**Upper Park Discovery Hike**

**60 minute**

**Theme:** Bidwell Park has different ecosystems that inhabit a variety of animals. The park has an interesting history that is revealed to us through geology.

**Goal:** To make observations about the various ecosystems and how animals interact and survive in those ecosystems. Learning about the geological history of Bidwell Park.

**Destination:** Meet at Parking Lot E and welcome group to Upper Bidwell Park. The hike will take you up the hill a bit to look at the chaparral habitat, then down to the creek to look at riparian.

**Materials:** pelts, backpack with rocks, rock cycle diagrams, volcano layers of the earth, hand lenses.

**Overview:**

INIWIRMO, Chaparral and Riparian ecosystem comparison, Pyramid of Life activity.

**Introduction/ Habitat discussion:**

Upper Bidwell Park is a diverse place with a variety of ecosystems, geology and animals. We are going to be learning about the unique ecosystems and how the animals that live here survive and interact with nature. We will also be observing the different ecosystems. *What is a habitat?* (A place in the environment inhabited by a particular animal or plant; where it lives out its life.) *What are the four things a living thing needs for a suitable habitat?* (food, water, shelter, and space). Groups often have trouble guessing space.  A great way to illustrate this is to have everyone skoosh in and huddle together as close as they can.  Ask if they’re comfortable this way; if they could live each day this way (they invariably answer “NO!”). *So what’s the fourth thing that animals need in their habitat?* (“SPACE!!”). Habitat is: where a plant or animal finds everything it needs to live. *What is your habitat?* Compare similarity between habitat to home or neighborhood, and community. In a neighborhood, you find water from tap, food from store, you live in a house, and your house is your space.

We are going to observe this chaparral ecosystem. Stay behind leader (they know where they’re going), and stay on trail (avoid poison oak and snakes). Continue up Middle Trail along base of Monkey Face and then turn right towards Lower Trail.  Look down to the Valley and discuss habitat *transition* from valley grassland to foothill woodland, which includes this chaparral shrubland (few trees, mostly grasses, flowering plants and shrubs). Contrast deep rich soils of the valley/ valley oak and the shallow, rocky soils of the transition zone/blue oak.

**INIWIRMO:** For inquiry fever, send on hunt for evidence of food, water, shelter, space. What animals might use this ecosystem for their habitat?

Buckbrush, blackberries can be both a food and shelter component of habitat.  *What might eat it?* (deer, rabbits) *What might use it for shelter?* (rodents, rabbits, birds, lizards, snakes) *Why?* Protection offered by dense branches, thorns.

**Geology Intro and Rock exploration:**

*What is Geology?* “-ology” is: the study of something. “Geo” means: earth. So, geology is: the study of the earth and its history as it is written in the rocks. Geology is the composition of the land and how it is shaped. The shape and composition of the land affects the climate, elevation, water storage, and therefore the plant and animal species that live in any given area.

*What is a rock?* A rock is: a solid piece of the matter that makes up the crust of the earth. Rocks are made up of minerals, which are naturally occurring chemical compounds. Ask for examples of minerals. Examples: copper, iron pyrite, quartz, gold etc…  Use the Rock and Mineral chart to show that minerals always have the same properties (hardness, cleavage, color, luster and streak).

Compare rocks to cookies. Prompt students to think of a cookie. They are all likely thinking of different kinds of cookies or even similar types of cookies with slightly different ingredients. There are lots of kinds of cookies, they have different ingredients. Even if every student is thinking of a chocolate chip cookie, they will each have their own idea of a chocolate chip cookie. Some might have dark chocolate or white chocolate, some might have walnuts or almonds. Rocks are like cookies, the minerals are the ingredients. Every cookie or rock has different combinations and amounts of ingredients or minerals.

**Stop at the Conglomerate Wall (volcanic sedimentary)**

A phenomenon happened here millions of years ago. Allow students to partner up and use their hand lenses, and to carefully touch the wall to come up with a story of how this rock formation happened. Give a few minutes to explore and then talk with each other. Ask prompting questions such as *“Can you tell me more about that? Or why do you think that? How does this formation look? How would they describe its appearance? Do you notice any patterns?”* After a short time ask for their ideas. Then share that this conglomerate wall was originally formed by a series of volcanic eruptions that occurred 1-4 million years ago which resulted in massive mudflows and the formation of a “lahar” (in this local case resulting in the Tuscan Formation). Use the volcano diagram to illustrate that water - which came from either the volcano erupting and expelling water from within the caldera or melting the snow-capped peaks - resulted in sediments and rocks being transported and deposited downhill. These sediments compressed to form this sedimentary rock formation, with the rocks and pebbles being cemented together by the minerals like glue.

