOGY H	33-35
NEST TECH TRAINING I	BIOLOGY I 1	36-39
NEST TECH TRAINING II	BIOLOGY I 2	40-44
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LIFELONG LEARNERS	BIOLOGY J	47-49



AMAZING ANATOMY I BIOLOGY A

Rationale

To understand the anatomy of a condor and compare size, students will create a life-size representation of a condor.

Objectives

1. Students compare wing and body size to birds with which they are familiar.
2. Students identify the basic anatomical features of the condor.

Aligned Standards

NGSS: Using Mathematics and Communicating Information; Structure and Function
LS4.C: Adaptation: The condor's anatomic features (eg. wing size) promote survival in its native environment.
3.MD.B.4: Measuring Lengths

Vocabulary

wingspan
species
adapted
molt

Materials

Butcher paper (paper must be at least 10' long)
Ruler or tape measure

Tech Integration

Condors in Flight photo library

Time

Day 1 of two-day lesson
Teaching time: one hour
(approximately)

PROCEDURE – DAY 1

IMAGES (10 minutes)

Introduce to condors in flight through images, and encourage students to guess, relative to items in images, the size and weight of the birds.

Begin by projecting a photo of a condor in flight from the Condors in Flight photo library. Have students make inferences about the bird: what it is, where it lives, what it eats, and how it behaves. As you move through the series of photos, have the students give evidence for their inferences.

DATA (10 minutes)

Create a chart to examine the wingspan of each student. Measure each student's "wingspan," add in the data, and display the chart in the classroom.

CREATE (40 minutes)

Divide the students into groups and pass out materials and instructions to measure and draw a scale representation of a Turkey vulture, California Condor, juvenile condor, and human.

Provide rulers, butcher paper (one 10-foot-long sheet for entire project), close-up photos, and the measurement fact sheets to each group.

Students work in groups to create the life-size artworks.

AMAZING ANATOMY I BIOLOGY A

Day 1 of two-day lesson
Teaching time: one hour
(approximately)

ELL MODIFICATION:
Translate the vocabulary
words to Spanish.



OPTIONAL EXTENSION:
Depending on the number of
students, other groups can be formed
to create other true-to-size birds,
including the Western Scrub Jay,
Golden Eagle, and Red-Tailed Hawk.

ELL MODIFICATION: Label the body
parts in both English and Spanish.

Before you begin

Prep butcher paper, measurement fact sheets, and rulers or tape measures for each group.

What to do

As neighbors to the California condor territory, it can be common for us to hear about the condor as the largest bird in North America. What does that mean in size and weight relative to an 8- or 9-year-old?

Images

Begin by projecting an image from the Stages of Life or Condors in Flight photo libraries. Ask the students if they have ever seen this bird before. Ask the students to guess, in comparison to the size of objects or people in the images, the size of the California condor. Encourage the students to observe all parts of the image. Have the students compare the size or weight of the bird to themselves.

If time permits, ask the students to guess or provide previously known information on the life of the condor: what does it eat? Where does it live? How does it behave? Have students identify what they see in the photos that allows them reach these conclusions. You may record these ideas and guesses on a flip chart to return to at the conclusion of the module.

End the discussion projecting the “Size and Coloring USFWS” photo from the Stages of Life photo library. Ask a student to find the condor in the image and read the measurement given. The top measurement is 9.5 feet. To the side of the condor, the measurement is between 8.5 to 9.5 feet. Either response is acceptable. One of those numbers is the average, which the class will learn about next. Introduce the vocabulary word “wingspan” as the measurement from the tip of one wing to the tip of the other wing.

Data

Make a data chart and measure each child’s wingspan. Measure each wingspan in feet and meters. Have the class find the average wingspan, the longest wingspan, and the shortest wingspan. Explain to the students what the “average condor wingspan is 9.5 feet” means.

Create

Explain to students that as a class, they will create life-size or true-to-scale drawings of a condor, a Turkey Vulture, and a human. Divide the class into four groups to be in charge of measuring and drawing a condor, juvenile condor, Turkey Vulture, and human. The sizes of the wingspan should be the averages supplied by the USFWS chart and the data chart created by the class.

After they are finished, hang the drawings in the classroom. Have each student take a turn to measure his or her height and “wingspan” against the final product.

AMAZING ANATOMY II BIOLOGY B

Rationale

To understand the anatomy of a condor and compare size, students will create a life-size representation of a condor.

Objectives

1. Students explore the skeletal system of a condor.
2. Students identify the basic anatomical features of the condor.

Aligned Standards

NGSS: Using Models and Using Mathematics; Patterns and Structure and Function
LS4.C: Adaptation: The condor's anatomic features (i.e. skeletal structure) promote survival in its native environment.
3.MD.B.4: Measuring Lengths

Vocabulary

wingspan
species
adaptation

Materials

Straws, pencils, Popsicle® sticks, tape, glue

Tech Integration

X-ray photo library

Time

Day 2 of two-day lesson
Teaching time: one hour
(approximately)

PROCEDURE – DAY 2

IMAGES (10 minutes)

Look through a group of x-ray images and representations of condor skeletons.

EXPLORE (15 minutes)

At each desk or group, pass out Popsicle® sticks, straws, and pencils. Have students examine each item and discuss their differences in their small groups. After about 5 minutes of discussion, have each group share their observations with the rest of the class. The teacher should circulate and facilitate conversations about the following: size and density of bones, flight, the hollow nature of bird bones, and vocabulary.

Direct the class to the life-sized representation of the condor from the previous lesson. Ask them which material they think the condor's bones would be similar to and why. Accept all answers and validate each student's reasoning. Address flying birds (condors) vs. diving/swimming birds (penguins) for hollow or dense bone needs. Be sure to end the discussion with the focus on size and mass. Many big things are heavy, but what can we think of that is large, yet light (balloons, pillows, etc.)? The item with the least mass is the straw; therefore, the large condors can fly better if their bones are like straws. Show X-Ray images.

CREATE (30 minutes)

In the same groups from lesson A, have students use straws to represent the skeletal system on their drawing created in lesson A. Have the students tape the straws onto the paper (with as much detail as possible) before gluing them down.

AMAZING ANATOMY II BIOLOGY B

Day 2 of two-day lesson
Teaching time: one hour
(approximately)

ELL MODIFICATION:
Translate the vocabulary words
to Spanish.

MATERIALS NEEDED:
Straws
Popsicle® sticks
Pencils
Scissors
Tape

ELL MODIFICATION:
Label the body parts in both
English and Spanish.

Before you begin

Prep sets of materials that include one straw, one pencil, and one Popsicle® stick. Prepare to project images of condor x-rays from the X-ray photo library. Set out tape or glue for the class to use.

What to do

For their fascinating features, bird bones are important to highlight as unique adaptations. While not all birds have the same hollow bone structure (diving vs. flying birds), the condor indeed has many hollow bones. These strong, stiff bones are adaptations for the stresses of flying. Many birds, including the condor, have “fused” bones. Therefore, the number of bones in the body of a condor is fewer than the number of bones in a human body.

Explore

Show the students photos from the “X-ray” photo library to introduce the bones found in condors. Ask the students what an x-ray shows. Ask the students about the function (structure, support, and movement) and features (strong, stiff, etc.) of bones. Ask the students what bodies would be like without bones.

Create

Pass out to each student a Popsicle® stick, a straw, and a pencil. Have students in small groups or pairs examine the materials as representations of bones.

In pairs or groups, have the students discuss the differences in shape and structure of the given materials. They should talk about what they might already know about bones and the shape and size of the materials given. Have the groups list their observations to share with the entire class. After 5 minutes, have the students share their observations of possible bone-like materials. Carefully guide the discussion to comparing the flat, hollow, and solid nature of the three materials.

Direct the class to the life-sized representation of the condor on the wall. Ask them which materials they think the condor’s bones would be similar to and why. Address the needs and lifestyles of flying birds (condors) vs. diving birds (ducks). Bring up the idea that many big things are heavy, and challenge the students to think of items that are large yet light (balloons, pillows, etc.). End the discussion with the large size of the condor and the connection to straws. The straw is hollow and has the least mass. The condor can fly better if it has fewer bones and if the bones are like very strong straws. Introduce the vocabulary word “adaptation” as a word meaning a change to fit the habitat or environment.

Explain to the students that they will now be creating a skeleton for their condor from lesson A. Have the groups use straws to represent the bones in the body part they sketched during lesson A. Walk around and facilitate discussion on bird bones.

For reference, the condor has about 138 bones. Included in this count are 10 bones per wing, 5 bones per leg, 15 bones per foot, 28 vertebrae, and 14 ribs on each side of the ribcage (6 paired, 2 without a pair). For comparison, the Turkey Vulture has 136 bones with 2 fewer vertebrae than the condor.

FORAGING FLYERS BIOLOGY

Rationale

To understand the anatomy of a condor and its adaptations for flight, students will create condor paper airplanes.

Objectives

1. Students explore the concept of flight
2. Students understand the influence of size and weight to flight
3. Students identify condors as soaring, foraging birds

Aligned Standards

NGSS: Using Models and Constructing Explanations and Designing Solutions; Causation
LS4.C: Adaptation: The condor's anatomic features (eg., wings, bones, and size) promote survival in its native environment.

Time

Day 1 of two-day lesson
Teaching time: one hour (approximately)

Vocabulary

soaring
foraging
adaptation
scavenger

Materials

Scissors
Condor Plane Worksheet

Tech Integration

Soaring Condors:
<http://bcove.me/2mmv7bqq>

Seagulls flapping:
<https://youtu.be/OumJUbU8mk0>

Different birds in flight:
<https://youtu.be/kqX-sdvT-aM>

Condors in flight:
photo library

PROCEDURE – DAY 1

EXPLORE (15 minutes)

Watch the Soaring Condors, Seagulls Flapping, and Different Birds in Flight videos. Discuss the different ways birds fly from observations in the videos. Be sure to discuss adaptations for soaring vs. flapping.

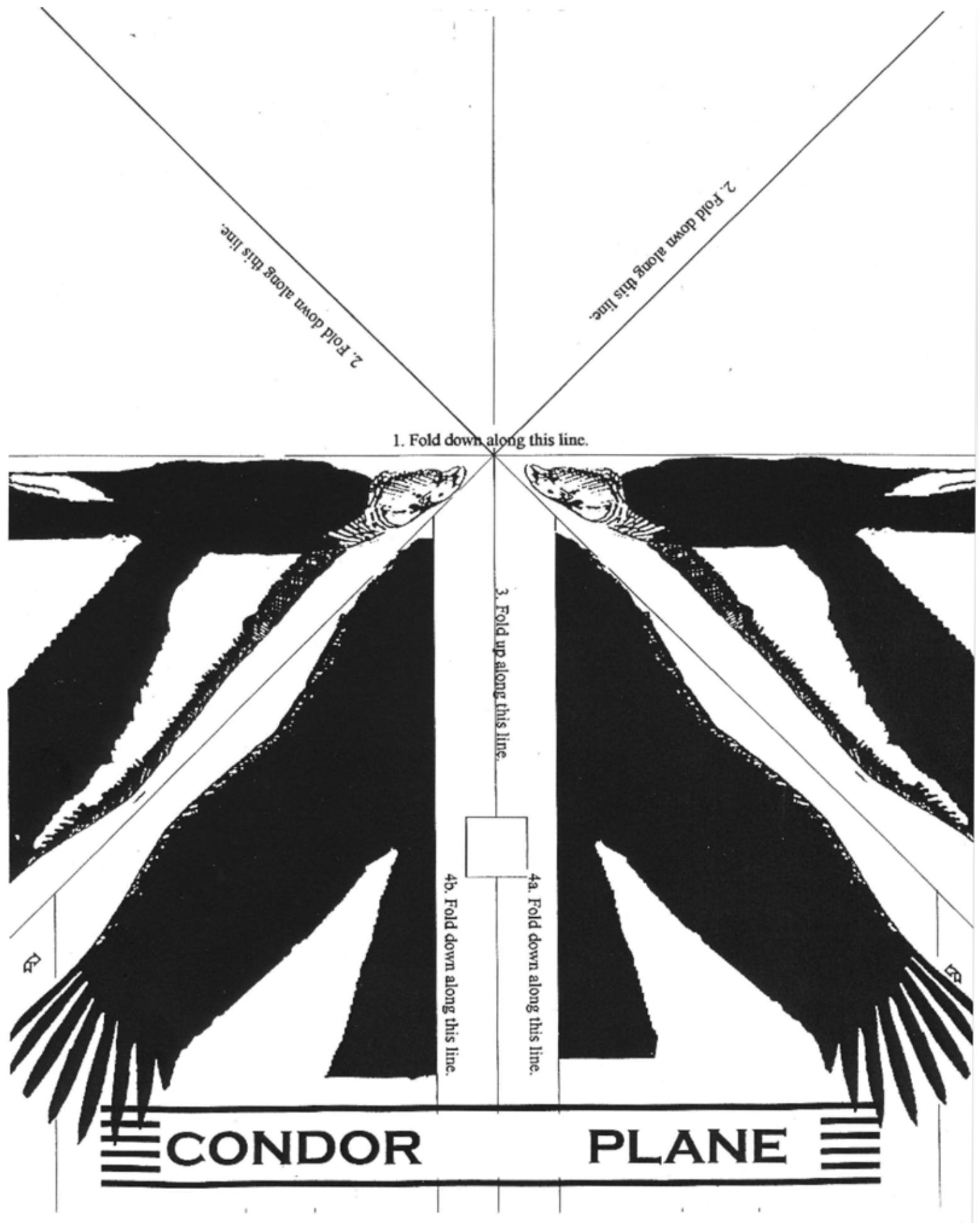
Students fold and fly their condor paper planes. The teacher facilitates conversations with students asking questions such as:

- Which type of flight uses more energy: soaring or flapping?
- What can you infer from the condor's wing size?
- What can you infer about flight from the density of the condor's bones?

JOURNAL (20 minutes)

Students answer the questions above about condor flight adaptations in their journals. Discuss as a class the various flight adaptations explored in the previous lessons: wings, bones, and size.

Many of the flyers will fail. With the knowledge gained in previous lessons, have the students engineer better flyer designs in their journals. Test new models.



Before you begin

Print out enough flyers for each student and set out scissors.

What to do

Not all birds fly in the same way. (Some birds are divers, too!) Some birds fly by flapping their wings for an extended amount of time, while others soar with hardly any flapping. These soaring flight adaptations continue an investigation of condor anatomy.

Explore

Show the video of seagulls flapping and different birds in flight. Have the students look for any contrast in flight style as they watch soaring condors.

Help the class to define flapping and soaring. Soaring: flight without much flapping for long distance travel.

Ask the students to stand (behind their desks or in a circle). Have them pretend to be “flapping” birds and flap their arms in the air for 30 seconds. Rest for 10 seconds. Then have the students pretend to be “soaring” birds, and have them raise their arms without flapping for 30 seconds. Then ask the students which type of flight uses more energy: soaring or flapping?

Direct the students to the condor they created from lessons A and B. Pose the question: If the condor is a big bird, with big wings, what type of flight would be best? Or, what can you infer from the condor’s wing size?

Without drawing any conclusions, direct the students to the “condor plane” and explain that they are to make a glider by following the folding directions on the page.

1. Fold along the “hamburger-style” line
2. Fold along the diagonals
3. Fold along the “hot dog-style” line
4. Fold along the body line (note there is a 4a. and 4b.)
5. Fold the wing tips in the direction of the arrow printed close by the tips

Be sure to have the students write their names on their condors!

When the students are finished folding their gliders, have them stand to one side of the classroom or venture out to the school-yard for soaring trials. Have the students stand in a long line and fly their gliders. See which student’s glider flies the farthest.

Journal

Upon returning to the classroom, have the students answer the following questions in their journals:

1. What can you infer from the condor’s wing size?
2. What can you infer about flight from the density of the condor’s bones?

End the discussion talking about the various adaptations from the three lessons A, B, and C: wings, bones, and size. Talk about how these adaptations promote survival in its native environment. What type of food source might a long-distance flight traveler have? (Optional: define foraging as a wide search for food/resources.) Thinking back to the video, what type of area/habitat was the condor flying in?

Many of the flyers will fail. Have the students engineer better designs for new flyers. Explore ideas based on knowledge from the previous lessons. Test new models.

Day 1 of two-day lesson
Teaching time: one hour
(approximately)

ELL MODIFICATION:
Translate the vocabulary words in Spanish and give an image for each word.



OPTIONAL EXTENSION:
Have the students engineer better designs for new flyers. Explore ideas based on knowledge from the previous lessons. Test new models.

Rationale

To bridge anatomy and literature and to think about biology through the lens of literature, students will read the Chumash story *Rainbow Bridge*.

Objectives

1. Students understand the use of story to convey biological information
2. Students identify biological features communicated in *Rainbow Bridge*
3. Students identify condors as birds with curiosity

Aligned Standards

NGSS: Communicating Information; Patterns
 RL 3.5: Students will be referring to the *Rainbow Bridge* story to answer comprehension questions.
 LS 3.A: Literature will be used to communicate biological trait inheritance possibilities. Many biological condor traits will factor in inheritance and interaction.
 SS 3.2: *Rainbow Bridge* is used to describe the Chumash (American Indian Nation) life through story.

Time

One-day lesson
 Teaching time: 45 minutes (approximately)

Materials

Rainbow Bridge story

Tech Integration

Condors in flight photo library

Vocabulary

Chumash
 vulture
 preserve

PROCEDURE – DAY 1

EXPLORE (20 minutes)

Students read the *Rainbow Bridge* story attached.

Write the Chumash words and translations on the board and go over them before you begin.

Hutash=Mother Earth

Limuw=Santa Cruz Island

Alchupo'osh=Milky Way

Wishtoyo=Rainbow

Mishopshno=Carpinteria

JOURNAL (30 minutes)

Students answer questions about the story:

1. According to this story, where did the Chumash people come from?
2. Name some traits or unique features of the condor that you learned from the story.
3. What personality trait caused the condor to change from a white bird to a black one? How did this happen?
4. What big change caused the Chumash People to increase in number?
5. Do you think Hutash's solution to move the people off of Limuw was good? Why or why not?
6. Tell of a time you (or someone you know) accidentally caused a problem when you were really trying to help.
7. How did the Chumash view the California Condor and why?

Rainbow Bridge

Hutash, the Earth Mother, created the first Chumash people on the island of *Limuw*, now known as Santa Cruz Island. They were made from the seeds of a Magic Plant.

Hutash was married to the *Alchupo'osh*, Sky Snake, or the Milky Way, who could make lightning bolts with his tongue. One day he decided to make a gift to the Chumash people. He sent down a bolt of lightning that started a fire. After this, people kept fires burning so that they could keep warm and cook their food.

In those days, the condor was a white bird. The condor was very curious about the fire he saw burning in the Chumash village. He wanted to find out what it was. He flew very low over the fire to get a better look, but he flew too close; he got his feathers scorched, and they turned black. Now the condor is a black bird, with just a little white left under the wings where they did not get burned.

After *Alchupo'osh* gave them fire, the Chumash people lived more comfortably. More people were born each year and their villages got bigger and bigger. *Limuw* was getting crowded. And the noise people made was starting to annoy *Hutash*. It kept her awake at night. So, finally, she decided that some of the Chumash people had to move off the island. They would have to go to the mainland, where there weren't any people living in those days.

But how were the people going to get across the water to the mainland? Finally, *Hutash* had the idea of making a bridge out of a *wishtoyo* (rainbow). She made a very long, very high rainbow that stretched from the tallest mountain on *Limuw* all the way to *Tzchimoos*, the tall mountain near *Mishopshno* (Carpinteria).

Hutash told the people to go across the rainbow bridge and to fill the whole world with people. So the Chumash people started to go across the bridge. Some of them got across safely, but some people made the mistake of looking down. It was a long way down to the water, and the fog was swirling around. They became so dizzy that some of them fell off the rainbow bridge, down through the fog, into the ocean. *Hutash* felt very badly about this because she told them to cross the bridge. She did not want them to drown. To save them, she turned them into dolphins. Now the Chumash call the dolphins their brothers and sisters.



