

JUNIOR RANGER PROGRAM CURRICULUM

Discover the wonders of nature through a multidisciplinary environmental education program, designed for children ages 8-16, with emphasis on exploring the science and the cultural history of the Santa Monica Mountains and beyond.

PARKS AS CLASSROOMS AND PLAYGROUNDS

EXPLORATION

LEADERSHIP

AWARENESS

STEWARDSHIP

TEAM BUILDING

SURVIVAL SKILLS

COMMUNITY OUTREACH



COMMUNICATION

Santa Monica Mountains Conservancy
Mountains Recreation and Conservation Authority

EXPLORATION

LEADERSHIP

STEWARDSHIP

**SURVIVAL
SKILLS**

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**COMMUNITY
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TEAM BUILDING






AWARENESS

JUNIOR RANGERS

The Mountains Recreation and Conservation Authority, and the Santa Monica Mountains Conservancy, offers the opportunity for children ages 8-16 to discover the fascinating world of nature through our Junior Ranger programs. The Conservancy Junior Ranger Program is a co-ed youth program that uses our parks as its classroom and playground. Specifically designed for children with little or no experience of the natural world. The Junior Ranger Program offers a unique combination of environmental science, outdoor skills, experiential learning and leadership activities, and is structured using the best methods of traditional youth organizations.

Conservancy Junior Rangers complete a series of nature courses and outdoor projects designed to meet California state curriculum standards, in a variety of natural science and cultural related subjects, such as: Mammals, Birds, Plants, Native Cultures, Geology, Survival Skills, Biodiversity, Fire Ecology, Reptiles & Amphibians.

Goals:

-  To increase exposure and positive experiences with the natural world
-  Understand conservation and our roles in the environment
-  Develop skills and knowledge necessary for wise decision making and land stewardship
-  Help to forge a sense of pride and respect for the environment while building leadership and responsibility skills
-  Provide opportunities for interactions with Park Professionals and ways to educate others about nature.

Participants who complete the Junior Ranger training program receive an official Junior Ranger badge or patch and a Junior Ranger certificate.

Junior Ranger programs are conducted by trained park professionals, field experts, community leaders, and volunteer naturalists.

TOPIC:

Mammals

KEY TERMS:Herbivores
Carnivores
Omnivores**CURRICULUM
FRAMEWORK:**Ecological Knowledge,
Changes & Adaptations,
Environmental Changes**GRADE LEVEL:**

Grades 3rd - 6th

DURATION:

1.5 hours

GROUP SIZE:

10-15

SETTING:

Outdoor/Indoor

SUPPLIES:Interpretive Props:Restaurant Signs
Mammal CardsHerbivore, Carnivore,
& Omnivore
Skull and/or teeth
replicasPictures:

Grazing Cows

SOURCES:www.window.ucar.edu
www.lalc.k12.ca.us
www.bbc.co.uk
members.aol.com.
WODOC Library

MAMMALS

Mammals and their Meals

THEME:

Despite their variety of shapes and sizes, mammals eat lunch at only 3 restaurants in the world.

SUB-THEMES:

- (1) Mammals that eat only plants are called herbivores.
- (2) Mammals that eat only meat are called carnivores.
- (3) Mammals that eat both plants and animals are called omnivores.

GOALS:

Jr. Rangers will be Inspired to use their observation skills and common sense to learn about what kind of food mammals might eat.

OBJECTIVES:

- (1) 75% will be able to define the differences between herbivores, omnivores, and carnivores.
- (2) 75% will be able to give examples of mammals that have herbivorous, omnivorous, and carnivorous diets.
- (3) 75% will be able to give examples of physical characteristics of mammals that tell us what kind of food they eat.

METHODS USED TO MEASURE OBJECTIVES:

Jr. Rangers will be able to respond correctly to facilitator's questions and conclusion statement.

