

Feathered Friends

SDH 2017

OVERVIEW:

If only we could all jump into the air and soar like birds, our feathered friends. In this class students will open their eyes in wonder as they explore the natural world of birds. They will investigate the homes and habitats of small birds, hawks, eagles, and owls native to the San Bernardino Mountains. They will experiment how parts of an ecosystem can affect each other.

OBJECTIVES:

Students will be able to:

-) Identify a diversity of local birds and their adaptations.
-) Explain the interdependence birds have within an ecosystem.
-) Summarize the interrelationship between birds and our communities.
-) Hypothesize how what we can learn from birds applies to other living things.

VOCABULARY:

Adaptation

Binocular Vision

Bioaccumulation

Biomagnification

Camouflage

Consumer

Contour Feather

Downy Feather

Ecosystem

Food Chain

Food Web

FWARPS

Habitat

Hollow Bones

Limiting Factor

Monocular Vision

Niche

Predator

Prey

NEXT GENERATION SCIENCE STANDARDS:

-) Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. (5-LS2.A)
-) Human activities have significantly altered the biosphere, sometimes damaging and destroying natural habitats and causing the extinction of other species. (MS-ESS3.C)

MATERIALS:

pictures of local birds
contour and downy feathers
beak bag (beaks and food)
carpet squares or mats
poker chips

PROCEDURES:

1. Introductory Activity: Bird Watching (found in the activity glossary)
 - A. Set the tone by having the group sit quietly...remind them that most animals will remain hidden if there is too much noise.
 - B. Debrief: What birds did you see? How can you identify birds? Briefly touch on location, color, size, sound, etc. It is good to study an area so you know what kind of birds to expect. Then, you have a short list of options to choose from. Rare/migratory birds are probably only going to be seen if you have done the research to notice them. If you did not see any birds, is there evidence of birds nearby? Why might you not have seen any birds?
2. Characteristics of a Bird Discussion
 - A. As students come up with characteristics, explain **adaptations** for a bird's lifestyle and the need for **camouflage**.
 - B. Feathers: Explain the difference between **downy** and **contour feathers**. Show students different feathers.
 - C. **Hollow bones**: Explain how bones link to flight. Explain that bones are not truly hollow like a straw. The connections inside are much more delicate, wire thin instead of densely packed like in a t-bone steak.