.....
One-day lesson
Teaching time: 45 minutes
(approximately)



OPTIONAL EXTENSION:
Make enough copies of the story
for each student. Have them
read along, tracking with their
index finger, as you read aloud.



OPTIONAL EXTENSION:
Have students re-read the story
quietly to themselves before
answering comprehension questions.



OPTIONAL EXTENSION:
Add the creation of a skit to the
lesson. Have the students create
cue cards to inform the four parts
of the skit. Film and edit the skit.



OPTIONAL EXTENSION:
Include an exploration in Prisms to
this lesson. Have students research
and provide information to the
class on the topic of Rainbows.

Before you begin

Print copies of *Rainbow Bridge* for each student.

What to do

According to the folklore in the Chumash story, *Rainbow Bridge*, the condor's wing color came about in a very unique way. Begin by discussing the purpose of folklore and what makes it different from other Literature genres. (It is usually passed down within a certain culture through many generations, it usually teaches an important moral lesson, it usually explains a natural phenomenon.)

Explore

Write the Chumash words and translations on the board and go over them before you begin.
Hutash=Mother Earth
Limuw=Santa Cruz Island
Alchupo'osh=Milky Way
Wishtoyo=Rainbow
Mishopshno=Carpinteria

Depending on your class, decide whether or not to use Chumash words in the story. Ask the class to make a movie in their minds as you read... that they should imagine the story as it is happening and to raise hands if anything is unclear.

After reading the first paragraph aloud, emphasize what life must've been like without fire. Ask the class how they felt the first time they saw something that amazed them. What have they been curious about? Has anything ever been dangerous?

After the second paragraph, discuss how something like the introduction of fire would make life more comfortable. Why would more people be born and the village grow? In conclusion, ask the class what they think about Hutash. She could do some great things, and wanted to do them for good, but did they all turn out good? Consider how she was annoyed at the people, came up with a solution that was slightly dangerous, then tried to fix it by turning people into dolphins. Was there a better solution?

Journal

Pass out Comprehension Questions and have students answer questions about the story (either individually, in partners, or table groups).

Comprehension Questions:

1. According to this story, where did the Chumash people come from?
2. What personality trait caused the condor to change from a white bird to a black one? How did this happen?
3. What big change caused the Chumash People to increase in number?
4. Do you think Hutash's solution to move the people off of Limuw was good? Why or why not?
5. Tell of a time you (or someone you know) accidentally caused a problem when you were really trying to help.

When the class has finished answering all 5 questions, have them share out loud what they came up with. If there is time, have them share what this story taught them about the Chumash people.

BIOFACT BRAINSTORM BIOLOGY E

Rationale

To understand the unique physical features of the condor, students will explore biofacts including a skull and egg.

Objectives

1. Students compare and contrast skulls/eggs of different birds
2. Students identify anatomical features of the condor skull and egg

Aligned Standards

NGSS: Asking Questions, Defining Problems and Using Models; Structure, Function
LS 3.A: Condor skull and egg replicas detail features of unique biological inheritance.
LS 3.B: Condor skull and egg replicas are used to communicate variation bird species and condor generations.
3.MD.B.4: Measuring Lengths

Vocabulary

bofact
species
incubate
scavenger

Materials

Skulls and eggs. Class set might include California condor skull, California condor egg, Western Scrub Jay egg, and a Red-tailed Hawk egg.
Measuring tape, string

Time

One-day lesson
Teaching time: one hour
(approximately)

Tech Integration

Eggs photo library
Video of condor with egg in photo library

PROCEDURE – DAY 1

EXPLORE (30 minutes)

Students explore the biofacts and images of bird skulls and eggs. The teacher should guide the conversation about the shape and size of the egg and use of beak in feeding and relate the biofacts to skeleton creation lesson.

Set out bird skulls and label them A-D. On a different side of the room, set out eggs and label them E-G. Set out measuring tape and string to use to measure the biofacts.

Have students make observations about each skull in their observation journals in the form of a Venn diagram; comparing each of the skulls to the others on the table. Have students measure each skull and egg. Log any data. Ask students to infer the birds associated with each egg and skull. (Variation: create a class led Venn diagram on the board.)

After examining the skulls and completing notes, have students look at the eggs and compare the shape. Egg shapes are an adaptation to prevent egg from rolling out of nest. Have students infer what types of birds the eggs are from.

JOURNAL (15min)

Students look at images/video of condors and eggs and sketch the skull and egg in their journals.

BIOFACT BRAINSTORM BIOLOGY E

.....
One-day lesson
Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:
Ask high school students or a parent volunteer to aid in the biofact exploration.



OPTIONAL EXTENSION:
Ask high school students or parent volunteers to bring in any skulls they may have (i.e. a deer skull).

.....
ELL MODIFICATION:
Translate the vocabulary words in Spanish and give an image for each one.



OPTIONAL EXTENSION:
Find scales to measure the weight of the skulls or eggs to record further data.



OPTIONAL EXTENSION:
Write letters to Wildlife Biologists with questions about eggs that do not get answered in class.

Before you begin

Set available skull and egg biofacts, measuring tape, and string on two tables.

What to do

Biological artifacts or “biofacts” allow the students to discover and explore animal artifacts (real or synthetic) kinesthetically. The skull and egg exploration provides a focused, in-depth look at specific adaptations.

Explore

Set up the biofacts on two different tables: one table for the skull and one table for the eggs. Set out the condor skull with images of other bird skulls next to it. If possible, request skulls from the school’s science lab. Label the skulls A-D. At the second table, set out the eggs, and label them E-G. Place string and measuring tape beside each skull and egg.

Divide the class in two groups. Allow the groups 20 minutes at each station. Have the students bring their journals to record their observations.

If necessary, review with the students how to make a Venn Diagram by drawing an example on the board. Leave the diagram on the board for the end of the activity. Instruct the students to draw a Venn Diagram on a page labeled “Skulls” and a second Venn Diagram on a second page labeled “Eggs.”

At the skull table, have the students begin by making verbal observations facilitated by the instructor. Ask the students to comment on the shape and size of the skull. List the skulls from largest to smallest. Guess what type of food the bird eats based on the beak. Measuring the skull with the string and measuring tape. Compare measurements for each skull in notebooks. Students can make measurements of beak to crown, beak length, etc.

At the egg table, discuss the size and shape of the egg. Ask students to compare the shape of the eggs. Ask students how the shape of the egg might function as an adaptation. This is to prevent the egg from rolling out of the nest. Have students infer what types of birds (large vs. small, condor vs. other) correspond to each egg. Ask the students how egg coloration might aid in protection. Have the students use the string and measuring tape to measure each egg. Measure the eggs around the middle and from top to bottom. Have the students record these measurements in their notebooks.

Lead the class in a Venn Diagram on the board. Add observations from the students’ diagrams to collect a full list of observations.

Project the images and videos found in the “Egg” photo library. Talk about the way the egg sits in the nest cavity. Ask questions: What is around the egg? What prevents the egg from falling out of the nest? How does the condor interact with the egg (see “Egg 1” and video “Egg vid 2”)? Explain to students that Nest Monitors like those in the “Egg 5” photo sometimes replace eggs that do not hatch with ones from a breeding facility like the LA Zoo. They keep the egg safe in a padded box. Point out the photo labeled “Egg 8” and the video “Egg vid 2” where there is a small crack in the eggs. What is happening to these eggs? Discuss “pipping”: the process by which a condor chick breaks out of the egg.

Journal

End the discussion by asking the students to sketch in their journals an egg inside a nest cavity.

FEEDING FRENZY BIOLOGY

Rationale

To understand the behaviors of the condors during feeding and illustrate the condor's curious nature, students will do feeding observations. .

Objectives

1. Students compile data on feeding
2. Students identify characteristics of a condor feeding event
3. Students understand the lifestyle of a scavenger

Aligned Standards

NGSS: Analyzing Data and Communicating Information; Patterns
LS2.D: As a group, condors obtain food, defend themselves, and cope with changes. Predator differences and number of condors change the social dynamic and observable behavior.

Time

Day 1 of two-day lesson
Teaching time: 45 minutes
(approximately)

Vocabulary

scavenger
feeding event
vigilance

Tech Integration

Feeding photo library

PROCEDURE – DAY 1

DATA (30 minutes)

Teacher should frame the lesson in such a way that the students are early condor researchers, trying to get the best info from photos to determine norms about condor feeding behaviors. Each image should be displayed for a certain time increment (eg. 30s). Students should log the behaviors seen in the image and take note of: juveniles, other birds, number of birds, day or night, etc.

Begin by brainstorming the many factors that are involved with a condor's feeding event. Show the students feeding event photos in order:

Animal dies

Scavengers approach

Hierarchy within different species

Hierarchy within same species

Taking turns, chasing if threatened

Have the students discuss what they saw and infer why the animals might behave that way. Discuss vigilance: Why do condors wait so long before they feed? Why do younger/lower hierarchy birds take more risks? Why feed in a group? How does this relate or compare to how we eat as humans?

GRAPH (15min)

Depending on needs of class, students can either graph the data they have collected on feeding behaviors (Y axis as number of times observed, X axis as type of observation) or answer comprehension questions in their journals.

FEEDING FRENZY BIOLOGY F

Day 1 of two-day lesson
Teaching time: 45 minutes
(approximately)



OPTIONAL EXTENSION 1:
Learn about the ways to identify condors today. Visit numbering system to learn about how to identify condors. Visit condor watch to practice.

ELL MODIFICATION:
Translate the vocabulary words and give an image for each one.



OPTIONAL EXTENSION:
Graph the data observed in the feeding event. The Y-axis should be the number of times observed and the X-axis should be the type of observation. ELL Modification for Extension: Label the X axis with drawings instead of words.

Before you begin

Prepare to display feeding event images.

What to do

The curious nature of the condor is one of Condor Kids' overarching goals for understanding. Feeding events are an excellent environment to observe this curious nature.

Data

Frame this lesson in such a way that the students are early condor researchers, trying to get the best information from photos to determine norms about condor feeding behaviors. The condor program relied and still relies on data observed from the wild population to learn more about condors. Before the use of radio telemetry and wing tags, photo identification was used to estimate the population of wild condors. U.S. Fish & Wildlife Service would collect all the photographs taken and identify the bird by missing, growing, and broken feathers as well as visible signs of age (color of under-wing feathers and head).

Before showing the images, brainstorm with the class the factors involved with the feeding event. Consider appropriate responses with your students. Discuss in advance what they might see, why such things occur, and what an appropriate response might be. For example, discuss whether or not the students should yell "EWW!" or hide underneath a desk.

What do they expect to see? List on the board an expected sequence of events. Ask the students how the term "scavenger" applies to the condor. What is a scavenger's role?

The sequence should be as follows:

1. Animal carcass in sight
2. Scavengers approach. Turkey Vultures, who depend mostly upon smell to locate carrion, approach first
3. Scavengers that search by sight (condors) approach
4. Inter-species hierarchies develop
5. Intra-species hierarchies develop
6. Condors take turns eating: chases can occur here

Use the time-lapsed photos of the feeding event in Feeding Event photo library. Each "Feeding Sequence" image should be displayed for 30 seconds. Then show the students the time-lapse video from the Feeding Event library titled "Condor Feast Video." Students should log the behaviors they see in the photo and take note of: juvenile condors, other birds (ravens, turkey vultures, golden eagles), the number of birds, day or night, etc.

Graph or Journal

Have the students discuss what they saw and infer why the animals might behave in the ways observed. Discuss vigilance: why do condors wait so long before they feed? How did the condor most likely find the carrion? Why do younger/lower hierarchy birds take more risks? Why feed in a group? How does this relate or compare to how we eat as humans?

Have students answer the following questions in their journals:

1. What are common characteristics of a feeding event?
2. Describe a scavenger.
3. Would you describe condors as "social?" Why?

FEEDING FRENZY II BIOLOGY G

Rationale

To understand the behaviors of the condors during feeding and their social structure, students will participate in feeding simulation activity.

Objectives

1. Students identify characteristics of a condor feeding event
2. Students understand the lifestyle of a scavenger
3. Students understand the social structure of a condor population
4. Students understand the social interactions condors have with competing scavengers at a feeding event

Aligned Standards

NGSS: Asking Questions, Defining Problems; Patterns and Structure, Function
LS2.D: Roles of ravens, turkey vultures, golden eagles, and condors in feeding events illustrate interactions and behaviors. Groups of condors work in a hierarchy to obtain food and compete with other animals at the feeding event.

Vocabulary

scavenger
feeding event
socialization

Materials

Supplies to create improv cards as needed

Tech Integration

Feeding photo library

Time

Day 2 of two-day lesson
Teaching time: one hour
(approximately)

PROCEDURE – DAY 2

IMAGES (15 minutes)

Begin by showing the Condor Feast video, "Feeding Other," and "Feeding" photos 1 - 3. Discuss the role and examples of a scavenger.

IMPROV (45 minutes)

Pass out improv cards to each student. Give students time to read their card; discuss the different roles as a class if necessary. Then guide the class by directing students through the first scenario. Encourage the students to be creative in their improvisation.

SCENARIO 1: Condor conservationists have just put out a carcass of dead meat for the California Condors to eat. But before the condors find the meat, Ravens and Turkey Vultures find the carcass first. As they begin feeding, California Condors circle overhead and perch in trees, ready to join the other birds at the feeding event.

SCENARIO 2: Condors and Turkey Vultures are together at a feeding event. Then an older California Condor begins to chase one of the juvenile condors around the feeding site to make sure the juvenile and all the other condors know the social structure of the group.

SCENARIO 3: Ravens and 2 condors are together at a feeding event. Then 3 Golden Eagles show up to feed as well.

SCENARIO 4: California Condors are feeding together with 3 ravens and 2 Turkey vultures. Then 1 Golden Eagle arrives and wants to feed as well. A little later on, a Mountain Lion comes to the feeding event.

FEEDING FRENZY II BIOLOGY G

FEEDING FRENZY II BIOLOGY G

You are a YOUNG CALIFORNIA CONDOR. You may show up to feeding events after ravens and turkey vultures. But remember to run away from any Mountain Lions. If there are more Golden Eagles than condors, you need to back up and let the Golden Eagles feed first.	You are a YOUNG CALIFORNIA CONDOR. You may show up to feeding events after ravens and turkey vultures. But remember to run away from any Mountain Lions. If there are more Golden Eagles than condors, you need to back up and let the Golden Eagles feed first.	You are a YOUNG CALIFORNIA CONDOR. You may show up to feeding events after ravens and turkey vultures. But remember to run away from any Mountain Lions. If there are more Golden Eagles than condors, you need to back up and let the Golden Eagles feed first.
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You are a GOLDEN EAGLE. You may show up to feeding events after ravens and turkey vultures. But remember to run away from any Mountain Lions. If there are more condors than Golden Eagles, you need to back up and let the condors feed first.	You are a GOLDEN EAGLE. You may show up to feeding events after ravens and turkey vultures. But remember to run away from any Mountain Lions. If there are more condors than Golden Eagles, you need to back up and let the condors feed first.	You are a MOUNTAIN LION. You may show up to the feeding event after other animals have been feeding. When you show up, the birds will leave the food alone!

FEEDING FRENZY II BIOLOGY G

Day 2 of two-day lesson
Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:
Learn about the ways to identify condors today. Visit numbering system to learn about how to identify condors. Visit condor watch to practice.

VARIATIONS:
Not all roles are needed; students can create a visual identifier for their role; make the cards into necklaces by taping a string on the back of the card long enough so that it can hang around the student's neck.

ELL MODIFICATION:
Translate the vocabulary words and give an image for each word.

Before you begin

Print and cut out improv cards for each student.

What to do

Scavengers are extremely important consumers; they help to clean up the environment. This function adds context for the condor feeding event and social environment.

Images

Begin the lesson by replaying the Condor Feast video and showing the “Feeding Other” and “Feeding” 1-3 photos from the Feeding Event photo library. Write the word “Scavenger” on the board. Ask students explain the role of a scavenger and give examples.

Pass out the prepared “improv cards.” Randomly select roles for each student. Give students 3 minutes to read their card and ask any questions about their role. Students are to be given the roles of: Raven, Turkey Vulture, Golden Eagle, juvenile condor, adult condor, and Mountain Lion. Have students hold on to their card throughout the activity.

Improv

Remind the students of the importance of social interactions between the same species and between different species. Spend time explaining the roles if students are unfamiliar with the animals represented.

When the students feel comfortable about their roles, guide the class by directing the students through the first scenario (copied below). Ask and guide with the following questions: “Who approaches first?” and “What happens when the condor arrives?” and “Which condor is first to the food?”

The activity should play out in such a way that the Ravens or Turkey Vultures show up to the event first. The condor and golden eagle can come next, but defer to the improv cards to know how the interaction between them is to play out. Answer questions as they arise during the game and be sure to discuss how each species feeds. Go over the differences between following the sense of smell vs. the sense of sight. Point out any differences as the students accurately portray them.

Scenario 1: Condor conservationists have just put out a carcass of dead meat for the condors to eat. But before the condors find the meat, Ravens and Turkey Vultures find the carcass first. As they begin feeding, California Condors circle overhead and perch in trees, ready to join the other birds at the feeding event.

Scenario 2: Condors and Turkey Vultures are together at a feeding event. Then an older California Condor begins to chase one of the juvenile condors around the feeding site to make sure the juvenile and all the other condors know the social structure of the group.

Scenario 3: Ravens and 2 condors are together at a feeding event. Then 3 Golden Eagles show up to feed as well.

Scenario 4: California Condors are feeding together with 3 ravens and 2 Turkey vultures. Then 1 Golden Eagle arrives and wants to feed as well. A little later on, a Mountain Lion comes to the feeding event.

Rationale

To understand the ecosystem in which the condor lives, students will brainstorm food webs with native and non-native plants and animals.

Objectives

1. Students identify characteristics of a food web and ecosystem
2. Students understand the lifestyle of a scavenger

Aligned Standards

NGSS: Asking Questions, Defining Problems, Communicating Information; Patterns, Causation, and Stability, Change
 LS1.B: Life cycles in the ecosystem including the condor have unique predator, prey, scavenger, and producer relationships.
 LS2.C: Illustrating the dynamics in the condor's ecosystem: availability of energy/food resources is demonstrated with predator, prey, scavenger, and producer relationships.

Time

One-day lesson
 Teaching time: one hour (approximately)

Materials

Yarn
 ID cards

Tech Integration

Feeding photo library

Vocabulary

ecosystem
 extinct
 endangered
 species
 habitat
 food web

PROCEDURE – DAY 1

CREATE (20 minutes)

Give each student a card with an animal or plant from the list on the following page. Each card can be made into a necklace with one piece of yarn. Creating their necklace allows students time to think individually about their animal or plant.