PREPARATION TIME: 10 MINUTES

1. Pre-cut the Mammal Restaurant signs, and Mammal cards.

INTRODUCTION:

Despite their variety of shapes and sizes, all mammals eat lunch at only 3 restaurants in the world. Are we mammals? Do humans have different types of restaurants? (*Italian, Mexican, Chinese, etc.*) What kinds of food would be on the menu at the Mexican restaurant? (*Tacos, burritos, enchiladas*) What kinds of food would be at the Italian restaurant? (*Spaghetti, garlic bread, pizza, etc.*) What kinds of food would be at the Chinese restaurant? (*Chow main, rice, orange chicken, etc.*) You and I eat at many different types of restaurants and enjoy a variety of foods. We are called omnivores. Omnivores are mammals that can eat both plants and animals. Can all mammals do the same? (*No*) Some mammals can only eat one type of food. Imagine you could only eat plants or meat for the rest of your life, which would you choose? Are there humans who choose to eat only plants? (*Yes, vegetarians*) Being an omnivore we can choose, but not all mammals have that choice. Some mammals only eat plants, some only eat meat, and some like us, can eat both.

ACTIVITY PROCEDURE:

I. **Facilitator, state and show Sub-Theme (1) Mammals that eat only plants are called herbivores.** What are some of your favorite plants to eat? Can you think of a mammal that eats only plants? (*Cow, goat, giraffe, horse, etc.*) Think about the shape of their feet. Are they different from ours, if so how? Facilitator, show picture of cow grazing. What function might they serve? Think about the size and shape of their teeth? Are they sharp like dog's teeth? (*No*) Herbivore's teeth are flatter and smoother, perfect for munching on grass and other plants. Facilitator, show herbivores skull/teeth replica. Allow Jr. Rangers to pass around and feel the teeth. Herbivores only eat _____ (*Plants*) at the *HEAVENLY HERBIVORES CANTINA*.

II. **Facilitator, state and show Sub-Theme (2) Mammals that eat only meat are called carnivores.** What are some of the meats that you eat? Can you think of a mammal that eats only meat? (*Tiger, dogs, raccoons*) Think about the shape of their hands, feet and claws. Are they different from ours, if so how? Facilitator, show picture of a carnivore eating. What function might their claws serve? Think about the size and shape of their teeth? Are they sharp like the cow's teeth? (*No*) Carnivore's teeth are sharp and are perfect for tearing and puncturing flesh. Facilitator, show carnivores skull/teeth replica. Allow Jr. Rangers to pass around and feel the teeth. Do these animals sit around and wait for their food to come by? (*No, they hunt for their food*) Meat is high in proteins and is necessary in their diets to have enough energy to hunt for their food and survive. Carnivores only eat _____ (*Meat*) at the *CARNIVORES CAFÉ*.

III. **Facilitator, state and show Sub-Theme (3) Mammals that eat both plants and animals are called omnivores.** Do you know any omnivores? (*Yes, humans*) Can you think of any mammals that eats both plants and animals? (*Humans, bears, giraffe, horses, etc.*) Think about the shape of their feet. Are they different from ours, if so how? Facilitator, show picture of cow grazing. What function might they serve? Think about the size and shape of their teeth? Are they sharp like dog's teeth? (*No*) Herbivore's teeth are flatter and smoother, perfect for munching on grass and other plants. Facilitator, show herbivores skull/teeth replica. Allow Jr. Rangers to pass around and feel the teeth. Herbivores only eat _____ (*plants*) at the *HEAVENLY HERBIVORES CANTINA*.

CONCLUSION

Today we have seen that mammals have 3 different types of eating habits. Just by looking at them, we can tell if it is an _____, _____, or an _____. (Have the Jr. Rangers fill in the sentence.)

Herbivores

Carnivores

Omnivores

TOPIC:

Animal Adaptation

KEY TERMS:

Adaptation, Habitat

CURRICULUM FRAMEWORK:Interdependency
Interactions

All livings are affected by and interact with their environment.

GRADE LEVEL:

Grades 3rd - 6th

DURATION:

1.5 hours

GROUP SIZE:

10-15

SETTING:

Outdoor/Indoor

SUPPLIES:Perishable Items

(May substitute/adjust to suit logistical needs)

6 small containers

Sunflower Seeds

Gummy Worms

Mini Marshmallows

Soaked red tissue paper

Chopsticks, toothpicks

Straws, clothespins

Small strainer,

Dirt & leaves,

Raptor talon replica

Duck foot replica

Coot foot replica

Swimming fins

Pictures of various birds

beaks, wings and feet

Toy helicopter

Toy airplane

SOURCES:www.window.ucar.eduwww.lalc.k12.ca.uswww.bbc.co.ukmembers.aol.com

WODOC Library

BIRDS

Birds can't hide their BEAKS, WINGS and FEET !

THEME:

You can tell a lot about what a bird might eat, and where it lives, just by looking at it.