The layers are different. Ask for observations (any patterns?) on the differences between layers.  Layers where there are fine particles at the base graduating to larger particles at the top tell us that a stream flowed there for a while between mud flows. Layers where all the particles are jumbled together (cobbling), all sizes in no particular order shows us where mud flowed from another slide or eruption. Mudflow= cobblestone – the finer sediment shows the creek flowing. Mudflow was from a mountain near SW of Almanor.

**Discussion:** How has the environmental changes over time altered this areas environment, habitats and the animals that live or once lived here? Elaborate on evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

**Stop 2**

**(@ bench overlooking dry creek)**

Briefly point out the boulders resting on the surface all over the place up the hill toward Monkey Face.  Ask if anyone has a notion how they got there. Relate it back to the lahar. Point out the nearby creek and explain that over a great length of time, water causes erosion, exposing the conglomerate walls/cliffs of the canyon and washing away softer and lighter materials, leaving the boulders behind. Mudflows can carry 6 inches of fast flowing water. Can move car. Mudflow moved boulders then water washed away everything but boulders. **~5 minutes**

**Rock Activity**

Get students into small groups of 3. Distribute 3 rock samples and hand lens. Ask them what they notice about each type. Explain that these are the three different layers of rock in Bidwell Park.

**Pyramid of Life Activity**

Gather at knoll and inquire, *“Why do animals eat?* (mainly for energy!)  *“What about plants? Where do they get their energy from?* (the SUN!). Display Pyramid of Life Diagram.  All living things require energy, and ultimately it all comes from the sun. But only plants can directly use the sun to produce their own food/energy – via **photosynthesis** – so we call them **producers**.  These form the broad base of our pyramid, and indeed, when we explore our natural world for signs of life we find mostly plants. Plants are then eaten (or consumed) by animals, which we call **consumers**.  All animals are consumers. Energy is transferred to the next level. *Animals that only eat plants are called what?*  Herbivores or **primary consumers**. Animals that eat animals that eat plants are called carnivores or **secondary** **consumers**. And animals at the top of the food chain (apex predators) are called **tertiary consumers**. At each trophic level energy is transferred, but most of the energy is lost, hence the pyramid shape.  Look around you and you will see mostly plants, insects and other invertebrates (mostly herbivores)…followed by carnivores. There are relatively very few tertiary carnivores such as Mt. Lion, eagles, sharks…

Reinforce key terms and that energy is passed (and lost) as you move along the food chain. Remind students that a food chain is a simple way to illustrate the flow of food energy. In the real world it is a much more complex web.  Each habitat has its own food web, and these are in turn part of larger food webs and interconnect with food webs form adjacent habitats. Use the familiar image of a spider’s web to illustrate how *all things are connected*. Introduce the term **biodiversity** to represent the variety of life in a particular habitat and more complex inter-relationships between the various species. The more biodiverse an ecosystem, the more stable it is.

Creatures have unique roles and provide useful services. Some, like the diurnal hawk and the nocturnal owl, share the same habitat but work different shifts. Others (like vultures) are called **scavengers**, and eat dead animal or plant matter. Fungus, bacteria and many kinds of insects eat dead animal or plant matter and recycle the nutrients back into the soil in the process of **decomposition**.

Put students in groups and give one pelt to each group. Have group figure out where they go on the food chain. Have enough pelts for two food chains to be represented.

**Producer- primary consumer- sec. consumer- apex predator**

Acorn – squirrel (or ring tailed cat) – fox – owl

Twigs (from trees) – beaver – coyote – mountain lion

Head down to the creek and do **INIWIRMO inquiry fever**. Hunt for evidence of habitat. Have groups talk about the differences between the two habitats on the way back. Have everyone make a circle in the parking lot.

Ask: What is one thing you learned today? Give thumbs up. Have students share with neighbors, and then the whole group.

What is something you are grateful for?

**Extended Upper Park Discovery Hike**

**90 minute**

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**Materials:** pelts, backpack with rocks, rock cycle diagrams, volcano layers of the earth, hand lenses.

**Overview:** INIWIRMO, Chaparral and Riparian habitat comparison, Extended Rock exploration sort, Pyramid of Life activity.

**Introduction/ Habitat discussion:**

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**Extended Rock Activity**

Get students into small groups of 3. Distribute 3 rock samples and hand lens. Ask them what they notice about each type. Give them a rock cycle sheet. Have them take a few minutes to identify which type of rock each of the three represents. Go over answers, sharing examples of the rocks. Explain that these are the three different layers of rock in Bidwell Park.

**Pyramid of Life Activity**

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