PLAY (30 minutes)

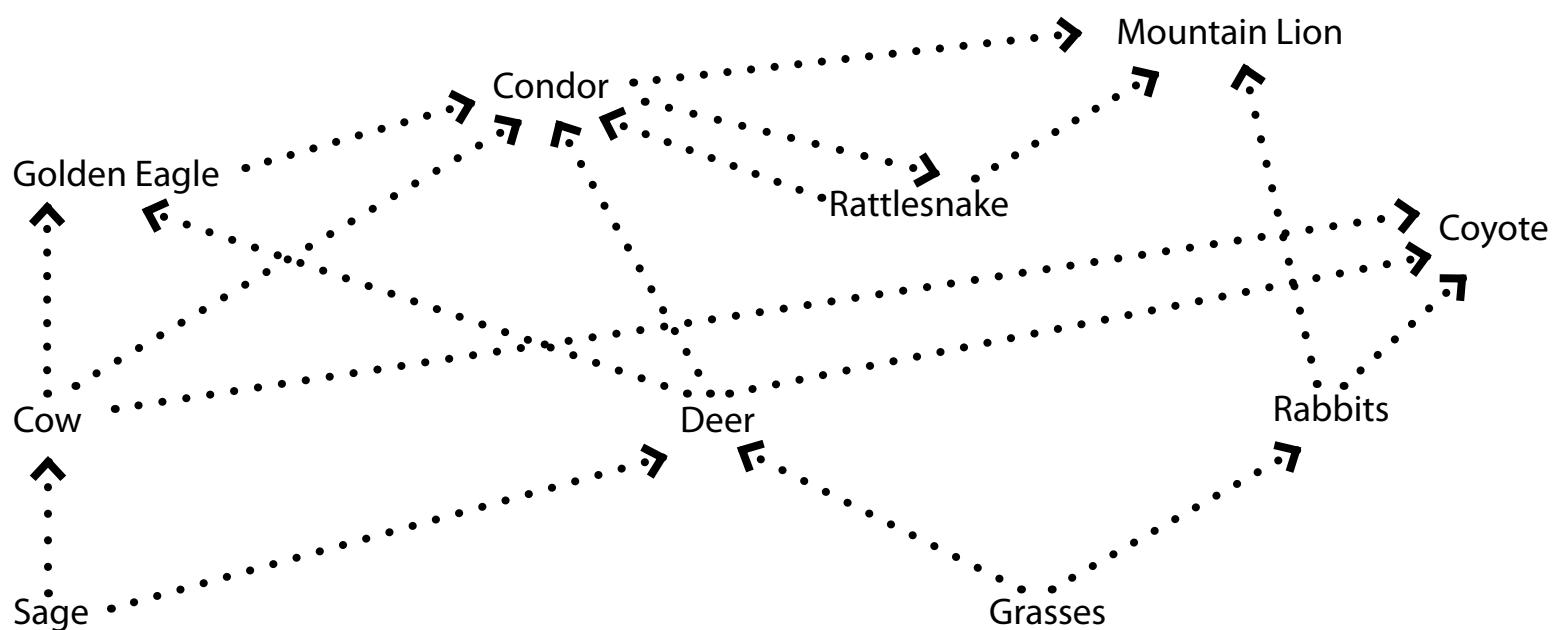
Begin the activity by freeze dance/jumping jacks, etc. Ask the students what fuels their activity. Transition from energy/fuel for the body into energy for the ecosystem.

Standing in a large circle, with the teacher starting as the Sun, throw the ball of yarn to a student while holding onto the end and explain the relationship (predator/prey/scavenger/producer or habitat relationship) between the Tosser and the Catcher. Each time the ball of yarn is thrown, the student throwing it holds onto her end so that a web is formed. Try modeling this activity with a few students at first. Then begin again and continue until a giant web is formed and all students have named one relationship. There must be a direct relationship between the Tosser and Catcher or the game begins again.

Ask the students what would happen if one species were eliminated due to a natural or human cause. Illustrate this by having that student drop his hold on the yarn. Emphasize role of scavenger.

Variation: have high school/older students lead the creation of webs in small groups.

Condor Food Web Example



IN THE ECOSYSTEM

PREY	PREDATOR	SCAVENGERS
Deer	Bobcat Mountain Lion Black Bear	California Condor Turkey Vulture
Cow		
Elk		
Pig		
Rabbit		
Sheep		
.....		
PREY AND PREDATOR	PREDATOR AND SCAVENGER	PLANTS/PRODUCERS
Rattlesnake	Golden Eagle Coyote Raven	California Poppy Black or white Sage Coast Live Oak Tree Manzanita Sycamore Tree Poison Oak Mugwort

Before you begin

Prep ID cards and a ball of yarn. ID cards can be made into necklaces. Wrap the yarn around a tennis ball so that it is easier to throw and catch.

What to do

Building upon the previous two lessons, social interactions and the scavenger life-style provide context for local ecosystems. The interplay of energy and food resources can be demonstrated with the predator, prey, and scavenger relationships.

Create

Begin by giving each student a card with an animal or plant from the list from the box titled "In the Ecosystem." If time permits, allow the students to create a necklace from their ID card. This will allow the students time to think individually about their plant or animal. They may decide to do a drawing of their plant or animal on the card. Walk around the classroom as the students create the necklaces to answer any questions. Help the students to figure out if their plant or animal is a consumer, producer, predator, scavenger, prey, or any combination of these.

Introduce new vocabulary words as they come up. An animal that is considered "prey" is hunted or caught by another animal. Predators are animals that do the hunting and catching of smaller or weaker animals. Scavengers are animals that eat left over parts of dead animals. Producers are usually plants. These plants create nutrients or food from a process that includes energy from the sun. Consumers cannot make their own food so they consume producers or other consumers.

Play

Have the students stand in a large circle in the classroom or the schoolyard. When the students are in the circle, have them do 30 seconds of jumping jacks. Ask the students what fuels their jumping jacks. Listen for the students to answer with ideas of energy or fuel for the body. Transition from fuel for the body to fuel for the ecosystem. Explain that, similarly to the way energy is needed to fuel exercise, energy is transferred within an ecosystem to fuel the included species.

Still standing in a circle, with the teacher starting as the "Sun," throw a ball of yarn to a student while holding on to the end and explain the relationship between the Tosser (the teacher) and the Catcher (eg. California Poppy). In this example, the Poppy uses the sunlight to produce energy. The teacher uses this explanation as justification for the toss. The Catcher (California Poppy) then becomes the Tosser and tosses the yarn to the new catcher while still holding on to the yarn. The toss justification should be given during or after the toss. Each time the ball of yarn is thrown, the student throwing it must hold onto her end so that a web is formed. (Variation: try modeling this activity with a few students first.) Any relationship explanation can be given between the Tosser and Catcher. There must be a direct relationship between the Tosser and Catcher or the game begins again. Continue the game until a giant web is formed and all students have named one relationship.

Ask the students what would happen if one species were eliminated due to a natural or human cause. Illustrate this by having the student drop his hold on the yarn. Emphasize the role of the scavenger. Highlight any time the condor or turkey vulture or another scavenger was mentioned as cleaning up the remains of a dead animal.

One-day lesson

Teaching time: one hour (approximately)



OPTIONAL EXTENSION:

Create a Native Plant Garden in the schoolyard to visit for this lesson and others. Students can encourage native plant life, learn watering and drought techniques, and observe native plant and animal species.

ELL MODIFICATION:

Translate vocab words in Spanish and give an image for each word.



OPTIONAL EXTENSION:

Invite parent volunteers or high school students to participate in the activity. Have the volunteer lead the creation of webs in small groups.



OPTIONAL EXTENSION:

If time permits, debrief the activity by having the students draw a food web in their journals. An example food web is given in the Lesson Overview resource page. Make sure the arrows point the correct way. Arrows point the direction in which energy flows.

ELL MODIFICATION: Use images and/or Spanish words for the food web.

Rationale

To understand the complexities of condor reproduction and nesting, students will illustrate the roles of condor families and conservationists.

Objectives

1. Students understand the roles of the condors and conservationists in breeding and nesting.
2. Students identify the typical characteristics of a condor nest site.

Aligned Standards

NGSS: Using Models, Conducting Investigations, and Using Mathematics; Structure, Function
LS3.A: Condors inherit and learn nest finding and egg laying skills from their parents (3-LS3-1). The environment also influences a condor's nest finding (3-LS3-2).

Time

Day 1 of three-day lesson
Teaching time: one hour (approximately)

Vocabulary

nest site
cavity
nesting
incubate

Tech Integration

Nest Tech photo library
Nest Cam use

Materials

Nest site videos, Nest Activity Materials: box, brown paint/paper/etc., pebbles, plastic egg

PROCEDURE – DAY 1

IMAGES (20 minutes)

Have students watch videos of condors nesting and wildlife biologists monitoring the nest sites. Discuss the characteristics of nest sites (i.e. cavity, cliffs, close to a roost). Discuss the purpose of a nest site. Focus on how each nest is different and specific to the needs and resources of each bird species. Look closely at one image of a nest site; ask the students to identify what they see (i.e color, materials, location). Connect the nest to a local habitat.

CREATE (40 minutes)

Give each student a shoebox-sized box, materials to make the outside of the box look like mountain terrain, pebbles, and an egg. If materials are available, have the students create a life-sized nest cavity to crawl into. Clarify that condors find their nest sites instead of building a nest in a tree or on the ground. When finished, students must hide their nests around the classroom. Discuss what condors look for in a nest (i.e. rocks, big trees, above ground, wind conditions).

EXPLORE

For the next two lessons, students will respond to scenarios and explore what it is like to monitor a condor nest. Their priority is to keep their nest safe and have "nest success." Nest success occurs when a chick hatches and successfully fledges, or learns how to take flight. Choose from the available scenarios in preparation for the next lessons, place the scenario card in each nest, and have students respond to the circumstances.

Chick hatched!	Chick hatched!	Predators (Ravens) spotted nearby	Predators (Ravens) spotted nearby
Egg rolled out of nest	Egg rolled out of nest	Check nest for microtrash	Check nest for microtrash
Condors are taking turns leaving the nest	Condors are taking turns leaving the nest	All condors have left nest area	All condors have left nest area

.....
Day 1 of three-day lesson
Teaching time: one hour
(approximately)

.....
**VISIBLE THINKING ROUTINE;
THINK, SEE, WONDER:
(Harvard Project Zero):**
“This routine encourages students
to make careful observations
and thoughtful interpretations.
It helps stimulate curiosity and
sets the stage for inquiry.

Ask students to make an observation about an object - it could be an artwork, image, artifact or topic - and follow up with what they think might be going on or what they think this observation might be. Encourage students to back up their interpretation with reasons. Ask students to think about what this makes them wonder about the object or topic.

The routine works best when a student responds by using the three stems together at the same time, i.e., “I see..., I think..., I wonder...” However, you may find that students begin by using one stem at a time, and that you need to scaffold each response with a follow up question for the next stem.

What do you see?
What do you think about that?
What does it make you wonder?”
www.visiblethinkingpz.org

Before you begin

For optimal effectiveness, this lesson set should be facilitated over the course of 3 consecutive days. Prepare to project videos and photos from Nest Techs photo library. Gather materials for sets of nests: brown paper, tissue paper, pebbles, shoe boxes, etc.

What to do

In the center of our conservation efforts to help condors reproduce in the wild is a specific practice called a “Nest Observation” done by “Wildlife Biologists” and “Nest Technicians.” Before a student is able to understand this important practice, it is important to understand the process of nesting and reproduction.

For background info on Nest Management see 2013 HMNWRC California Condor Recovery Program Annual Report section 2.4 “Nest Management” that begins on page 9.

Think, See, Wonder is a Visible Thinking Routine that initiates curiosity and cultivates inquiry. In this case, we will use a photo of a Nest Technician conducting an inspection in a condor nest.

Tell the class that they will participate in an activity called “Think, See, Wonder.” They will be shown an image that they may or may not have seen before. They will be asked to make an inference about what the image is. In their observation journals, they will complete these three statements: “I think..., I see..., I wonder..”

Consider appropriate responses with your students. Discuss in advance what they might see, why such things occur, and what an appropriate response might be. For example, discuss whether or not the students should yell “EWW!” or hide underneath a desk.

Images

If there are not any further questions, project image “Nest tech16” on a large screen in front of the class. Give the students a few minutes to examine the photo and then write their statements in their observation journals. Walk around and read over each student’s response as they are working. Occasionally ask for support for their claims. “I think” should be a statement that is visually supported or supported by previous experience or knowledge. “I see” should be an objective statement of the image. “I wonder” can be very open, as long as it is regarding the image. When they are done, ask if anyone would like to share their inferences and observations. Encourage all responses even if they are inaccurate. Carefully guide them to the conclusion that the photo is of a scientist (conservationist) who is inspecting a condor nest to ensure that the egg and/or parents are healthy.

Following the activity, have a brief discussion of what a nest is... What is its purpose? What does it look like? Who finds them? Project various photos of nests in general (nests photo library on website). Focus on how each nest is different and specific to a bird species based on its habitat and needs (i.e. hummingbird vs. crow, duck vs. vulture).

Then show an image or video of the condor nest. Looking closely at it, have students identify what they see. What is unique about it and why is it necessary (color, materials, location)? Have students watch videos of condors and biologists in nest sites from the Nest Tech photo library. In each photo or video, discuss the style of the nest site and have students point out key characteristics. Ask specifically, “What do you see in this condor nest? What is it made up of, and why do you think the condors chose this

NEST TECH TRAINING I BIOLOGY I-1

location?" You will be looking to hear the words "cavity," "cliffs," and "close to a roost."

Introduce vocabulary words as these words come up. A nest site is the location of the nest. A cavity is a small cave or hole in the side of a rocky cliff. Nesting is what birds do when they are preparing for their eggs to hatch. Different bird species have slightly different nesting behaviors. Incubating is the process of warming and caring for the egg. A Roost is a place for a condor to perch, such as a high branch.

Create

Now that the details of a condor nest have been explained, the class will create condor nests of their own. The activity can be done in small groups or pairs, depending on the class size and materials available. Explain that the nest they are creating will be the one they are in charge of and will be acting as nest observers for. Their goal is to have "Nest Success," meaning that their egg will hatch successfully and their hatchling will fledge (learn how to fly) successfully.

Each student pair or group is given a shoebox-sized box, materials to make the box brown in color, small pebble-like objects, and an egg. Tell the class they will have about 20 minutes to create their nests. Then they will be selecting a nest site in the classroom and leaving their nest there for the next 3 days.

Walk around while the groups are constructing their nests. Encourage the students to begin considering a good nest site; they should consider safety from predators, stability, a roost, and accessibility to food (hypothetically speaking). Be sure to clarify that condors do not "make" their nests but find them.

As the groups finish, help them place their boxes in the designated locations and have them look over the possible scenarios that might occur while the nests are "unattended."

If there is time, discuss what happens during one nesting period:

- Nests are entered about 5 times during the egg laying to chick fledging (first flight).
- Nest observers/monitors enter first to check for egg fertility. They hold a light to check if the egg has blood vessels and an embryo. They will go inside a trash bag so that it is dark to do this check. It looks hilarious.
- During later checks, they measure, weigh, and get blood samples from the chick; they sift for trash, vaccinate (only later entries), and record data on a sheet for each entry. Blood is taken at the nest but tested at the office.
- If the egg is infertile, they will replace the infertile egg with a dummy egg and then return to the nest with a foster egg that is about to hatch. The nest techs then switch out the dummy egg for the foster egg.
- Basically, the monitoring program wants to give condor pairs the best shot they have at hatching an egg in the wild and being reared in the wild. They think it is the best possible way to go for the population right now.
- Some signs they look for to see if they need to enter nests/check on chicks: possible predation, tail feather growth (a sign the chick is healthy or not healthy), injuries (broken legs, wings), lead in chick's blood, lead in parents' blood, death of parent or pair.

(After the class has left for the day, place an event card in each nest indicating activity that has taken place in their absence.)



OPTIONAL EXTENSION:
Participate in the "Introducing Nesting Birds" activity from the Cornell Lab of Ornithology.

ELL modification:

Translate the vocabulary words to Spanish. Have the ELL students write the word in both English and Spanish to be glued into their observation journals for reference.

Strategically pair students heterogeneously or balance the groups to have fairly equal ability.



OPTIONAL EXTENSION:
Instead of (or in addition to) having the class create small shoebox sized nests for each pair, have the students create a giant nest that they can crawl in to for nest examination. This can be completed with a large cardboard box.



OPTIONAL EXTENSION:
Students who finish early can explore the images in the photo gallery and use the Think, See, Wonder Routine in their Observation Journals. They can also journal their thoughts about "replacement clutching."

NEST TECH TRAINING II BIOLOGY I-2

Rationale

To understand the complexities of condor nesting and captive rearing, students will illustrate the roles of condor families and conservationists.

Time

Day 2 of three-day lesson
Teaching time: one hour
(approximately)

Objectives

1. Students understand the roles of the condors and conservationists in breeding and nesting in captivity and the wild.
2. Students identify the typical dynamics of a condor family: incubating, mated pairs, brooding, etc.
3. Students chart nest success.

Aligned Standards

NGSS: Communicating Information; Patterns
LS4.D: Condor populations throughout California live in different areas of similar habitats as well as distinctly different habitats that support the same biological needs (i.e. Coastal coniferous forests vs. chaparral vs. high desert). Changes in the habitat from predators, humans, weather, trash, etc. will affect nest success.
3.MD.B.3: Draw graphs to represent data sets.

Vocabulary

nest technician
fledge
captive rearing

Materials

Data table, charting or graphing materials, including paper and pencils

Tech Integration

Nest Tech photo library
Nest Cam use

PROCEDURE – DAY 2

IMAGES (10 minutes)

Teacher reviews photos or video illustrating conservationists and condor relationships and connections to Nest Activity from previous lessons.

GRAPH (30 minutes)

Given data on nest success, students chart nest success using images, bar charts, or dot graphs. The teacher should frame this activity as if the students were conservationists, monitoring nest success. (Are the nests successful? What might they need to observe to gain more data?)

EXPLORE (20 minutes)

Examine event cards that have been previously placed by the teacher. Students should respond with an event that describes their actions and place it in their nest. Once more, in preparation for the next lesson, the teacher “responds” with a second event placed in each nest.

NEST TECH TRAINING II BIOLOGY I-2

The data collected on the number of eggs hatched in southern California does not include eggs in the captive population; this data reflects trends in wild eggs only.

Breeding began in the wild in 2001 in southern California with limited success. In contrast, the flock in Arizona after reintroduction was initially more successful. Some of the problems identified in the SoCal nests were: trash in the nests and in the crops and stomachs of condor, eggs not hatching, predation, and illness. Nest monitoring began. Nest success has since improved, probably due to conservation efforts such as nest monitoring, replacing eggs, and trash clean ups.

Data collected by Mee, Hamber, and Sinclair. From “Low Nest Success in a Reintroduced Population of California Condors” from *California Condors in the 21st Century* ed. Mee and Hall, p. 167.

Create a visual representation of:

YEAR	NO. OF BREEDING PAIRS	NO. EGGS LAID	NO. EGGS HATCHED	NO. CHICKS FLEDGED
2001	2	3	0	0
2002	3	3	3	0
2003	1	1	1	0
2004	3	3	3	1
2005	3	3	1	0

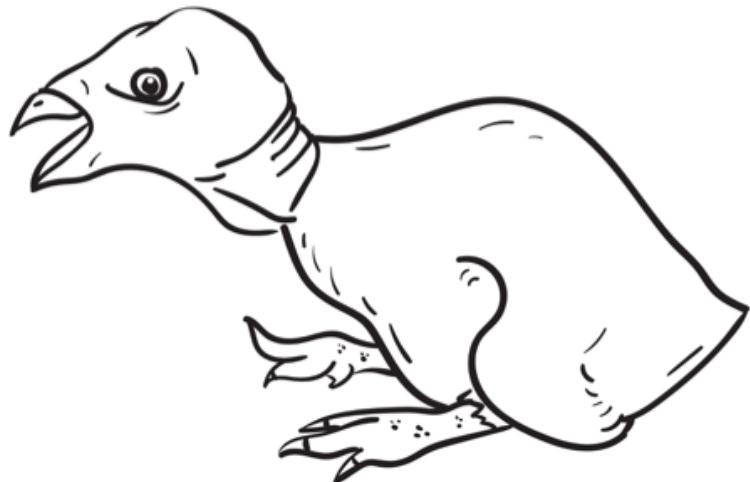
VARIATION:

Compare the following in a line plot graph: year, number of eggs hatched, and number of eggs laid.