SUB-THEMES:

- (1) The shape and size of a bird's beak gives us clues to what it eats.
- (2) The shape of a bird's wings reveal how and where it lives.
- (3) The shape of a bird's feet can help us determine where it lives and what it eats.

GOALS:

Jr. Rangers will be inspired to use observation skills and common sense to learn about where birds might live, and what they eat.

OBJECTIVES:

- (1) 75% will know that a bird's beak, wings and feet tell us where it might live and what it eats.
- (2) 75% will be able to match a bird's beak type with what it eats.
- (3) 75% will be able to match a type of wing to a bird's habitat.
- (4) 75% will be able to match a type of bird's feet with its habitat.

METHODS USED TO MEASURE OBJECTIVES:

Jr. Rangers will be able to respond correctly to facilitators questions and conclusion statement.

PREPARATION TIME: 20 MINUTES

1. **Bird Feeding Ground Containers:** Fill any 6 small containers with a variety of pretend bird food. In 2 containers, mix sunflower seeds and gummy worms with dirt and leaves. In 2 containers, fill with water and mini marshmallows. In 2 containers, place soaked red tissue paper.
2. **Different types of bird's beaks:** Place next to containers, chopsticks, toothpicks, straws, clothespin and small strainer. Have Jr. Rangers match the bird beak with what it eats.
3. **Interpretive Props:** Have foot and talon replicas, and pictures of various birds beaks, wings, and feet ready to show Jr. Rangers.

EXPANSION: Allow time for Jr. Rangers to practice their bird observation skills outdoors, or through a window. Encourage them to sketch, count, or journal their observations.**SPECIAL CONSIDERATIONS:** Facilitator may substitute or adjust program supplies or procedures to best suit logistical and site needs. Some of the supplies are perishable, therefore you may need to replenish these items when needed. Jr. Rangers may also want to eat the pretend bird food. Use wise discretion when allowing or prohibiting this behavior.

INTRODUCTION: “You can tell a lot about what a bird might eat, and where it lives, just by looking at it. We can do the same just by looking at ourselves. What kind of food do we like to eat? What tools do we use to eat our food? (*Forks, spoons or knives*) Imagine eating all of your food without using forks, spoons or knives. We would have to change what, and how we ate. We have built-in tools to eat our food, what do you think those might be? (*Hands, nails, teeth, tongue*) What kinds of food would you eat using your own eating tools? Do birds have built-in eating tools? (*Yes, beaks and feet*) Birds have another built-in feature that reveal where and how it might find its food. If you were a bird that finds its food by soaring high in the sky, what built-in feature would you need to keep you flying and finding food? (*Exactly, wings*) So birds have built-in features that we can just look at to determine what it might eat, and where it lives. What are those features again? (*Beaks, wings, and feet*) Do all birds have the same size and shape of their beaks, wings and feet? (*No, many different sizes*) Let’s take a look at some examples of just how different these sizes and shapes can be.

ACTIVITY PROCEDURE:

I. **Facilitator, state and show Sub-Theme (1) The shape and size of a bird’s beak gives us clues to what it eats.** Begin this activity by showing Jr. Rangers the various sizes and shapes of birds beaks. Introduce the various functions of bird’s beaks, i.e., spearing, sucking, straining, tearing, picking, seed or nut. Ask provoking questions for each picture, such as: Look at the size and shape of this bird’s beak, what do you think it eats? What function does it have?

INTERPRETIVE TECHNIQUE: Have Jr. Rangers move both middle and index finger together like a duck’s beaks. Have them pretend to bite their opposite index finger using this motion. Next, have them curl both middle and index finger like a hawk’s beak. Again, try to bite the opposite index finger. Which one is stronger? Which one would be best for insects, plants and small fish? Which one would be best for ripping and tearing flesh?