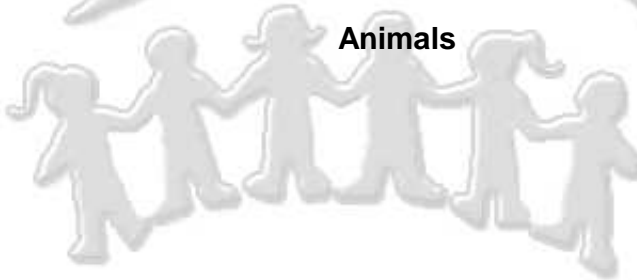
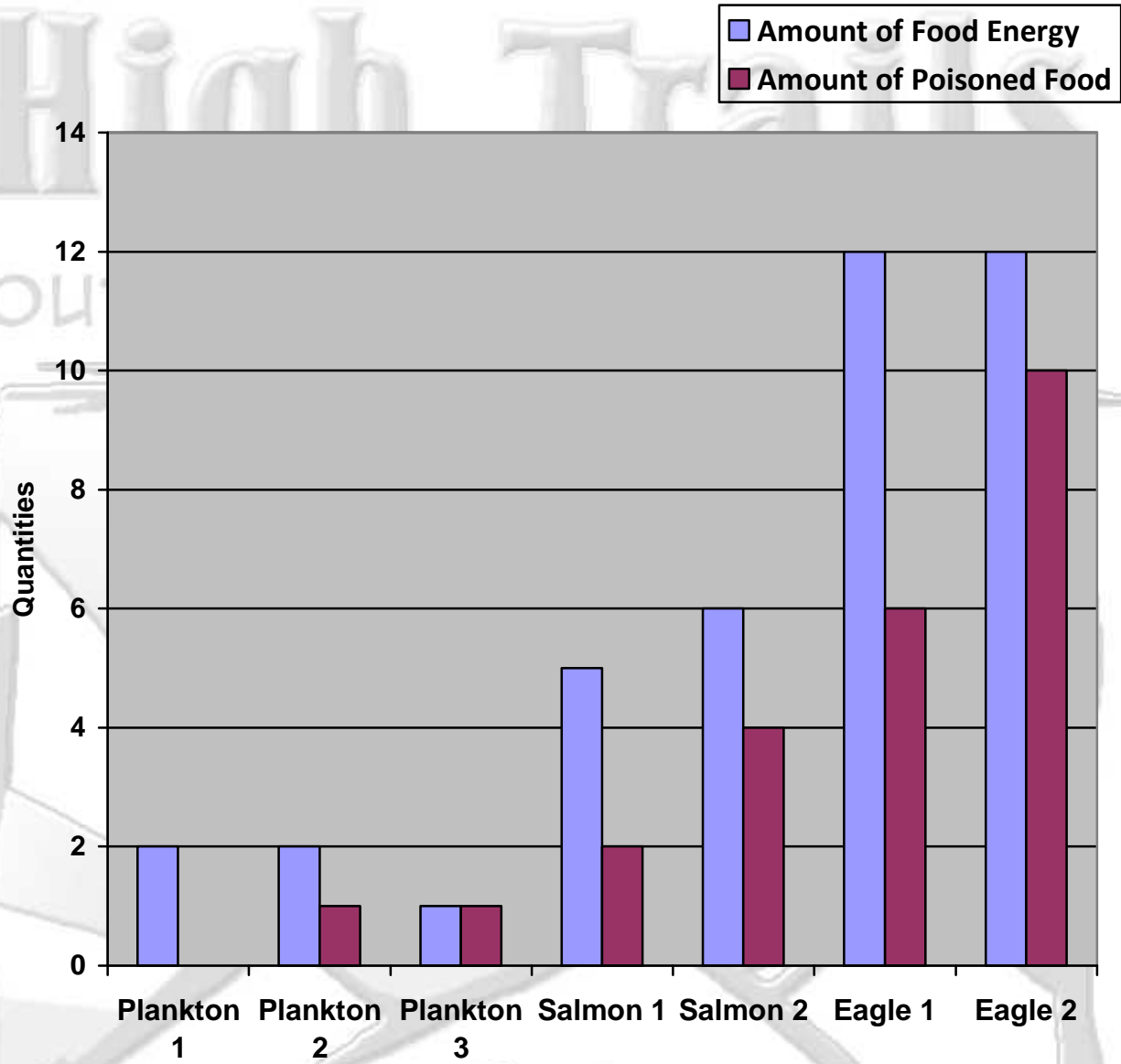
- D. Eyes/Vision: Explain the structure and function of **monocular** and **binocular vision** and how it links to **prey** and **predators**.
- Activity: Goggles (found in activity glossary/activity video)
 - Debrief: What is one pro and one con to binocular vision? What is one pro and one con to monocular vision? Discuss with a partner which type of vision is better for predators/prey. Why?
- E. Feet: Have students share different bird feet and their uses.
- F. Beaks: Have students share different beaks and their uses.
- Activity: Beak Relay (found in activity glossary)
 - Debrief: If desired, set a point value bird families need to achieve for survival. Are certain food types more desirable based on your beak type? What could happen to the bird population if a food source is eliminated from the food web? What are food sources for birds in this area? How can we protect them?
3. Lifestyle of a Bird Discussion
- Point out a bird in the forest or show a picture of a local bird. Have students theorize what is needed in its **habitat**.
 - Review **FWARPS**. Discuss habitat changes and **limiting factors**.
 - Activity: Migration Headache (found in activity glossary)
 - Debrief: What FWARPS was the limiting factor in the activity? (Space). Big Bear has areas off-limits to humans, closing parks where Bald Eagles have nested, during breeding seasons.
4. The Bird's Role Discussion
- Pick a local bird, and discuss its' role in the **ecosystem**. What does it eat? Determine that one of a birds' **niches** is to be a **consumer**. Many birds control the insect population and may take secondary roles pollinating or dispersing seeds for plants.
 - Have students theorize what different types of birds consume: berries, seeds, grasshoppers, snakes, other birds, etc.
 - Use pictures and items in the forest to have student hypothesize a **food chain** (acorn-squirrel-hawk). Reiterate that birds are consumers.
 - Rearrange pictures and items to demonstrate a **food web** (acorn-woodpecker/squirrel-snake-coyote/hawk). Have students make inferences about the changes to a food chain if pollution gets introduced.
5. Experiment: Deadly Links
- Conduct experiment.
 - Utilize white board to bar graph the results.
 - Debrief: How does pollution affect changes in different stages of the food chain? How does this activity demonstrate **bioaccumulation** (the increase of a toxic substance in an organism) and **biomagnification** (the increase of a toxic substance in the food chain)? Chemicals like fertilizer are spread across fields and keep crops healthy, but in turn they might add pollution to waterways. How can contaminated plankton affect humans? How can humans help the bald eagle food chain? See if students can apply these concepts to another bird or animal. For example, the Pacific Coast Albatross eats fish – not plastic. So how does it die from a stomach full of plastic? How do humans get mercury poisoning? (Often, by eating too many fish that eat mercury in polluted water).
6. Wrap Up
- [*What?*] Concisely review the major points of the lesson, all the way back from the introductory activity.
 - [*So what?*] What was important for you to discover from the lesson? Why was it important for all of us to take this class?
 - [*Now what?*] What can you now do with this information? What changes can you make in your life? What can you teach to others? Who will you tell? What will you say?
 - Pass out beads after all students have contributed.

THINGS TO THINK ABOUT:

Time Fillers: A scavenger hunt for signs of birds: 1 Stellar's Jay, 2 snags, 1 nest, etc.

Weather: Feathered Friends activities can be done in a variety of locations. If we get pushed inside we will still be able to carry out most of this lesson plan.

Sample Graph for 'Deadly Links'



Animals