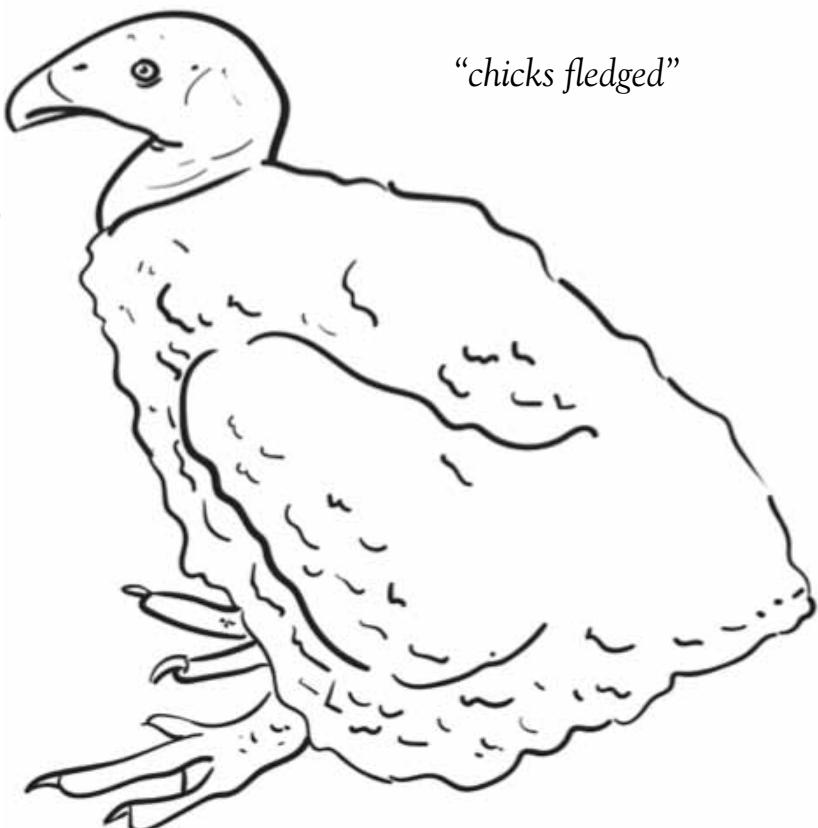
Compare in bar charts: number of chicks fledged.

Use these images in a poster-sized visual chart for the number of breeding pairs, number of eggs hatched, and number of chicks fledged.

“chicks hatched”



“chicks fledged”



“breeding pairs”



Before you begin

Prep poster graph materials. Enlarge the illustrations for use in a large poster chart.

What to do

As the class returns on the second day, inform them that nest activity has occurred overnight. They may choose to look at the event cards in their nests; however, they will not be referring to it directly until the end of the day's lesson.

The class will be accessing the nest cams to observe actual nests in real time.

Show the list of possible scenarios (event cards) to the class. Discuss what a nest technician might be looking for when (s)he inspects a nest. Do any of the nest cam nests seem to reflect any of these scenarios?

Inform the class that we will be examining how successful nesting has been over the past few years. Give them some statistics and ask them to infer... How many condors were there in the wild 100 years ago? 50? 20? Now? In the past 50 years, how many condor eggs do you think successfully hatched in the wild? Write their inferences on the board.

Taking on the role of Nest Technicians, ask the students to imagine going to check on these nests over long periods of time, monitoring every detail, and trying to determine how to help. Project the data table or draw a large version of one on the board. Divide the class into pairs. Then pass out the table of information on nest success and materials for charting/graphing. This includes larger images for students to place on a poster size graph they create or graph paper and pencils. For the poster-sized visual chart, have the students cut out the number of images necessary for their chart according to the data. In the column for number of eggs laid, have the students draw one egg or three eggs, depending on the data given. The poster should look like the table paired with this lesson. Students should glue the corresponding images onto the correct square as an illustration of the data. Fill in the visual chart one year at a time, emphasizing that the reintroduced condors had little success when released to the wild during the years in the nest success table of data.

Use variations to manipulate the data in graph form. Instruct the students to graph the data from the nest success table with the year as the x-axis and the number of chicks hatched as the y-axis. Discuss the trend.

Discuss the practice of captive-rearing and replacement-clutching. Wildlife biologists have raised chicks in a captive-environment, using puppets to cover their hands when feeding the chicks. This is part of captive-rearing. When necessary, nest techs will take an unfertilized egg from a wild nest, replace the condor's egg with a dummy egg, and replace the dummy egg with an egg from a breeding facility that is ready to hatch. Sometimes a fertilized egg can be removed from a captive or wild nest for captive-rearing, and the condors will produce another egg as a replacement. This is what is known as replacement-clutching. Not all bird species are capable of replacement-clutching.

Have the class infer why the statistics are so grim. Why would a nest be unsuccessful? What types of actions do you think the nest observers wanted to try?

Now have the students check on the status of their nests. With the information they have learned today, ask them to discuss as a group how to proceed in caring for their nest. Have them fill out an event card of their own to communicate the action they are taking as nest technicians. After placing it in their nest, have them individually journal their thoughts.

(After the class has left for the day, place an event card in each nest indicating activity that has taken place in response to their chosen action.)

.....

ELL MODIFICATION:
By using images in our graphing, ELL students are able to have visual access to the content or label them in Spanish.

NEST TECH TRAINING II BIOLOGY I-2

Year	Number of Breeding Pairs	Number of Eggs Laid	Number of Eggs Hatched	Number of Chicks Fledged

NEST TECH TRAINING III BIOLOGY I-3

Rationale

To understand the complexities of condor breeding and nesting, students will illustrate the roles of condor families and wildlife biologists.

Objectives

1. Students understand the roles of the condors and wildlife biologists in breeding and nesting.
2. Students identify the typical characteristics of a condor nest site.

Aligned Standards

NGSS: Using Models, Conducting Investigations, and Designing Solutions; Structure, Function
LS3.A: Condors inherit and learn egg laying, brooding, and protecting skills from their parents (3-LS3-1). Events occurring to nests will illustrate interactions with the environment.
LS1.B: Nest success is essential to the continued existence of condors. Condors begin reproducing at age 6, yet amid habitat threat. (3-LS1-1)

Time

Day 3 of three-day lesson
Teaching time: one hour (approximately)

Vocabulary

nest technician
nesting
incubate
brooding
predators

Materials

Nest created in previous class, event cards

Tech Integration

Nest Tech photo library
Nest Cam use

PROCEDURE – DAY 3

EXPLORE (20 minutes)

Leave event cards to indicate events that occurred overnight and indicate paths of successes and failures. Explain each nest has a new set of circumstances that will lead to either nest success or failure. Spend time as a team discussing further action (enter nest to check egg, replace with a captive egg, continue to monitor with no nest entry, etc.). Be sure to note that not all nests have the same amount of trash or monitoring needed.

The more nests there are, the less nest management may be necessary.

JOURNAL (20 minutes)

Students share their experiences caring for their egg. What was successful and what would they do differently? Allow plenty of time for questions and for students to share specific anecdotes.

View the California Condor Cam's chick that hatched on April 11, 2015:

<http://www.endextinction.org/condor-cam>

Optional story to scroll through: <https://endextinction.exposure.co/helping-hands-for-sisquoc>

Before you begin

Leave event cards out for nest tech groups to find.

What to do

Explore

Upon returning to the classroom on the third day of the lesson series, students will go directly to their nests to read their newest event cards. In their pairs or groups, the students will discuss how to proceed and provide reasoning to support their decisions. Inform them that they will be sharing their experiences with their nest in presentation form.

During this time of discussion and reflection, walk around to monitor each group. Listen in to their dialogue and redirect when necessary. The teams will need strong evidence for their actions to determine the success or failure of their nest.

Spend about 30 minutes allowing teams to volunteer to share their experience and whether or not they think their nest should succeed or fail. Encourage sharing regardless of the outcome. The purpose of individual experiences is to learn from each other.

Consider repeating the “Introducing Nesting Birds” activity from Cornell Lab of Ornithology to affirm the students’ learning from the three day lesson.

Rationale

In order to identify the age of a condor and other information based the condor's appearance, students will illustrate condors at different ages.

Aligned Standards

NGSS: Communicating Information; Patterns and Scale
LS1.B: Stages of the condor life cycle, growth, and development are illustrated through size and color. (3-LS1-1)

Vocabulary

hatchling
nestling
juvenile
sub-adult
adult

Materials

Art materials: crayons, pencils, markers, colored paper, cotton balls, textured material, etc.

Objectives

1. Students identify characteristics of condors at different ages
2. Students infer information from a condor's appearance

Time

Teaching time: one hour (approximately)

Tech Integration

Photos of condors at different stages of life

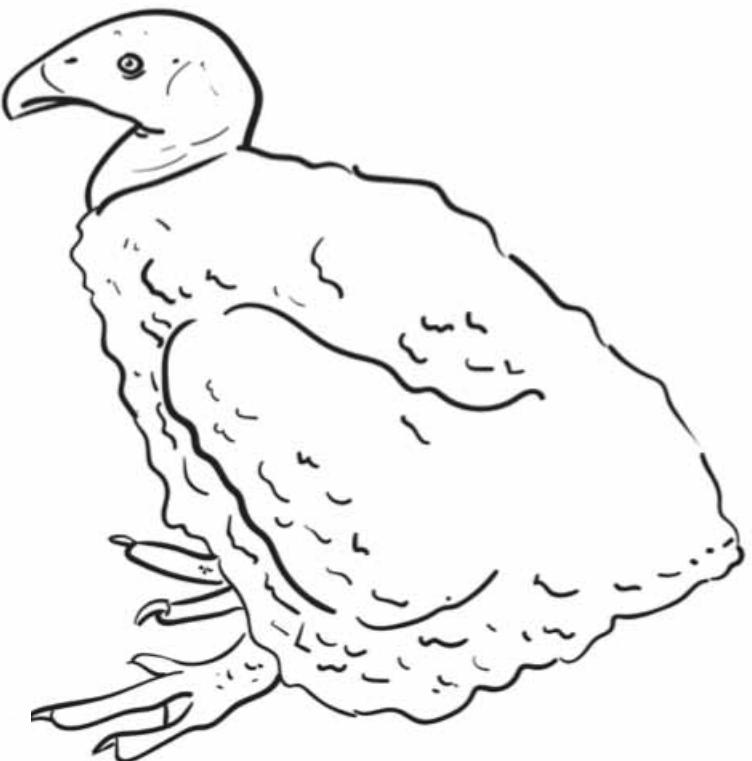
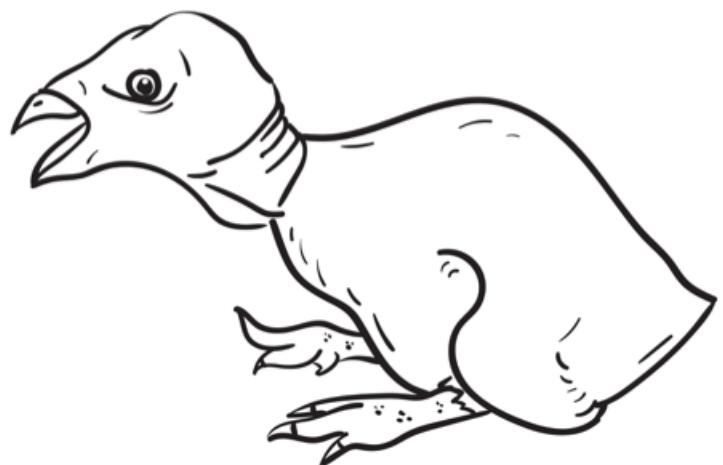
PROCEDURE – DAY 1

IMAGES (20 minutes)

Use photos of condors to show students different ages or life stages of the California condor from the colors of condor wings, heads, feathers, etc. Students should identify each condor's age range and abilities based on those differences.

CREATE (40 minutes)

Students illustrate the differences between condors with materials given. Students must illustrate a hatchling, nestling, juvenile, sub-adult, and adult.



Before you begin

Prepare to project images of condors from various photo libraries. Print out the corresponding page with condor illustrations for each student.

What to do

In the center of our conservation clear visual cues help us identify certain facts about condors. The wing tag is an easy cue to determine whether or not the bird in question is a condor. Age is the typical characteristic to identify by a condor's size and color. The sex of the bird, however, can't be determined by size or color.

Images

This lesson could be used during class time specified for art. Begin the lesson by projecting images from the "Stages of Life" photo library. Photos in the library are not given in order of age. You may choose to order the photos chronologically ahead of time, or keep them in a mixed order. Have the students guess the color and texture of the condor's feathers (see Optional Extension 1). Have the students guess the ages of the condors in the images. See if the students can spot the wing tags. Ask the students if the condor in the image projected is able to fly, forage, feed a chick, etc.

The condor chicks that have just hatched will be much smaller than the condor nestlings that have lived in the nest for a month or two. The hatchling will have peach colored skin on its head, a light gray colored beak, black eyes, and fuzzy white feathers. The nestling will have gray and white feathers, a beak from gray to black in color, gray or black colored eyes, and gray-peach colored skin on its head. Nestlings often exercise in and around the nest site to build muscles, especially for flight.

A juvenile condor has small black feather on gray head skin, gray to brown eyes, and a black beak. The juvenile condor has all black feathers with no white feathers on the underside of the wings. Juvenile condors have "fledged," meaning they have taken a first flight and are able to soar and forage with adult condors. At around 5 to 6 years of age, the "sub-adult" condor will have white feathers coming in on the underside of its wings. The skin on the head will have fewer small black feathers and the skin will be changing to an orange-pink color. The adult condor will have white feathers on the underside of the wing, an orange and pink colored head and neck with very few black feathers, a white beak, and red eyes. Adult condors have the potential to mate and take care of eggs, chicks, etc.

Create

After going through the pictures, pass out the condor portrait template resource page found in the Lesson Overview. Given various art supplies (cotton balls, crayons, markers, glossy paper, etc.), have the students illustrate the different life stages of the condor. Make sure each student adds color and labels to each condor. Possible labels may include: hatchling, nestling, juvenile, sub-adult, and adult. Walk around the classroom and assist students. Refer to the Stages of Life photo library as necessary.

.....
Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:

Since the students might already know the size or feather colors of condors at different ages, try quizzing the students before the photos from the Stages of Life photo library appear. Include all students by having them raise their hands if they agree on any guesses. For example, the teacher can ask, "What do the feathers of condor chicks look like?" before projecting the picture. A student may offer the answer "fluffy and white." The teacher may respond,

"Raise your hand if you think the feathers may be fluffy and white."

Students are given a moment to raise their hands. Then the teacher may ask for a second guess or may show the image of the chick.



OPTIONAL EXTENSION:

Using the illustrations provided, have the students create a flip book to show the change in color of the condor's appearance over time.

ELL MODIFICATION:

Translate the labels for each illustration into Spanish.

CONDOR KIDS GEOGRAPHY

CONDOR COUNTRY I	GEOGRAPHY A	51-52
CONDOR COUNTRY II	GEOGRAPHY B	53-57
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CONDOR COUNTRY I GEOGRAPHY A

Rationale

To understand the different landforms and geographic features surrounding the nest sites of California Condors, students work to identify different landforms and infer characteristics of the condor from their geographic location.

Objectives

1. Students identify landforms in condor territory
2. Students understand the typical characteristics of a condor nest site

Aligned Standards

NGSS: Communicating Information; Systems
LS2.C: Condor nest sites and local landforms offer resources and temperatures, which affect reproduction and survival.
LS 4.D: Nest sites vary in distance to human populations and affect the relationships between condors and humans.

Vocabulary

nest site
cavity

Tech Integration

Nest Sites photo library

Materials

Images of nest sites

PROCEDURE – DAY 1

IMAGES (20 minutes)

Students receive images of nest sites either individually or in groups. Frame the lesson by explaining the need for conservationists and condor observers to be aware of what nest sites look like and where they are located. We need to identify geographic landforms to guess where the nest site could be located. In pairs or individually, have the students make lists of the landforms and locate the nest site on the image.

EXTENSION (30 minutes)

Visit yardmap.org and following the instructional video, have students map out the school grounds, a nearby park, or their homes. This is a free, interactive, citizen science mapping project. It encourages learning about local habitats and low impact land use.

EXPLORE (20 minutes)

The teacher leads a discussion of landforms identified by students and guides the students to make inferences of why nest sites are located in the geography seen in the images.

.....
Day 1 of two-day lesson
Teaching time: one hour
(approximately)

SUPPLEMENTAL INSTRUCTION:

If needed, a Unit on General Landforms and Biomes to help students differentiate the condor's habitat from others that exist around the world can support this lesson.



OPTIONAL EXTENSION:

Create a Native Plant Garden in the schoolyard to visit in this lesson and others. Students can encourage native plant life, learn watering and drought techniques, and observe native plant and animal species.



OPTIONAL EXTENSION:

Guide the class discussion toward the remoteness of the nest sites in the images. Where do they think these photos were taken? Do they think there are homes, streets, and populations of people nearby? If so, how might this affect the nesting process and why would the condors choose to stay there?

Before you begin

Prepare to project photos of landforms and nest sites from the corresponding photo libraries.

What to do

If possible, a Unit on Unique Landforms and Biomes should be taught prior to this learning set.

Every species lives in a habitat that supports its survival. The condor in many ways is fit for a certain type of habitat. Think about some of the physical features that we have learned about previously: size, food source, and flight ability.

Images

Begin by reviewing previously taught landforms. Discuss what the differences are between mountains and other landforms: Desert, Chaparral, and other biomes. Project or pass out copies of image "nest site 9" and ask the students what type of land-form they see, and what biome they believe it to be a part of. Why would condors live in this type of habitat?

Looking at image "nest site 7"; it is clear that the condors' nest is in a mountainous cavity. Ask the students to infer why they think this is. Have any of them seen a place like this before?

Next, focus on image "nest site 11" and have the class identify the nest site. Why do they think the condors have chosen this site? What features would make this a good/bad choice? (A Perch is necessary for watching for predators).

After going through your selected images, have the class work in small groups or pairs to discuss what features are important for the survival of all living things (food, water, shelter). Have them journal which features they can identify in the images and how this information might help conservationists be more effective.

Explore

If you would like to extend the lesson, visit yardmap.org to map out the schoolyard, a nearby park, or a student's home. This activity is web-based, interactive, free, and promotes learning about local habitats and low-impact land use. Have the activity open and available on the computer before the lesson begins. You will need to click the "Join YardMap" button on the yardmap.org page. Once you are signed up, the students can create yard maps. If you create an account, you may return to yardmap.org later on and click "sign in" at the top right to return to your account.

Have students work in groups to draw a map of their local park, school, etc. Encourage them to think about local habitats and the birds from the Biofacts biology lesson that dwell in these habitats.

(End of lesson 1 of 2)

CONDOR COUNTRY II GEOGRAPHY B

Rationale

Recreating the landscape of condor territory, students will understand the natural habitat of the condors and be aware of the differences between nesting and foraging territory.

Aligned Standards

NGSS: Communicating Information; Systems
LS2.C: Condor nest sites and local landforms supply resources, which affect condor reproduction and survival.

Vocabulary

habitat
nesting
foraging

Tech Integration

Maps photo library
Nest Sites photo library
Google Maps and Google Earth

Objectives

1. Students identify and represent landforms in condor habitat
2. Students understand the necessary resources for condors

Time

Day 2 of two-day lesson
Teaching time: one hour (approximately)

Materials

Images of nest sites
Clay or paper for habitat representation
If paper theater: scissors, tape/glue, pencils/crayons
Templates if necessary

PROCEDURE – DAY 2

IMAGES (10 minutes)

Facilitate a student review of nest site images from the previous lesson in class-encompassing PowerPoint format or individually via tablet.

CREATE (40 minutes)

Distribute materials for habitat illustration (clay or paper, depending on materials). Students are required to show the following in their habitat: 1. A nest site, 2. Water source, 3. A perch. Students display and explain their habitat in small groups.

Variation: create condor or carrion characters glued on Popsicle® sticks. Add these to the theater.