II. **Facilitator, state and show Sub-Theme (2) The shape of a bird’s wings, reveal how it finds food, and where it lives.** What do we have that is similar to birds wings? (*Arms*) Can we fly. Encourage Jr. Rangers to stand up and flap their arms fast enough to fly? What have we made to help us fly? (*Airplanes and helicopters*) Show toy airplane. Stretch your arms wide just like an airplane. What types of birds fly with their wings spread just like this? (*Hawks and eagles*) Do they fly high in the sky, or low and in between the trees? (*High in the sky*) Now, bring arms close in to imitate a small short winged bird, and flap your hands fast like wings. Which wings would be best for flying through a thick oak tree forest? (*Short*) Let’s test this theory out. **ACTIVE GAME:** Randomly choose one Jr. Ranger to be a hawk with wide wings, and another to be a squirrel. The remaining rangers are a thick oak tree forest, standing frozen, close together, with arms stretched out like tree limbs. On facilitator’s instruction, the hawk has 10 seconds to chase the squirrel through the oak tree forest. Ask, was this easy or difficult for the hawk to find food? (*Difficult*) Now, instruct all the trees to kneel down and allow the hawk to fly above their tree tops. Was this easier for the hawk? (*Yes*) Now the hawk is a scrub jay with small short wings, and the squirrel is an insect. Instruct the trees to rise again so that the scrub jay may fly through and catch its food. Allow 10 seconds for the scrub jay to catch the insect. Was this easier then the hawk? (*Much easier*) If we know that a hawk finds food easier when it is up high, where do you think its nest might be? (*High*) Where would a scrub jay’s nest be? (*Low*) Conclude the activity by asking the group what feature they can look for on a bird to determine how it finds food and where it might live. (*Wings*)

III. **Facilitator, state and show Sub-Theme (2) The shape of a bird’s feet, can help us determine where it hangs out and what it eats.** Begin by asking the Jr. Rangers to think about what their own feet look like. Are they strong enough to tear flesh? Ask them what nail shape would be the best for tearing flesh? (*Sharp and pointy*) Show the group the raptor talon replica. Ask them if this nail would do the job. Allow them to gently touch the tip of the talon. Can you guess what types of birds need nails like this? (*Birds of prey, like hawks and eagles*)

Ask Jr. Rangers if they wear different shoes for different conditions. Would you wear sandals or boots in the rain? Ask the group, which hand shape is best for swimming, fingers wide open or together? Sometimes do we wear shoes to help us swim better? (Yes, *swimming fins*) Bring out the swimming fin. Are there birds that have feet similar to this? (Yes, *ducks*) Pass around duck foot replica, and show picture.

Next, choose a Jr. Ranger to put on the swimming fins. Have them walk around in them and ask if they are easy to walk in. Next, imagine that you liked to eat insects, plants and small fish near the edge of a muddy lake or pond. Would these feet be good for that? (No) What shape of foot would be good for walking in thick mud and through plants? (Not *webbed feet*) Show American Coot foot replica. Ask if this foot shape would be a better match for that habitat? (Yes) This bird looks like a duck, but has different shaped feet. Show picture of American Coot. Notice their large greenish yellow fingers, perfect for walking and searching for food in the mud.

Continue to show pictures of the different shaped bird feet and ask provoking questions for each, such as: with the size and shape of this bird's feet, where do you think it lives? How does it help this bird find and eat food? Birds don't wear shoes so their feet are always perfect for their surroundings.

CONCLUSION

You can tell a lot about a bird, just by looking at it. Today we have seen that we can tell a lot about what a bird might eat and where it lives just by just looking at its _____, _____ & _____. (Have the Jr. Rangers fill in the sentence.)
Beaks Wings Feet

GEOLOGY

Moving More than Mountains

KEY TERMS:

Plate Tectonics
Mountain Building
Rock Cycle
Uplift and erosion
Geologic History

CURRICULUM FRAMEWORK:

Changes and Natural Formations
Properties of rocks and minerals reflect the processes that formed them.

GRADE LEVEL:

Grades 3rd - 6th

DURATION:

1.5 hours

GROUP SIZE:

10-15

SETTING:

Indoors

SUPPLIES:

Box of graham crackers
Boxes of fruit roll ups
Can of frosting
Cup of water
Wax paper
Plastic knives or forks
Plastic and wood box
Bag of flour
Bag of sand
Board or flip chart
Pictures or diagrams of the rock cycle and plate tectonic boundaries
Any pictures or maps of the Santa Monica Mts.
Rock samples of Igneous, metamorphic and sedimentary rocks collected locally

SOURCES:

www.window.ucar.edu
www.lalc.k12.ca.us
www.bbc.co.uk/members.aol.com
WODOC Library

THEME:

The Geology of the Santa Monica Mountains is a “moving” story about a cycle of rock and its faulting, uplift, and erosion which is all taking place on the edge of a plate.

