

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

Time

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

Vocabulary

wingspan
species
adaptation

Materials

Straws, pencils, Popsicle® sticks, tape, glue

Tech Integration

X-ray photo library

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 (ballons, 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.

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 (ballons, 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.

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.