Day 2 of two-day lesson
Teaching time: one hour
(approximately)

CONNECT, EXTEND, CHALLENGE

THINKING ROUTINE:

"This routine works well with the whole class, in small groups or individually. Keep a visible record of students' ideas. In small groups, ask students to share some of their thoughts and begin a collection of ideas in each of the three categories. You will have students write their individual responses on post-it notes and add them to a class chart on the board. Keep students' visible thinking alive over time: Continually add new ideas to the lists and revisit the ideas and questions on the chart as students' understanding around a topic develops."

Before you begin

Prepare to project photos of landforms and nest sites from the corresponding photo libraries. Gather materials for condor theaters: land-form and tree-line templates, glue, colored paper, card stock, scissors, etc.

What to do

Connect, Extend, Challenge

"This routine helps students make connections between new ideas and prior knowledge. It also encourages them to take stock of ongoing questions, puzzles, and difficulties as they reflect on what they are learning."

On the board or on an easel, create 3 columns and label them "Connect," "Extend," and "Challenge." When the class is ready, ask them to reflect on the previous lesson about the condor's habitat. You might choose to project an image to refresh their memories.

CONNECT: How are the ideas and information about landforms CONNECTED to what you already knew?

EXTEND: What new ideas did you get that EXTENDED or pushed your thinking in new directions?

CHALLENGE: What is still CHALLENGING or confusing for you to get your mind around? What questions, wonderings, or puzzles do you now have?"

Students can record their responses in their observation journals or write them on post-it notes to put under each column. Ask for volunteers to share one or all of their responses. If a student is challenged or confused about a concept, provide additional information to clarify or suggest that further research be conducted. This may be a good opportunity for an individualized learning project.

Once the discussion has concluded, tell the class that they will be creating a 3-D theater to demonstrate what a nest site looks like. This will be done with cardboard, construction paper, and various colors of card stock. Before passing out materials, first display the finished project at the front of the room, holding up materials while describing each step. You can go through the process a second time with the class following along to ensure a successful outcome.

1. Take 2 sheets of construction paper, each 7 inches square. Use a ruler to divide them into ten $\frac{3}{4}$ inch lines. Fold along the lines to make two accordion shapes for the sides of your theater.
2. Glue the accordion shapes to the 4 inch sides of the cardboard base. Your theater is complete.
3. To create the nest site scene, have students choose a sheet of card stock for background color (white or blue works well). They may choose to add details that they may find in the sky at a nest site, such as other condors, predators, or the sun/clouds. These details should be very small and faint as they are far from the site itself. Slide this sheet into the rear of theater between the accordion folds.
4. The remaining card stock sheets will be for different features of the habitat. Have the students choose a color for the mountains. Placing it landscape (9 inches across the bottom), near the top of the sheet, draw the mountaintop and cut it out with scissors. Using markers or paints, add details to the mountain, such as crevices and cavities where the nests may be found. A featured nest site should be indicated.

CONDOR COUNTRY II GEOGRAPHY B

5. Choose a color to represent trees, foliage, or rocks that might act as a perch near the nest site. This can be done by drawing out the perch and surrounding shrubs, lower than the mountaintop, and cutting across with scissors. Keep in mind that all card stock should maintain a width of 9 inches.
6. Another color should be chosen for the base of the mountain, indicating a water source. Cut along this one about 2 inches from the bottom so it drops to the lowest level of the theater.
7. Place cards into the theater in order to create a 3-D effect of the Condor's habitat.

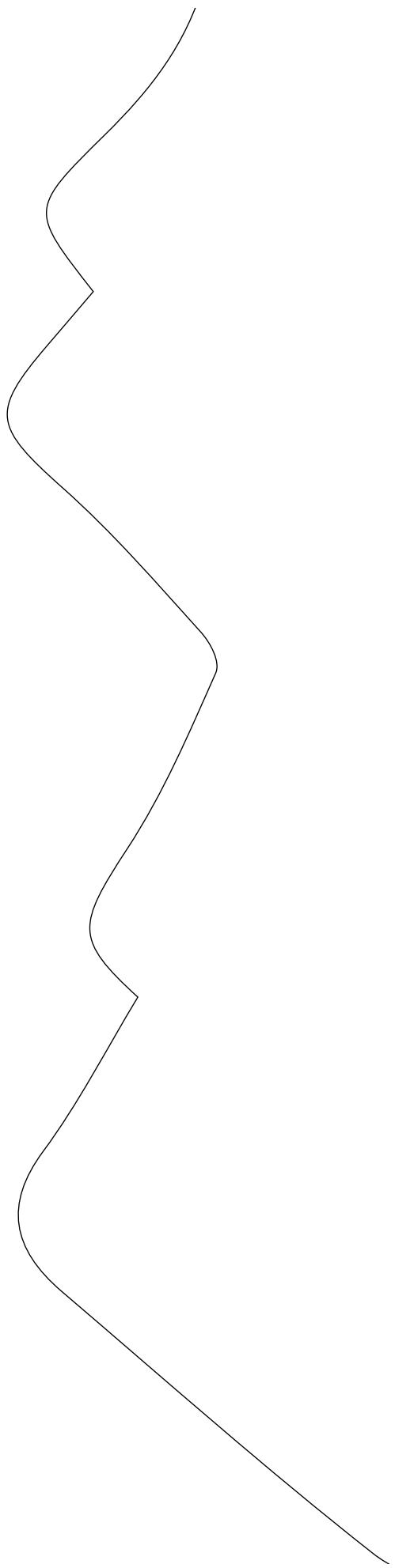
When everyone is finished, have the students place their theaters on their desks and allow them to individually share the features they included.



OPTIONAL EXTENSION: For steps 4 and 5, use given templates for mountains and tree line.

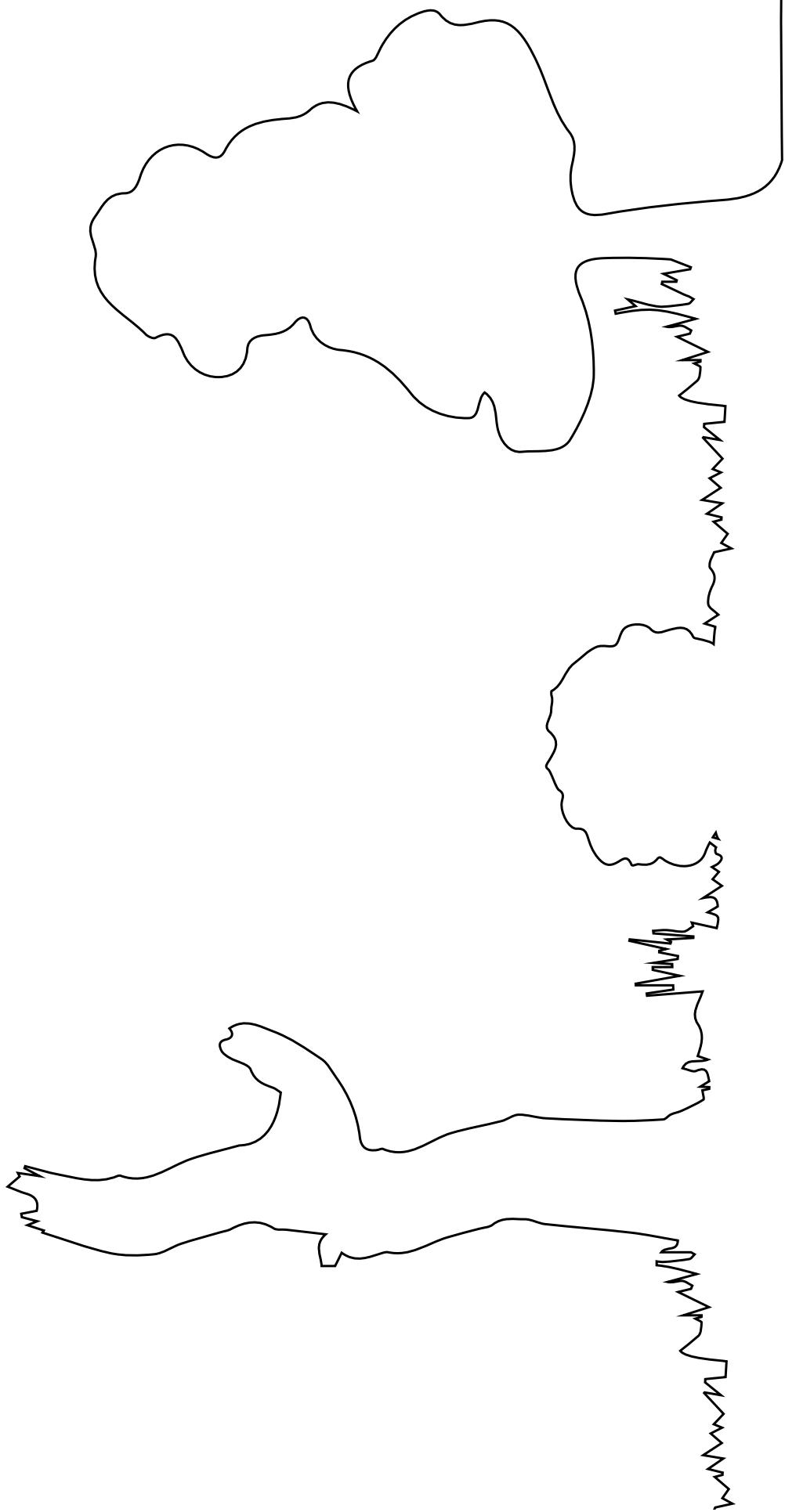


OPTIONAL EXTENSION: You may choose to have students create a frame for the front of their theater that resembles rocks or shrubs.



CONDOR COUNTRY II GEOGRAPHY B

Optional Mountain & Tree line



RADICAL RANGE GEOGRAPHY C

Rationale

To understand the topics of and relationships between population and range of condors, students will participate in a range fluctuation activity.

Objectives

1. Students understand the affects of range reduction on a population
2. Students begin to identify reason for habitat loss

Aligned Standards

NGSS: Asking Questions, Defining Problems and Analyzing Data and Using Mathematics; Causation and Scale and Stability, Change
LS 4.D: Nest sites vary in distance to human populations and affect the relationships between condors and humans.

Vocabulary

habitat
range
forage
endangered
extinct
survey

Materials

Rope

Tech Integration

Maps illustrating historic range and current range

Time

One-day lesson
Teaching time: one hour
(approximately)

PROCEDURE – DAY 1

EXPLORE (30 minutes)

Divide students in two groups: condors and range holders. The range holders, along with the teacher, stand in a large circle with a rope. The condors fly around the “territory” created by the rope. The teacher then cuts the rope or tells the range holders to take giant steps towards the middle (to illustrate a decrease in range). Discuss the affect on the condor population as the range shrinks. Ask condors to leave the range for unknown reasons. Condors that have left the inner rope area may become rope holders. This process should continue until one condor is left (AC-9 was the final condor in the wild when conservationists began trapping the condors in the early 1980s). The process is reversed as the “Conservation Program” begins. Increase the range and little by little allow condors into the territory.

JOURNAL (20 minutes)

Debrief activity verbally or through journaling about causes for habitat loss and the importance of habitat for animals.

Before you begin

Obtain a long rope, about 30' in length.

What to do

A significant concern in the sustainability of condor conservation is the fluctuation in the condor's ability to travel across its natural range.

Explore

This activity should be conducted outdoors in a large, open space. Students will need to listen carefully to your instructions during the activity.

Describe the activity before beginning: this exercise is intended to give students an idea of how the condor's "range" or space for travel has changed over time. Ask the students why range might be important. Guide responses to considering the physical size of the condor, where they nest, then how they hunt and what they hunt. One group of students will be designated "condors" and another will be "range holders." Encourage students to observe the behavior of "condors" as the range fluctuates. (Instruct the "condors" to behave realistically, soaring and looking for food.) They will be asked to share their observations in class.

Divide the class into the two groups and have the "range holders" stand in a large circle with the rope fully extended. Explain in a loud voice that this is how the condors lived over 100 years ago, before recent major changes in their environment. Have the "condors" run through the space provided inside the rope. It should be clear that they have a sense of freedom and plenty of space for one another.

Ask the condors to gather in the middle of the circle while you fold the rope in half. Have the range holders now create the circle, at half its area, and ask the condors to attempt to soar through the space. There should be a noticeable difference in their behavior due to the lack of space. Slowly remove half of the condors from the center of the circle and ask them to have a seat. Fold the rope in half again, and have the range holders re-create the circle (now $\frac{1}{4}$ of the original area). This should show a drastic change in the condors' ability to fly freely. Remove all but one of the condors and ask him or her to sit out with the others. The last lonely condor should continue flying.

Once the students are able to observe these changes, have the range holders drop the rope, and ask the entire class to gather in the center for a brief discussion.

Ask what they observed when the area shrunk to half of its original size, then what they observed when it was small. Inform them that this was what happened right before the Conservation Program began in the early 1980s. This was when conservationists decided to trap the few remaining condors for a program hoping to breed condors in captivity. What do they think caused the range to shrink so drastically? (Possible responses: People moved into their habitat, condors couldn't find food, there were no safe places to nest, etc.) What options do you think conservationists came up with? What would've happened if the conservationists did not intervene? (The population might have continued to decrease until they were extinct.)

If there is time, demonstrate the restoration of the condor's habitat by reversing the activity: going from the small area, slowly to the larger area, and then to the largest area with the rope fully extended. Note that the present range is not the same as the historic range.

One-day lesson

Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:

Have the students return to the classroom and journal about the activity and what it represented.

Have them add their opinions about habitat loss, how it makes them feel to know animals have less space to survive, and possibly an argument about why we should make habitat conservation a priority.

FANTASTIC FLIGHT GEOGRAPHY D

Rationale

To understand the amount and range of flight of the condor, students will observe and track flights of specific condors.

Objectives

1. Students understand the capabilities of a condor's flight in day periods
2. Students collect and track data of condor flights

Aligned Standards

NGSS: Asking Questions, Defining Problems and Analyzing Data and Using Mathematics; Causation and Scale and Stability, Change
LS 4.C: Condors are adapted for long-range flight in their habitat.
LS 2.C: Condors have adapted their range from the availability of resources, the population of condors, and the changing physical landscape of their habitat.
3.MD.B.4: Measuring Lengths

Time

One-day lesson
Teaching time: one hour (approximately)

Materials

Maps

Tech Integration

Maps illustrating historic range and current range
Use Google Earth to look at the geography of the region

Vocabulary

habitat
range
forage
endangered
extinct

PROCEDURE – DAY 1

IMAGES (15 minutes)

Show students the image of Condor 513's flight. Class should locate Fillmore, familiar cities, and familiar landforms. They should discuss the distance traveled, the range they recognize, and the size of the condor (relative to Biology C).

EXPLORE (40 minutes)

Depending on student level, students rotate through stations.

Station 1: Students arrange the printed photos of condor 107's flight in sequence order.

Station 2: Students measure the distance traveled of condor 513. They should measure point to point, writing in the distance in miles in between points. Estimates of distance traveled can be displayed in poster form where each student records his or her estimation of distance traveled. (There is a measurement scale at the bottom of the image to use.)

Station 3: (This station can be a daily class activity.) Students predict, track, and measure the flight of condor 648, given the successive map images.

FANTASTIC FLIGHT GEOGRAPHY D

Before you begin

Prep a digital display of the image of Condor 513's flight from the Map photo library.

Create three distinct stations around the classroom. Prep Station 1 with printed images of Condor 107's flight from the Map photo library. The images can be in a pile on the station's table. Prep Station 2 with a printed image of Condor 513's flight. This station works best with the largest size print of Condor 513's flight available. Add rulers and string to this station as tools for measuring.

Prep Station 3 with printed images of Condor 648's flight found in the Map photo library. Place images individually in folders with the sequence number written on the front of the folder. Place a sheet of paper in the folder where students can write down their predictions for the condor's flight. During the activity, students will look at one image at a time and try to predict the flight path of the condor. The folders act as a hiding mechanism so that the students do not see the next image in the sequence before completing the station's tasks with the previous image.

What to do

Images - Display the image of Condor 513's flight. Ask students to describe what they see. Students should be encouraged to explain what a map shows to viewers, what the data (dots and lines) are documenting, how the scale at the bottom right of the image can be used, any landmarks they recognize, what the stars represent, and what the colors on the map represent. Assist the students in locating familiar cities on the map.

When the class has become familiar with the map, explain the stations that are set up around the classroom. Give the students directions for each station. Split the class into three groups and explain they will have 10 minutes at each station.

Explore - At Station 1 students are to arrange the printed photos of Condor 107's flight in order. The nine photos on the table at Station 1 are out of order and need to be lined up in sequence correctly. This can be done on a long table or on the floor. The teacher should monitor the station as she walks around the classroom. At this station, ask the students to point out familiar cities. Ask the students where the condor is traveling: through the mountains or along open fields? Ask students to name reasons why a condor would fly in mountainous areas instead of valleys. Remind students about the importance of nesting sites.

At Station 2 students are to measure the distance traveled of Condor 513. Using rulers or string, students should measure point to point, writing down the distance in miles in between points on a separate paper or journal. Remind students that there is a measurement scale at the bottom of the image.

Have the students use rulers and help them convert inches to miles based on the scale. Students using the string to measure Condor 513's flight may want to place the string on the image and cut pieces the same length as the distance from one point to the next. These pieces of string can then be lined up in a straight line and measured by the scale at the bottom of the image.

Estimates of distance traveled can be displayed in poster form where each student records his or her estimation of distance traveled.

At Station 3 students are to only open one folder at a time, starting with folder number one. Tell the students that in each folder they will find an image of one day in the flight of Condor 648 and a prediction page. Instruct the students to discuss Condor 648's flight for that day. They should discuss what type of landforms she saw on her flight and any cities that may be near her flight path. Then the students should, individually or as a group, write down their prediction of the next day's flight on the Prediction Page found in the folder. Predictions might include: "Condor 648 will fly over Fillmore" or "Condor 648 will continue to fly in areas of mountains."

Walk around the classroom and monitor the students' progress at each station. After 10 minutes, have the students rotate to the next station. When each group has visited each station and completed the activity, have them return to their desks. As a class, discuss the correct sequence for Condor 107's flight. Hold up the chart of estimates from Station 2 and discuss difficulties in measuring Condor 513's flight. Open the folders from Station 3 and discuss predictions. Ask the students what informed their predictions.

OPTIONAL EXTENSION 1:

Use Station 3 as a daily warm up during the week. Open one image a day and discuss what Condor 648 might be up to and where she might go the following day.

CONSTRUCTION CONCERNs GEOGRAPHY E

Rationale	Aligned Standards	Time	Materials
To communicate the difficulties in planning cities and habitat conservation, students will debate paths forward.	NGSS: Asking Questions, Defining Problems and Analyzing Data and Using Mathematics; Causation and Scale and Stability, Change LS 4.D: Condor ranges vary in distance to human cities or structures and affect the relationships between condors and humans. LS2.C: The condor's environment changes as humans affect the environment both positively and negatively. ETS1.A: Available land and materials limit solutions to condor-human relationship difficulties. Proposals for solutions should arise.	One-day lesson Teaching time: one hour (approximately)	Poster Post-Its®
Objectives	Vocabulary	Tech Integration	Maps illustrating historic range and current range in Maps photo library Tejon Mountain Village photo library Google Maps or Google Earth

PROCEDURE – DAY 1

IMAGES (10 minutes)

Open Google Maps or Google Earth and find Fillmore, Hopper Mountain, Bitter Creek, and Tejon Ranch on the map. Project the two images of Tejon Ranch and Tejon Mountain Village from the Geography photo library and discuss location, habitat conservation, and city planning.

EXPLORE (30 minutes)

Choose the most appropriate level articles for the class from the Geography E resource library on the Online portal. Distribute articles and focus on how organizations must work together to build communities in the condor habitat. (Go further than the gridlock of Side A vs. Side B.) Expand to the complex nature of the many perspectives involved in getting things done. Have small groups of students read articles together and summarize, "Where do people agree on this issue?" and "Where do they disagree?" Summarize major plot points of the Tejon Mountain Village situation.

PLAY (20 minutes)

Have students work in groups of three to represent some of the groups involved with the TMV decision-making. Include the Tejon Ranch Co., U.S. Fish & Wildlife Service, Future TMV homeowners, Audubon California, etc. Hold a dialogue between the groups, facilitating each group's goals and suggestions.

CONSTRUCTION CONCERNs GEOGRAPHY E

Before you begin

Look through the available articles on the Tejon Mountain Village, and select a few to use depending on your class.

.....
One-day lesson
Teaching time: one hour
(approximately)

What to do

The difficulties in habitat preservation include many different perspectives that belong to individuals and organizations. Nevertheless, different groups and partners work together or around each other in community development.

Images

Direct the students to a projection of Google Maps or Google Earth. Challenge students to locate Fillmore, Hopper, Bitter Creek, Tejon Ranch, the 5 freeway, etc. Then project the two images of Tejon Ranch and Tejon Mountain Village from the Geography photo library. Discuss the location, habitat conservation, and city planning by asking students: “What type of geographical landforms are in this area?” “Is the proposed area to develop within the range of the condor?” “Is this an area where a community of homes could be developed?” “Describe the habitat of the condor.” “What do you think the community called ‘Tejon Mountain Village’ could look like?” “What do you think it would take to plan a city?” “What type of research would need to be conducted?” Discuss different perspectives as they come up.

ELL MODIFICATION:

Provide instruction on how the informational text is structured.

Outline some of the clues within journalistic writing.

Explore

Choose the most appropriate level and number of articles for the class. Distribute the articles to students in pairs. Reiterate how organizations work together to build communities in habitats such as the condors’. Have small groups or pairs read the articles together and answer: “Where do people agree on this issue?” “Where do they disagree?” Have the students summarize the major plot points of the Tejon Mountain Village. As they work on summarizing the plot points, bring the class back together as a whole and summarize the plot points on the front board as a class.

ELL MODIFICATION:
Have the students create subtitles for each paragraph in the article.

Play

Divide the class again in pairs or small groups (not in the same group as before). Have students work in groups to represent some of the groups involved in the TMV decision-making. Include the Tejon Ranch Co., U.S. Fish & Wildlife Service, Future TMV homeowners, Audubon California, etc. Give the groups about 5 minutes to discuss the perspective they are taking on as a specific group. Walk around and facilitate group discussion to keep them focused on discovering their point of view. Answer questions as necessary.

Perform a town hall styled meeting where students hold a dialogue about the TMV situation. Facilitate a speaker from each group to point out goals and suggestions from their perspective. Insert personal stories belonging to the “Future TMV homeowners” group. Have students respond to each other’s statements and suggestions.

ELL MODIFICATION/ OPTIONAL EXTENSION :

Create a KWL Chart with three columns for lists of information that students “Know,” “Want to know,” and “What they have Learned.”

CONDOR KIDS HISTORY

TIMELINE POCKETS	HISTORY A	65-68
EXPLORING AUTHORS	HISTORY B	69-72
SYMBOL SAVVY	HISTORY C	73-75
TRIBES	HISTORY D	76-79



TIMELINE POCKETS HISTORY A

Rationale

In order to put condors in their context over time, students will create a chronology with visual cues.

Aligned Standards

LS4.D: Our city has not always looked as it does now. Different groups of people have lived in the area and have affected the habitat and organisms in various ways. (3-LS4-4)

Vocabulary

symbol
rancho
chumash
naturalist

Materials

Pocket paper, symbols sheet, art supplies including crayons, scissors, markers, etc.

Objectives

1. Students comprehend the proposed chronology
2. Students identify the (overlapping) time periods based on visual markers

Time

One-day lesson
Teaching time: one hour
(approximately)

PROCEDURE – DAY 1

CREATE (30 minutes)

Distribute material to students and explain the project. Each student will create a document with 5 pockets. Each student will be given symbols representing each time period: Chumash, Spanish Colonial, Rancho, Mappers and Miners, Early Naturalists and Biologists, and Conservation.

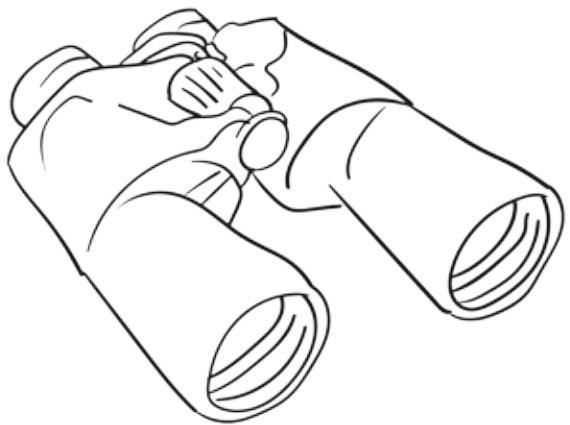
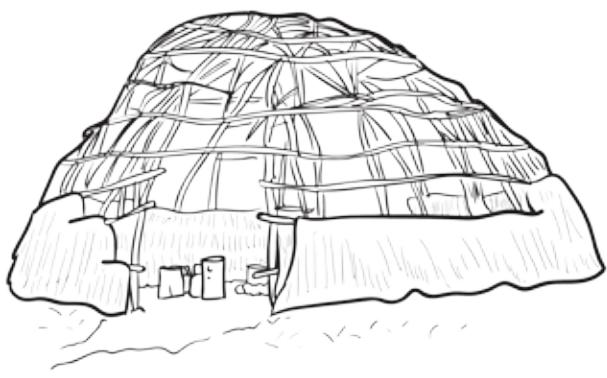
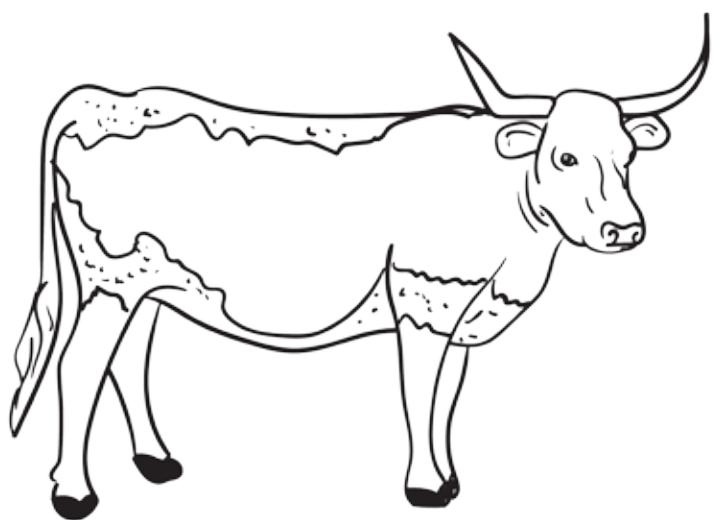
DATA (20 minutes)

The students will put the symbols in sequential order based on what they already know. (Make sure they can support their claims.) Discuss and reorganize in correct sequential order.

JOURNAL (20 minutes)

Students create a KWL about the time periods.

TIMELINE POCKETS HISTORY A



Before you begin

Print out a page with the six chronology symbols for each student.
Prep art supplies such as crayons, glue, scissors, markers, etc.

One-day lesson

Teaching time: one hour
(approximately)

What to do

Over time, people have played various roles in affecting the environment. As people with evolving ideas, innovations, and economics, these groups of people have passed through our land and significantly altered it. History will reveal the importance of our daily decisions and how it will ultimately shape our future. With this in mind, students will need to understand the historical context of local people groups.

Chalk Talk

Chalk Talk is a form of introspectively prompting conversation and sharing knowledge.

Before the class enters the room, place 6 large sheets of blank paper in various flat locations around the room (poster-sized if possible, on the floor or tabletops). At the top or center of each sheet, write one of the 6 “tribes” we will be learning about and draw a box or circle around it. Glue the symbol provided next to the word as well. Place a box of markers at each sheet. Also write the 6 Tribe names (in English and Spanish) on the board for the class to see.

As the students enter the room, ask them not to touch the paper or markers spread around the room. Explain that they are going to be used for an activity called “Chalk Talk.” The purpose of Chalk Talk is to learn what others think or know about an idea or word. The words we are considering today are: 1. Chumash, 2. Spanish Colonial, 3. Rancho, 4. Mappers and Miners, 5. Naturalists and Biologists, 6. Conservation. Before anyone says anything about these words, we are going to do our activity in silence. There is to be no talking out loud, only talking on paper! Tell the class that you will split them up into 6 groups and send each group to a different sheet of paper. On that paper, each person is to take a marker and respond to the word or words that are on it. They can write what they think it is, what they know it is, something it reminds them of, or even draw a picture of what they think it is. As a hint, a symbol will already be on the page. Their comments and drawings need to be appropriate and will be discussed as a class. They do not need to write their names. After 3 minutes, you will ring a bell and the groups will rotate. This time, they will examine the previous groups’ comments and drawings. They can respond with stars if they see something they like or agree with. They can also use question marks if they have a question about it. Then they will add their own comments and drawings. This will continue until all 6 groups have visited all 6 sheets of paper.

While this is taking place (about 20 minutes of silent communication and rotating) make sure to walk around and read the comments that are being written. You should have a good idea of what the class knows by the time they are done.

When the time is up, tape or tack the 6 sheets up on easels or on the board so everyone can see them. Identify the interesting comments and highlight the accurate ones. The focus should not be on the outcome of this activity, but on the process. Now that everyone has had an opportunity to think about each tribe, they will be creating a graphic timeline foldable with the same symbols used on the chalk talk posters.

CHALK TALK:

This exercise allows students to share thoughts and ideas without communicating verbally.

This provides a safe venue for each student to express him or her self and receive positive feedback or questioning.

ELL MODIFICATION:

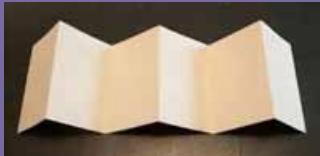
Translate the Tribe names in Spanish and write them underneath the English words on the poster.

Strategically pair students heterogeneously or balance the groups to have fairly equal ability.

TIMELINE POCKETS HISTORY A



OPTIONAL EXTENSION:



ELL MODIFICATION:

By using images on our foldable, ELL students are able to have visual access to the content.

Create

Pass out 11x17 sized construction paper and the sheet with six symbols to each student. Demonstrate how to create our graphic organizer foldable by holding your paper up in front of the class. You will be creating 6 horizontal pockets. Fold the paper horizontally “hot-dog style” with about an inch showing at the top. Then fold in half, one side over vertically “hamburger-style.” Fold again, vertically, into thirds. When you open up the vertical folds, you should have 6 pockets. Use these creases to fold again, this time accordion-style.

Data

Ask the class to look at their 6 symbols and infer which one came first. Give them a few minutes to place all 6 images in the order they think they occurred, one on each section of their foldable with the corresponding tribe card. Tell the class that we will be going over the timeline together, and to make adjustments to their images as needed.

Talk through the timeline and how each tribe came onto the land and why. Show a clear connection between the tribes and how the transition from one to the next occurred.

Explain how the Chumash lived in the area for hundreds of years. Many of their walkways linked the area we call Fillmore to other areas along the coast—highways follow these paths today. Chumash peoples encountered Spanish Colonials that came up the coast. The colonials brought new animals like sheep and cattle into the area.

As the Spanish Colonials transitioned out of California, the land was divided into Ranchos governed by Mexico. Sheep and cattle grazed these massive areas of land. During the time of the Spanish Colonials and Ranchos and continuing after both, mappers and explorers traveled through California seeking information on plants, water, resources, and more. Some of these explorers were Spanish, some were Russians, and some were even sent by the government of the United States.

A little later on, some people interested in researching nature in California, called Naturalists, traveled through California. All of these groups affected the land they traveled on both in positive and negative ways. It is important to know that California and Fillmore did not look the exact way they do today. Descendants of each group live still in many areas of California today.

As the Condor Recovery Program developed, the term and title “Conservation” became more frequently used. Conservation includes the idea of protecting, preserving, and conserving all the plants and animals in a given area, instead of limiting the focus to one particular species (i.e. “Save the [insert animal here]!”).

Walk around and make sure that all students have their images and tribe cards in order. Once checked, the students can glue their images to the foldable pocket and insert the tribe card in the slot behind it. If there is extra time, they may color the images. They will be using this foldable for the upcoming lessons.

Rationale

In order to put condors in their context, students will explore different excerpts from authors connected to condor studies.

Objectives

1. Students ask contextual questions to better understand those affiliated with condor studies
2. Students understand how to think historically and do history

Aligned Standards

- RL3.1: Refer to the Finely, Koford, Synder, and Hamber texts to answer contextual questions about authors.
RL3.6: Differentiate between given author's perspective and students' own perspective.

Vocabulary

conservationist
naturalist
biologist

Materials

Timeline Pocket document previously created, art supplies including crayons, scissors, markers, etc.

Time

One-day lesson
Teaching time: one hour (approximately)

PROCEDURE – DAY 1

EXPLORE (10 minutes)

Divide the class into small groups and distribute the 4 excerpts. Frame the lesson in such a way so the students become historian detectives. Distribute the Exploring Authors handout to be filled in by students.

CREATE (40 minutes)

Students work on sourcing, contextualizing, using background knowledge, and reading the silences (what are the authors leaving out? Is that on purpose?) as they read the excerpts. Each group creates a symbol to put in their timeline pocket and fits the author into the timeline.

William L. Finley

1906 Journal article titled "Life History of the California Condor" published in *The Condor*

"On March 10, 1906, I set out with two companions to make further search for the nest. The most striking feature of this region where the condor lived is the fact that one passes through the green fields, orchards and vineyards; land that is under the highest cultivation, right up to the beginning of the mountains. At eight o'clock in the morning, we were in the midst of pleasant homes and gardens, out of civilization. We were in the roughest, wildest place without an indication of human habitation. Wild indeed, because this was the natural haunt of the California Condor. Following the trail for several miles along the canyon we came to the place where the great birds were last seen. From this point, we had a splendid lookout up and down the ravine. For some time we watched and scanned the mountain sides without field glass, but saw no signs of condors."

Carl Koford

1953 from *The California Condor* p. 1

"My method was primarily that of watching condors for long periods under conditions which were as natural as possible. Because condors are easily disturbed by men, observations were usually made from a considerable distance with binoculars or with a 20-power spotting telescope, and the concealment of a cave or blind was often used. Many entire days were spent in observing from a small lookout house, which the United States Forest Service constructed for my use, and from regular fire lookout stations."

Noel and Helen Snyder

2000 from Chapter 14: "Formation of a captive flock" p. 289 in *The California Condor*

"Perhaps the closest we came to disaster was at a nest site in Santa Barbara County in 1985, where the wind rose to a howling intensity shortly after we had a completed removal of an egg before the helicopter arrived. Jim Dalton was only barely able to land the chopper, and Noel and Jim took off down canyon just moments before the conditions became totally impossible for flight. Unfortunately in the haste to leave the area Noel had not fastened his seat belt. Only half a mile from the nest the chopper hit one last turbulent downdraft that "lifted" him and the egg transport case in his hands right to the ceiling, breaking one egg case thermometer in the process. Thankfully, the descent back to seat level was not violent, the egg was unharmed, and it ultimately landed successfully."

Janet Hamber

from 05/28/2015 interview

"Once the decision was made to take into captivity all the remaining wild California Condors, the biologists from the Condor Research Center were out almost every day trapping those last few birds. From February and through all of March, for almost two months, we were chasing AC-9, this one last bird. When I went out in mid-April, a nice fresh carcass had been put out. AC-9 came in to the bait so I watched the trap but there was a Golden Eagle on the carcass. Every time AC-9 tried to sneak a bite, the eagle would chase him off. Once that eagle left, another eagle came in and continued to chase AC-9, who finally gave up his chance to eat and flew off to a nearby roost. I knew he would come back the next morning, which was Easter Sunday. I sat there thinking, 'I should call in the trap team. Capturing AC-9 is the job and this is the goal. I'm going to have to trust that things will work out and they are going to release the wild birds.'

(This story and similar interviews can be found in the film *The Condor's Shadow*. Use of this film is recommended as an ELL modification of visual and auditory learning options.)

EXPLORING AUTHORS HISTORY B

Name: _____

My group's source: _____

Sourcing	Using Background Knowledge	Reading the Silences

EXPLORING AUTHORS HISTORY B

One-day lesson

Teaching time: one hour
(approximately)

ELL MODIFICATION:

Distribute ELL students
equally among groups.



OPTIONAL EXTENSION:

Withhold a portion of the source's description. For example, withhold the name, occupation, or time period of the author. Allow students to guess while they work in groups on the graphic organizer. Make sure to lead the students to the correct answer by the time the class ends.

Before you begin

Print out a copies of the excerpts page. Each student should have a printed copy of one of the four excerpts; each group should focus on one excerpt.

What to do

The process of doing history in the context of condor conservation involves detective work to enhance the following skills: tolerating complexity, adapting to new situations, and resisting the first answer that comes to mind. Five different points of view from those involved in condor conservation over the past 100 years will be considered in this lesson to add depth and richness to the story of condors.

Explore

Give each student a copy of the graphic organizer. Go over the titles in the sections so that students understand what information to fill in each portion. "Sourcing" should be filled with thoughts about the document's author and its creation. Ask: "Who created this document?" "What type of document is this? A letter, textbook, diary?" "When was it written?" "For what purpose?" "How trustworthy is this source and why?"

Explain "using background knowledge" as putting the documents and the events described in the document in time and place (context). Encourage the students to think of other historical events or individuals that took place around the same time. Ask students: "What do you know about the topic?" "What do you know that took place in or around the same time?" "What other knowledge might apply?"

"Reading the silences" should be explained as an identification of what the author has left out. Ask the students, "What event or perspective might be missing?"

Divide the class into 4 or 8 small groups. Choose an excerpt for each group. Give each group enough copies of the source so that each student has her own copy. Frame the next part of the lesson as detective work. Explain that students are historians at work to detect what information we can gather from each source.

As the students read the sources, have them fill in the graphic organizer. William Finley was a naturalist who went on trips specifically to learn about condors. He and a few others would hike and search for nests in order to learn and photograph. Carl Koford was one of the first people to be hired to study condors. His work is known for being extremely influential for the Recovery Program. He studied the condors before and after World War II, and was in the US military during the war. Noel and Helen Snyder wrote a textbook that includes the core of known information on condors. Noel was at one time in a top leadership position within the Recovery Program. Janet Hamber, Condor Biologist and Archivist, currently maintains condor archives at the Santa Barbara Museum of Natural History. She has decades of first hand knowledge from her work with condors in the wild and her personal relationship with Koford, the Snyders, and many others. More information about each of the authors is available in the Snyders' textbook *The California Condor: A Saga of Natural History and Conservation* published in 2000.

When each group is finished, come back together as one whole group to discuss each document. Have a student from each group summarize their document or give an idea that their source brought up. Allow them to describe any forms of writing or description that seem "strange" or "funny" to them. After each group has informed the class as a whole, ask the students questions about details across all of the sources to determine points where they agree or disagree. Ask students what questions arise after carefully reading the sources multiple times. Ask, "What other

SYMBOL SAVVY HISTORY C

Rationale	Objectives	Aligned Standards	Vocabulary
In order to understand and develop the symbolism attached to condors, students will identify problems, research, and create new symbols or add to symbols in use.	<ol style="list-style-type: none">Students identify problems with current condor stereotypesStudents research and learn what types of symbols are known and in use relating to condorsStudents understand the meaning and use of symbols	RI3.7: Students use images of condors and eagles and logos to demonstrate understanding of symbols.	symbolism preserve

Materials

Article for birds in Chumash culture: <http://www.sbnature.org/crc/334.html>

Time

Day 1 and day 2 of two-day lesson
Teaching time: one hour (approximately)

PROCEDURE – DAY 1 & 2

DAY 1

EXPLORE (30 minutes)

Use images of the bald eagle to begin a conversation about what ideas we attach to animals (or what they as a symbol represent). The conversation should be extended to condors: what do they as a symbol represent? How has it changed? What problems are associated with that symbol? How might it be beneficial to the condor?
(Variation: create a Venn diagram of the bald eagle vs. condor symbols.)

DATA (30 minutes)

Students research where the condor symbol is used (companies, government agencies, etc). At home, they interview family and friends about what ideas the condor represents.

DAY 2

CREATE (40 minutes) – Divide the class into small groups. Students are to create and distribute a new symbol or plan how to counteract a negative symbol (i.e. Create a new company brand or mascot for a school).

TAKE HOME INTERVIEW:

Interview your family and friends to find out what they think about the symbolism of the California condor!

LIST THE NAMES OF THE PEOPLE YOU ARE INTERVIEWING:

QUESTIONS:

WHAT IDEAS OR IMAGES DO YOU THINK OF WHEN I SAY “CONDOR?”

HOW DID YOU LEARN ABOUT CONDORS?

Before you begin

Prepare to project images of the Bald eagle and the California condor.

What to do

Introducing the Lesson – Day 1

In society, we are largely influenced by notions that are generally accepted, or perceived by the majority of people. We might not even know why these notions exist, or from where they originated. It is important to think independently of these ideas and create our own ideas based on evaluating different perspectives.

Explore

On a flip chart, draw a Venn Diagram. Label one side “Bald Eagle” and leave the other side blank for now.

Project an image of a bald eagle toward the front of the room. Ask the class to raise their hands if they know what it is. Once a student has correctly identified it, ask him/her how they know and where they have seen it before. Then ask the entire class to think of words or feelings they associate with this image. List these words under “Bald Eagle” on the Venn Diagram. Then explain that any image that represents something to a group of people is called a “symbol.” A bald eagle is a symbol of liberty, patriotism, and pride because that is what our society has coined it as. Can they think of any other animals that have symbolism? (Smokey the Bear=forests, bats=vampires, etc.)

Now project an image of the condor from any photo library. Ask the students to think of words associated with the condor (according to society). How would most people respond to this bird? What do they think it represents? Label the other side of the Venn Diagram “condor” and list these words.

Are there any commonalities between the representation of a condor and a Bald Eagle? List them in the center of the Venn Diagram. There may not be many, but some students might suggest that both are symbols of hope or success. Encourage these responses! Use the remaining class time to project images of condors that have been used as mascots or in other institutions. Examples include the Condor Express boat in the Santa Barbara harbor, the Condor airline, Condor Systems tech company, etc.

Data

At home or outside of class, students interview friends and family about what they think of condors. How would they describe them, and what image do they have of them? How can we create a new image if the one they currently have is a negative one?

Continuing the Lesson – Day 2

Discuss information gathered from the out of class interviews. Divide the students into groups to create artwork for a new symbol or ideas to counteract a negative symbol of the condor.

.....
Day 1 and day 2 of two-day lesson

Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:
Have images prepared of other animals or logos that you think the students identify with.



OPTIONAL EXTENSION:
If possible, have students research on their own and share what they have learned.



OPTIONAL EXTENSION:
Discuss the symbolism of condors in Chumash culture. Considering visiting www.sbnature.org/crc/334.html to learn more about symbolism and birds in Chumash culture.

Rationale

Comparing and Contrasting people in the region provides diverse perspectives regarding the land, its resources and attitudes toward the condor.

Aligned Standards

Social Studies 3.3: Narrative experiences are divided into Chumash, Spanish Colonials, Ranchos, Miners, and Naturalists.

Objectives

1. Students will demonstrate changes in the population
2. Students will discover how each group of people changed the landscape

Time

Four-day lesson
Teaching time: four hours (approximately)

Vocabulary

Chumash
rancho
miner
explorer
naturalist

Materials

Butcher Paper
Markers/paints
Costumes
Tribe Cards
Large lined index cards
11x17 construction paper
Sharpies

PROCEDURE – DAY 1-4

Day 1 - EXPLORE (60 minutes)

Divide the class into 3-6 “tribes” (depending on time allowance and class size)

Possible tribes are Chumash, Spanish Colonials, Rancho, Gold Miners, Explorers, and Naturalists.

Each group will complete a KWL chart regarding their tribe.

Once in their tribes, each student will be given a job card that integrates thinking historically about the natural world and asked to discuss with one another.

Each tribe will create a background poster displaying what the landscape looked like during their time.

Day 2 - CREATE (60 minutes)

Tribes practice presenting their posters and introducing themselves to the class in chronological order. (Optional skit)

Day 3 - CREATE (60 minutes)

Students present their tribes; taking notes on other tribes when not presenting.

Day 4 - CREATE (60 minutes)

Have students create Timeline Pocket artifacts for each tribe; inserting notes from each and creating a replica of backdrop to be reduced on copier.

Tribe Job Cards

Chumash

- We live on the coast, but not on the beach.
- We use thatch for round homes built around water sources.
- We gather plants and hunt animals like deer to eat.
- We trade with other villages and use tumols, a type of boat, to sail along the coast.

Spanish Colonials

- We live in a fort made of large bricks called adobe.
- We want to protect homes, families, animals, and fields.
- We like to go hunting in the hills and forests.
- There are not very many people living in the area. We know many of the natives, the friars at the Mission, and some people from Russia.

Rancho

- We brought and take care of hundreds or thousands of cattle that graze on grasses.
- We want to raise more cattle to make more money.
- Some of us have herds of sheep.
- Usually we stay within the area on the rancho that we mapped.

Gold Miners

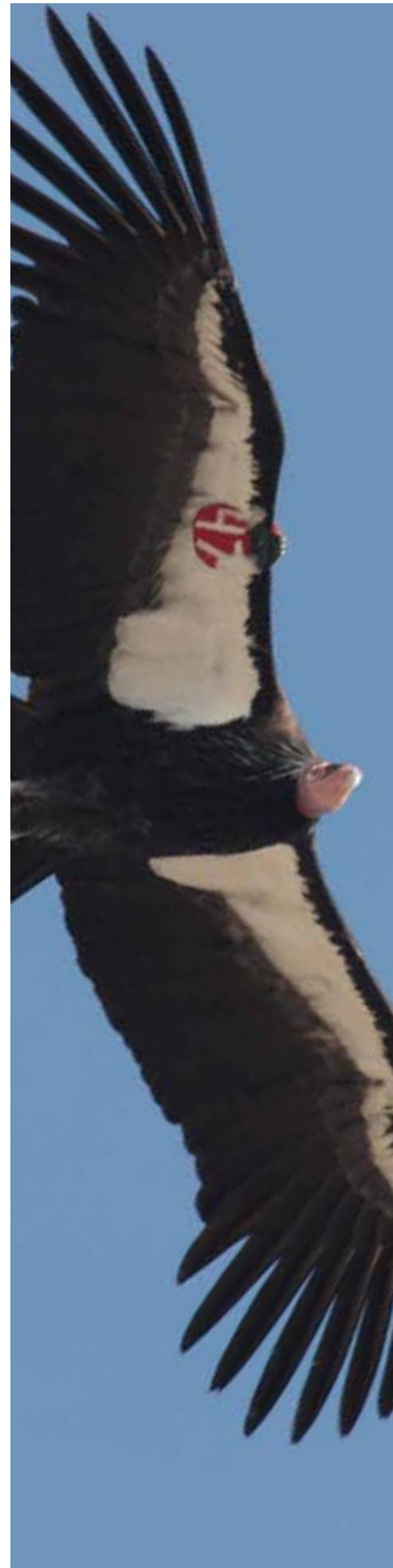
- We need somewhere safe to store small amounts of gold.
- We are on the move looking for places to make money.
- Usually we camp in forests, fields, along riverbanks, and more.
- Many of us are new to California and did not grow up in the area.

Mappers and Explorers

- We get money to follow rivers and paths, and to look for new animals and plants that some people have never seen before.
- We usually camp and eat what we can find as we cross mountains, hills, and valleys.
- Most of us have not seen the area before.

Early Naturalists and Biologists

- We want to learn about the plants and animals around us.
- Sometimes we collect eggs and animals and send them around the world.
- When we are in the field we camp, when we are doing our research at home, we live in towns and cities.
- We are beginning to notice that animals like the grizzly bear, wolf, and condor are harder to find than before.



TRIBES HISTORY D

Four-day lesson
Teaching time: four hours
(approximately)

ELL MODIFICATION:

The vocabulary words should be translated in Spanish and an image given for each word. ELL students will write the word in both English and Spanish to be glued into their observation journals for reference.

SUGGESTION:

Strategically pair students heterogeneously or balance the groups to have fairly equal ability.



OPTIONAL EXTENSION:

If possible, allow students an opportunity to research their tribes online.

This project will take place over the course of 4 days with at least 1 day of class presentations.

Before you begin

Print out copies of the Tribes informational sheet. Each student should receive a slip of paper with their tribe's information. On Day 2 students will need 5 to 10 ft of butcher paper.

What to do

Introducing the Lesson – Day 1

The different perspectives and attitudes of the societies that came in contact with the condor influenced the condor's decline in population. In order to understand how people of the past have viewed the role of the condor and begin to change and affect our current society's perceptions, we will be examining the different "tribes" of people who have inhabited the local community.

Have the class refer to the "Timeline Pockets" activity that was completed on a previous day. Inform the class that each student will be assigned to one of the tribes and will work together as a group. Once they are given their groups, they will be filling out a KWL chart within their group.

Write the Tribe names on the board along with students that will represent the group. Have the groups gather in different areas of the room where they will not disrupt each other. Designate a recorder to write down the comments that group members make regarding what they [K] know and [W] want to know about their Tribe. Walk around to help facilitate the discussions taking place. When the groups are done, pass out tribe job cards and discussion questions to each group. Then have the group members use this new information to add to the [L] learn portion of the chart. The group will take the remaining class time to sketch what they believe the landscape looked like at the time their tribe existed there. They will also use their tribe job cards to create a skit to present to the class. The 5-7 minute skit should clearly demonstrate what a day in the life of the people would look like. They should also discuss possible costumes and props that may aide in their presentation. The recorder should take notes on initial ideas. The following day, they will be allowed to bring items to class to practice integrating them into their skit.

Skit Rehearsal – Day 2

Students will use their initial landscape sketches to create a backdrop for their skit. Using butcher paper, have each group select a large space to lay out their paper and work (on the classroom floor and possibly outside in the corridor).

Use large sharpies to outline features and large paint pens or brushes to add color and depth. Once the landscape is complete, put it in a safe place to dry. Then the groups will continue working on constructing and rehearsing their skits with costumes and props. (Collect the sketches to be used on day 4.)

TRIBES HISTORY D

Presentations – Day 3

Pass out note-taking paper to the class. Instruct the students that as each tribe is presenting, they should be taking notes about what they are learning about that tribe. Their goal is to put at least one original comment under the [L] learned column in that group's KWL chart. Original comments will be added to the chart via Post-it note.

Starting with the first Tribe, have the group tape their landscape to the front of the room. Standing in front of it, they will introduce themselves based on the role they have been designated within the tribe. Then they will perform their skit as rehearsed.

Each group will present in chronological order until all groups have gone. When finished, have the groups bring up their KWL charts and tape them up in chronological order. At their desks, have the students examine their notes. Starting with the first chart, read the comments previously listed by the group members under the "L" column. If students have the same comments as the ones in the "L" column of each chart, have them put a star next to it on their note sheet. Ask students to contribute new comments that are not already in the "L" column. Each student that has an accurate comment is to be given a post-it note to write the original comment and add it to the chart. Other students should add this comment to their notes as well. Do this with all KWL charts until the students have their note sheets filled completely.

Create and Conclude with Timeline Pockets – Day 4

Students re-visit their note sheets and Timeline pockets. Pass out 4 note-cards or pre-cut paper for each student to fit the timeline pockets. Now that they have an abundance of information, ask them to choose 3 or 4 important and distinguishing facts that they learned about each tribe. These facts will be transformed into artifacts that will be tucked behind each tribe pocket. The fact can just be written out in an interesting and artistic font, or illustrated visually in a sketch. It can also be transformed into a symbol with a description of why this symbol was chosen. The 5th artifact for each tribe can be a copy of the landscape sketch, to be labeled and passed out to each student.

If there is time, ask students to volunteer to share an artifact that they have created.



OPTIONAL EXTENSION:
As homework, have students list household items that could be collected that evening and brought to class the following day.



OPTIONAL EXTENSION:
For the benefit of all learners, assist the class in note-taking by emphasizing important facts that are mentioned. For example, say, "that seems important, that the Chumash really respected the condor..."

SUGGESTION:

Put the sketches on the photocopier and darken the image. Then reduce it to about 40%. This should create a copy that is extremely detailed and will fit in the timeline pocket. Make a one copy of each sketch per student.

ELL MODIFICATION:

By using images in our artifacts, ELL students are able to have visual access to the content or label them in Spanish.

CONDOR KIDS

CONSERVATION

CONDOR TAG	CONSERVATION A	81-83
READY, SET, SORT	CONSERVATION B	84-86
PARTNER PARTY	CONSERVATION C	87-88
POPULATION POINTERS	CONSERVATION D	89-91



CONDOR TAG CONSERVATION A

Rationale

In order to understand the complex relationship between condors, poachers, and prey, students will engage in a role-play tag game.

Objectives

1. Students identify needs the needs and resources of the ecosystem that includes condors
2. Students understand the complexity involved with condor mortality and the poacher-condor relationship

Aligned Standards

NGSS: Communicating Information; Causation and Structure, Function and Stability, Change
LS2.C: The hunter-prey relationship expressed in the game illustrates the complex relationship between poachers and condor's that allows some condors to reproduce while some die.

Time

One-day lesson
Teaching time: one hour (approximately)

Vocabulary

prey
ecosystem
endangered
lead poisoning
carcass
forage

Materials

Deer and infected deer id cards, stopwatch

Tech Integration

X-ray photo library

PROCEDURE – DAY 1

EXPLORE (15 minutes)

In the classroom, explain that historically, hunters shot with lead ammunition. The hunting community today is decreasing lead usage, but poachers still use lead ammunition. Explain that:

1. Condors eat large to medium mammal carcasses.
2. Deer carcasses and gut piles are seasonally available within their range.
3. These carcasses may be contaminated with lead from ammunition.

Split the class in to groups of 12. Each group will play their own game. Give roles for 6 deer (with id cards), 3 infected deer (with id cards), 1 condor, 1 poacher, and 1 timer.

PLAY (45 minutes)

Rules:

1. There are three infected deer that were poached with lead ammunition.
2. Any deer that is tagged is now a deer carcass and must put ID card face-down and sit down outside the area of play.
3. The condor must try to gather as many points without being infected.
4. If a condor becomes infected, (s)he loses and the round ends.

Game play:

1. Timer puts 30 seconds on clock and says, "Hunting season open!"
2. The condor sits out while the poacher chases the deer and tries to tag as many deer as possible.
3. After 30 seconds, the poacher and deer sit out.
4. The condor then has one minute to gather as many points as possible.
5. The condor can stop at any point, but the winner is the condor that collected the most carcasses by the end of class time.

Play as many rounds as class time allows.

DEER

DEER

DEER

DEER

DEER

DEER

**INFECTED
DEER**

**INFECTED
DEER**

Before you begin

Print enough copies of the deer/infected deer cards.

.....
One-day lesson
Teaching time: one hour
(approximately)

What to do

Explore

One of the major attributes of the condor species is that they are scavengers. This makes them vulnerable to ingesting contaminated food. Sometimes, contamination comes from lead-based ammunition used to shoot prey. Many times, this prey is left to decay, and the condor comes along to clean up the mess. Regardless of how long the lead is in the prey's system, it infects the carcass to some extent. It is a game of chance if a condor can survive without being contaminated itself. Historically, hunters shot with lead ammunition. The hunting community today is decreasing lead usage, but poachers still use lead ammunition.

This would be a good activity to do during PE since it involves running outdoors. After giving the class a brief background about lead contamination, explain that the goal this game is not to try to win, but to understand what condors face when foraging for food. Although it is a real problem in the wild, winning or losing is largely based on chance, not skill. This also means that condors cannot avoid this problem without intervention.

Play

In 2 groups of 12, each group will designate 6 healthy deer, 3 infected deer, 1 condor, 1 poacher, and 1 timer. Place tags around their necks to indicate what they are. (The status of the deer should be on the back, not the front.) Demonstrate how the game is to be played:

Rules:

1. There are three infected deer that were poached with lead ammunition.
2. Any deer that is tagged is now a deer carcass and must put down ID card face-down.
3. The condor must try to gather as many points without being infected.
4. If a condor becomes infected, (s)he loses and the round ends.

Game play:

1. Timer puts 30 seconds on clock and says, "Hunting season open!"
2. The condor sits out while the poacher chases the deer and tries to tag as many deer as possible.
3. After 30 seconds, the poacher and deer sit out.
4. The condor then has one minute to gather as many points as possible.
5. The condor can end the round at any point but the winner is the condor who collected the most deer carcasses by the end of class time.

Play as many rounds as class time allows.

READY, SET, SORT CONSERVATION B

Rationale

In order to put condors in their context, students will explore different excerpts from authors connected to condor studies.

Objectives

1. Students identify what types of trash condors collect and ingest
2. Students understand the path of trash from our community to a condor's nest

Aligned Standards

NGSS: Asking Questions, Defining Problems and Conducting Investigations and Arguing from Evidence; Causation
ESS3.B: Students will determine what type of a hazard microtrash may be considered and their role in its reduction.

Vocabulary

microtrash: dime sized trash ingestion

Tech Integration

X-Ray photo library

Materials

Personal and group trash collection bins, images

Time

One-day lesson
Teaching time: one hour (approximately)

PROCEDURE – DAY 1

EXPLAIN (10 minutes)

In the classroom, the teacher explains that trash collection is an important part of conservation for identification, assessment, and disposal. Students are given collection bins and the class journeys to the schoolyard to collect trash.

EXPLORE (30 minutes)

Trash collection in the schoolyard. Small groups can be formed to sort trash (microtrash, compost, paper) and race to sort their trash. (Variation: the entire group can race to sort the trash.) Teacher highlights the type of trash found in condor nests and guts: pop tops, bottle caps, glass, screws, and metal nuts.

IMAGES (10 minutes):

Students return to the classroom, and sort trash into categories. Determine how these are mistaken for food and nest material, and how they are harmful to the condor. Teacher shows images of trash in nest sites and x-ray of trash in condor gut or crop. Students hypothesize about the path of trash from the schoolyard to a condor nest. Students offer ideas on how to eliminate trash in the schoolyard and beyond.

READY, SET, SORT CONSERVATION B

Before you begin

Prep collection bins or baggies for trash. Set out three main bins in the classroom, label them “Microtrash,” “Compost,” and “Other.” Prepare to project images of condors that have ingested microtrash from the X-ray photo library.

What to do

Every individual is a consumer. By looking at trash and microtrash, we can directly see the effects of our consumerism on the wild populations of a variety of species. This concept puts us in a position to examine our personal responsibility in this area. The term “conservationist” sounds official, but what it really means is someone willing to intentionally and consciously conserve our environment. Are we willing to do this?

Compass Points is a great routine for examining what we think and want to know about this topic before committing to an answer.

On the board, draw a large compass rose. Explain to the class that the compass is an instrument of guidance and gives direction. We will be using it as an acronym to help us find direction in the issue of recycling. Have the class take their Observation Journals to record their ideas as we discuss.

- E = Excited:
What excites you about the idea of recycling? What's the upside?
- W = Worrisome:
What do you find worrisome about trash? What's the downside?
- N = Need to Know:
What else do you need to know or find out about recycling? What additional information would help you to evaluate things?
- S = Stance or Suggestion for Moving Forward:
What is your current stance or opinion on the idea of recycling? Is it reflected in your actions? How might you move forward?

Use this activity as a jumping-off point for discussion the issue of trash. Have the class consider why conservationists might be so determined to make sure trash is collected properly.

Explore

Inform the students that they will be doing an investigation on their own school playground. In teams, they will be going out to look for and collect loose microtrash. Pass out collection bins and gloves and set up sorting bins in front of the room. Explain that the sorting bins are labeled “Microtrash” for small, quarter-sized objects that condors might collect, “Compost” for biodegradable trash, and “Other” for all other trash. When the students return from searching the playground, they will sort out what they've found, recording the number of each type. Let them know how you will signal them when it is time to return (whistle, bell, etc.).

Send the class out and assist where needed. If the students are having a hard time finding trash, use the bags of provided trash to supplement as examples.

One-day lesson

Teaching time: one hour
(approximately)

COMPASS POINTS: A VISIBLE THINKING ROUTINE

This Routine enables students to think about an idea before formulating an opinion about it.

Most students will know what recycling is; this will give them an opportunity to think about the good and challenging aspects of it.



OPTIONAL EXTENSION:

Have students share their thoughts about each question and either write on post-its or write directly onto the compass rose.

ELL MODIFICATION:

Display images of examples and Spanish translations of Vocabulary words on sorting bins.

READY, SET, SORT CONSERVATION B



OPTIONAL EXTENSION:
Complete the microtrash search
as a race between teams.



OPTIONAL EXTENSION:
“I Used to Think... But Now I Think...”
A routine for reflecting on how and why our thinking has changed. This routine helps students to reflect on their thinking about a topic or issue and explore how and why that thinking has changed. It can be useful in consolidating new learning as students identify their new understandings, opinions, and beliefs. By examining and explaining how and why their thinking has changed, students are developing their reasoning abilities and recognizing cause and effect relationships.

Signal the class to return after about 20 minutes. Back in the classroom, have them come up to the sorting bins and share what they found.

Examine the “Microtrash” bin. In it should be items such as pop-tops, bottle caps, glass, screws, and metal nuts. As a class, have the students infer how these objects might harm the condor.

Images

Show videos and images in Microtrash Photo Library. Ask the students to discuss what they see in the nests and in the X-rays that they found lying around the playground.

Return to the Compass Points Activity that was introduced at the beginning of the lesson. Ask the students if their thoughts have changed regarding trash collection and recycling.

If there is extra time, have the students frame their learning with “I Used to Think..., But Now I think...”

A Visible Thinking Routine for reflecting on how and why our thinking has changed. This can also be done independently in their Observation Journals.

Remind students of the issue of trash and recycling. Have students write a response using each of the sentence stems:

- I used to think...
- But now, I think...

PARTNER PARTY CONSERVATION C

Rationale

In order to understand the complex relationship between partners in the Condor Recovery Program, students will participate in a chalk-talk.

Objectives

1. Students identify needs the needs and resources of the partners in the Recovery Program
2. Students understand the complexity involved in sustaining the Recovery Program

Aligned Standards

NGSS: Communicating Information; Causation and Structure, Function and Stability, Change
LS2.C: Changes in the Recovery Program affect changes in the habitat and resources available to condors.

Time

One-day lesson
Teaching time: one hour (approximately)

Vocabulary

refuge
sustain
conservation

Tech Integration

SD Zoo Collaboration:
<http://bcove.me/sbypgumt>
SD Zoo captive feeding:
<https://youtu.be/ljRelaouFD0>

Materials

White-board materials or poster/marker

PROCEDURE – DAY 1

CREATE (15 minutes)

Create a “Partners” list either on white-board or poster. The class will work to define the roles of zoos (Oregon, San Diego, Los Angeles, Santa Barbara), national wildlife refuges (Hopper Mountain, Bitter Creek), captive breeding facilities (The Peregrine Fund in Boise, ID; San Diego Zoo, Oregon Zoo, Los Angeles Zoo etc.), national parks, wildlife preserves, and sanctuaries (Pinnacles, Sespe, Wind Wolves), and Societies (Ventana Wildlife Society).

Where to find information on the roles of partners:

2013 HMNWRC California Condor Recovery Program Annual Report, “Introduction” pages 1-3.

JOURNAL (40 minutes)

Shows the informational videos (collaboration between San Diego and Chapultec captive breeding). Students participate in a “chalk talk.” In this silent activity, posters for each question are posted around the room and students write responses to questions. Student can respond to each other’s answers or further questions as written on the chalk-talk sheets. Questions might include:

1. What is valuable about the role of zoos in condor conservation?
2. What does it take to be a conservationist?
3. What have you learned about Refuges?
4. What role can a 3rd Grade class play in California Condor Conservation?

PARTNER PARTY CONSERVATION C

.....
One-day lesson
Teaching time: one hour
(approximately)



OPTIONAL EXTENSION:

Use transparencies. Students should form groups of three. Together, the group should create a “geography base map” on a blank sheet of paper. This should include hills, mountains, rivers, buildings, etc. Individually, students create maps on their own transparency sheet. Drawing with their transparency over the base map, one student creates a map where endangered plants reside. One student creates a map where endangered animals reside. One student creates a map where refuges, parks, and habitat preserves reside. The transparencies should be created individually, without group members seeing. When all three transparencies are complete, combine all three over the base map. Allow students to reflect on where towns, endangered species, and preserves intersect. Talk about the ways in which Partners in habitat conservation must work individually and must come together to collaborate.

Before you begin

Prepare to project and play the two videos on conservation collaboration.

What to do

The partners involved with the Condor Recovery Program work within their own organizations and collaborate together under the direction of U.S. Fish & Wildlife Service. See 2013 HMNWR California Condor Recovery Program Annual Report’s “Introduction” on pages 1-3 for more background information. These partnerships are united under the goal of conservation. They operate in roles that sometimes overlap and evolve as the program changes.

Create

Create a “Partners” list to expand which organizations and groups are involved in the Condor Recovery Program. A good place to begin might be Nest Management and Zoos. Ask students to recall information about nest monitors from the Nest Tech lessons in the Biology Module. List nest monitors and wildlife biologists under Zoos and Refuges like Hopper Mountain and Bitter Creek. Add the Oregon Zoo, San Diego Zoo, Los Angeles Zoo, and Santa Barbara Zoo to the list of zoos involved. Note that the LA Zoo and SD Zoo do quite a bit of veterinary work. Breeding locations include The Peregrine Fund in Boise, ID; San Diego; Oregon; and LA Zoos. Watch a feeding video: <https://youtu.be/ljRelaouFD0>. Ask the students, “What is happening in this video?” “What partner is involved and how does the partner function?” Define habitat preserves and national parks and include Pinnacles, Sespe, and Wind Wolves. Ask the students to rate the level of accessibility of each organization or area.

When many of the partners are listed on the board, direct the students’ attention to the projection of a video about the collaboration between the San Diego Zoo and the Chapultec Zoo (<http://bcove.me/sbypgumt>). Note the logos of the partners that introduce the video. With this partnership, talk about the range of the condors overlapping the boundaries of states and countries. Ask the students where boundaries exist for responsibilities, habitat preservation, or conservation.

Chalk Talk

The purpose of Chalk Talk is to learn what others think or know about an idea or word. Before anyone says anything about the questions for this chalk talk, tell the class we are going to do our activity in silence. There is to be no talking out loud, only talking on paper! Tell the class that you will split them up into 4 groups and send each group to a different sheet of paper. On that paper, each person is to take a marker and respond to the question on it. They can write what they know about it, something it reminds them of, or even draw a picture of an answer. Their comments and drawings need to be appropriate and will be discussed as a class. After 3 minutes, you will ring a bell and the groups will rotate. This time, they will examine the previous group’s comments and drawings. They can respond with stars if they see something they like or agree with. They can also use question marks if they have a question about it. Then they will add their own comments and drawings. This will continue until all 4 groups have visited all 4 sheets of paper.

Set up 4 giant post-its and write the following questions:

1. What is valuable about the role of zoos in condor conservation?
2. What does it take to be a conservationist?
3. What have you learned about the Refuges?
4. What role can a 3rd Grade class play in Condor Conservation?

POPULATION POINTERS CONSERVATION D

Rationale

In order to engage with math and condor population statistics, students will use graphing techniques to illustrate population data.

Objectives

1. Students identify the chronology of condor population numbers
2. Students understand the sense of urgency in the recovery program
3. Students practice math and data skills

Aligned Standards

NGSS: Analyzing Data and Using Mathematics; Scale and Stability, Change
ESS3.B: Hazards to condors include micro-trash, lead, hunting, etc. (3-ESS3-1)
LS2.C: When food and habitat resources decline, the population declines. The question of condor resilience is proposed. The Condor Recovery Program's efforts are a partner in resilience but also a layer of the dynamic in the ecosystem.
3.NBT.A.1 Place Value

Time

One-day lesson
Teaching time: 45 minutes (approximately)

Materials

M&M's, population charts, data chart organizer

Tech Integration

Population charts photo library

Vocabulary

endangered
extinct
population
recovery

PROCEDURE – DAY 1

IMAGES (10 minutes)

Look through different ways of charting population change. (Digital chart images)

DATA (15 minutes)

The teacher should pass out m&m's and data chart worksheet while framing the lesson as conservationists in charge of communicating data.

GRAPH (30 minutes)

The students should create a key on their chart and select colors of M&M's to represent 1s, 5s, 10s, and 100s. Using M&M's the students should graphically represent the population info given in the various population charts. (i.e. For a population of 61 where blue is 10 and red is 1, the student should add 6 blue and 1 red M&M's.)

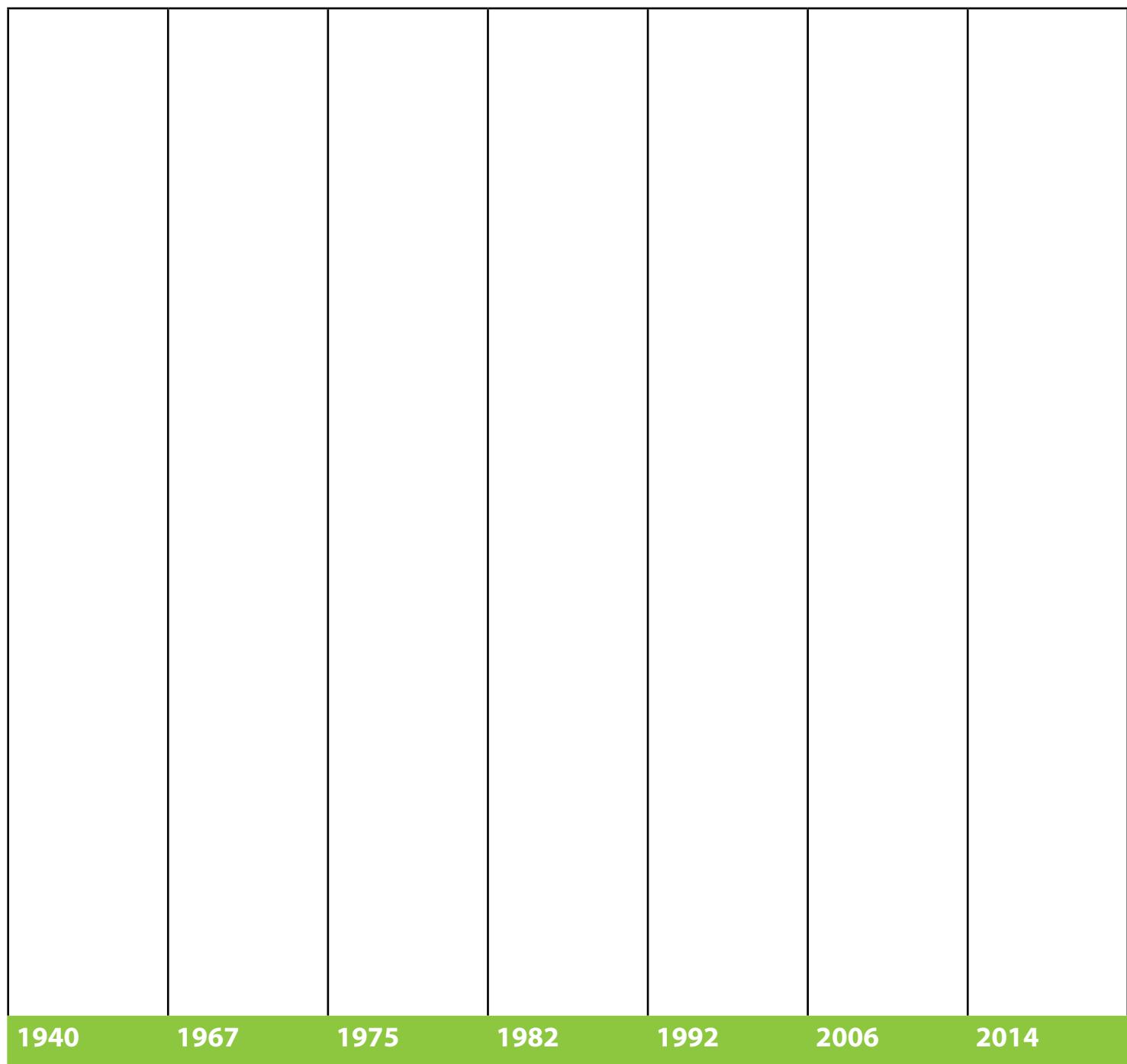
POPULATION POINTERS

CONSERVATION D

Year	Population
1940's	About 150
1967	61
1975	31
1982	22
1992	93
2006	284
2014	432

Key:

Color	Number



Before you begin

Obtain M&M's or another small snack for counting.

What to do

The condor population has experienced drastic changes over the past 55 years. It is amazing to see how the conservation efforts have affected the success of these birds.

Conservationists use many different tools to determine steps toward successful recovery. One of these tools is statistics. Statistics are numbers that can be used to show growth or decline over time. In this unit, we have looked at condor population in many different ways. Here are a few more ways to think of the numbers.

Images

Project digital chart images of condor population change. Explain the different kinds of charts that represent numbers visually. Pass out the bar graph chart and make sure the class understands that they will be charting population by year (x-axis). Demonstrate the use of M&M's in this activity. Red ones will represent groups of 100, blue ones will represent groups of 10, and yellow ones are ones. Ask the class, "What colors do we want to see in each column?" "What does it mean when we don't have any reds?" Possible responses will be, "Then there aren't very many birds" or "birds have died."

Data and Graph

For the year 1940, each student should place one red M&M and 5 blue M&M's in a straight line from the bottom to the top. Be sure that the class understands the importance of the COLORS, not the number of M&M's total. This is a skill in number sense that will be good to reinforce. Also remind them that population means ALL of the birds in the world. Ask them if they think 150 is a big number. Speculate, when this number was counted, do you think it was declining from a higher number?

- For the year 1967, notice there will be no red M&M's, 6 blue ones, and one yellow one. Ask the class what they think is happening. Is that a big change? Can they do the math? How many died?
- For 1975, once again, no red M&M's and now only 3 blue ones and one yellow one. Ask the class to do the subtraction.
- For 1982, use 2 blue M&M's and 2 yellow. Indicate that this was the year that people became very concerned. 22 birds... that is likely less than the number of students in your class!
- In 1992, something must've changed because now we need 9 blue M&M's and 3 yellow ones! What do they think happened? (This was when they captured all of the wild condors and bred them in captivity.)
- In 2006, there was an even more drastic change; we need 2 red M&M's, 8 blue ones, and 4 yellow!
- Finally, 2014, where we see the biggest growth, 4 red M&M's, 3 blue ones, and 2 yellow ones. What is contributing to this success?

Have students draw colored circles to represent M&M's onto their charts and put actual M&M's in a baggie to take home.

One-day lesson

Teaching time: 45 minutes
(approximately)



OPTIONAL EXTENSION:

Write "Red=100, Blue=10, and

Yellow=1" on the board for reference.

ENGINEERING INQUIRY PROJECTS

OBJECTIVES:

1. Define a simple design problem with specific criteria for possible constraints and a successful outcome. (NGSS 3-5-ETS1-1)
2. Generate and compare possible solutions to a problem relative to the established criteria. (NGSS 3-5-ETS1-2)
3. Plan and carry out fair tests with controllable variables. (NGSS 3-5-ETS1-3)

SUGGESTED PROBLEMS FOR INQUIRY:

1. Microtrash in the environment that makes its way from the city to the condor's nest.
2. Lack of signage and knowledge about California Condor habitat and recovery.
3. Land that could be conserved for recovery programs is currently unprotected.

SUGGESTED PLACES TO BEGIN RESEARCH:

1. Vultures: <http://kids.nationalgeographic.com/explore/nature/vultures/>
2. Threats: <http://lpfw.org/our-region/wildlife/california-condor/>
3. Microtrash: <http://lpfw.org/get-involved/volunteer/microtrash/>
4. Conservation: <http://animals.sandiegozoo.org/animals/california-condor>

SUGGESTED METHOD:

1. Define the problem
2. Do background research
3. Specify criteria
4. Brainstorm, evaluate, and choose solution
5. Develop prototype solution
6. Test solution
7. Communicate results

GLOSSARY

ADAPTATION: a change in an animal that helps the animal to be better suited to its surroundings

ADAPT: to change slowly from one way of life to another

ADULT: an animal that is fully developed

BIOFACT: a “biological artifact” for the purpose of study

BIOLOGISTS: scientists that focus on plants and animals

BROODING: taking care of the egg or chick at the nest

CAPTIVE REARING: raising chicks in a closed environment

CARCASS: the body of an animal that has died

CAVITY: an empty space

CHUMASH: the people group native to the central California coast

CONSERVATION: any idea or action that tries to protect, keep something going, restore, or save

CONSERVATIONIST: a person who works to protect and restore plants or animals

ECOSYSTEM: all the living things and the place where they live

ENDANGERED: the point at which the number of a species becomes very low

EXPLORER: a person who explores an area, an adventurer

EXTINCT: to die out, the point at which there are no more animals of a certain kind

FEEDING EVENT: a social event where many animals feed at the same time

FLEDGE: to take flight for the first time

FLOCK: a group of birds

FOOD WEB: a chart that shows how energy flows in a system

FORAGE: to search for food

HABITAT: the places where certain plants or animals live

HATCHLING: the name given to a baby bird that has just hatched

INCUBATE: to protect and keep warm

INGESTION: to take in, to eat

JUVENILE: this refers to the age between a chick and an adult

LEAD POISONING: this refers to when an animal eats

something that is harmful to its body. In this case, when an animal eats lead, it becomes difficult for the animal’s stomach to digest food. This usually leads to starvation.

MICROTRASH: small, dime-sized trash

MINER: a person who works in a mine

MOLT: to lose feathers and gain new ones

NATURALIST: a person who cares for and studies nature

NEST SITE: the place and the surroundings where a nest is located

NEST TECH: short for Nest Technician; a wildlife biologist in charge of documenting, entering nests, and caring for young

NESTLING: a young condor that lives in the nest

PERCH: a resting space for a condor

POPULATION: the number of plants or animals in a group

PREDATOR: animals that hunt and catch smaller or weaker animals for food

PRESERVE: to take care

PREY: an animal that is hunted and killed by another animal

RANCHO: a large area of land used for crops or livestock

RANGE: a set area

RECOVERY: returning to an earlier condition

REFUGE: a safe place

ROOST: a space, like a tree, where the condor can rest at night

SCAVENGER: this refers to animals that search for their food

SOAR: to fly high in the air, without much flapping motion

SOCIALIZATION: to learn or copy the behavior of others

SPECIES: a group of plants or animals that is similar

SUB-ADULT: this refers to the age between a juvenile and an adult

SURVEY: a way to study or collect data

SUSTAIN: to strengthen and support

SYMBOL: a thing that stands for something else

VIGILANCE: to keep watch

VULTURE: a kind of bird that searches for dead animals to eat. They are usually large, with sharp beaks and bald heads. Most types of vultures are endangered.

WINGSPAN: the measurement from the tip of one wing to the tip of the other wing



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