SUB-THEMES:

- (1) We all live at the edge of a plate that is in constant motion.
- (2) The Rock Cycle represents the never ending story of the movement of mountains.
- (3) The History of geologic change is written in the rocks of the Santa Monica Mountains.

GOALS:

Junior Rangers will understand that we live on a plate boundary and we are always moving, the rock cycle is never ending, and the geologic history of movement is written all around us in the rocks of the Santa Monica Mountains. All they need to know is what to look for.

OBJECTIVES:

- (1) 75% will be able to show how the plates move and know which plate boundary we live on.
- (2) 75% will know how the rock cycle is connected to mountain building and be able to relate it to the Santa Monica Mountain Range.
- (3) 75% will learn how to read the history of movement in the rock formations of the Santa Monica Mountains.

METHODS USED TO MEASURE OBJECTIVES:

Junior rangers will be able to draw each plate boundary in cross section, correctly respond to questions, and be able to fill in the blanks of the conclusion diagram.

PREPARATION TIME: 30 MINUTES

1. Snack Tectonics: Set up for each ranger—a square foot of wax paper, one large graham cracker broken in half= 2 square crackers, two 3-inch squares of fruit roll up.
2. Mountain in a box: Have your box, sand and flour ready. You can set this up before hand with the sand and flour layers, or pour in stuff as you talk about it.
3. Rock Cycle Diagram: Have this ready for the discussion as a visual aid or you can draw and label as you discuss it on a board or flip chart.
4. Santa Monica Mountains Conclusion Diagram: Have this ready for the conclusion as a visual aid or you can draw it on a board or flip chart while you prompt the rangers to fill in the blanks.
5. Research the stories of the rock samples you are bringing in.

EXPANSION:

If you find you have extra time, the Rock Cycle Song is a good addition to this program.

SPECIAL CONSIDERATIONS:

Part of this program is the eating of the tectonic models, so you should make sure that parents know about the snack before you start, because you could always substitute the tectonic/mountain building activity that uses clay models instead of sugar. The clay activity is found in the book Geology Crafts for Kids in the WODOC Library.

INTRODUCTION:

Introduce the theme and sub-themes to spark their curious. The Geology of the Santa Monica Mountains is a “moving” story about a cycle of rock, and its faulting, uplift and erosion, which is all taking place on the edge of a plate. Today we are going to move mountains on our plates and then eat them! You will leave here today with a better understanding of the concepts of plate tectonics and the rock cycle. You will know how the Santa Monica Mountains were built and what it means to live on the edge.

ACTIVITY PROCEDURE:

I. Facilitator states and shows the sub-theme (1) We all live at the edge of a plate that is in constant motion.

Introduce California and the west coast as a dynamic place to live; we have volcanoes and earthquakes and huge mountain ranges all along the Pacific ocean. Ask them to name a few Mountains. How are mountains built? Introduce plate tectonics: Ask how many of them have learned about it already? Bring their knowledge of the subject into the discussion so they are teaching each other. Then introduce the activity **Snack Tectonics.** Today we are going to make models of the different types of plate boundaries.

Give each student about a square foot of wax paper and a large dollop of frosting. Instruct students to spread frosting into a layer about half a cm thick. Tell students that the frosting in this model represents the asthenosphere, the viscous layer on which Earth’s plates ride. The plates in this model are represented by fruit roll up (Oceanic crust which is thin and dense) and graham crackers (Continental crust which is thick but less dense).

Divergent plate boundary (moving away from the other)

Instruct students to place the two squares of fruit roll ups (Oceanic plates) onto the frosting right next to each other. Press down slowly on the fruit roll ups (because they are dense and will sink a bit into the asthenosphere) as you slowly push them apart about half a cm. Notice how the frosting is exposed and pushed up where the plates are separated? This is analogous to how magma comes to the surface where real plates are moving apart at divergent plate boundaries. Most divergent plates boundaries are located within oceanic crust. When plates begin to pull apart at continents, rift valleys are made, like the great rift valley in Africa, which can become the bottom of the sea floor if the plates continue to pull apart.

Continental-oceanic collision (Convergent, moving together)

Instruct Jr. Rangers to remove one of the fruit roll ups from the frosting. (They can eat it if they wish!) Tell Jr. Rangers to place one of the graham cracker halves **lightly** onto the frosting asthenosphere next to the remaining fruit roll up piece. The graham cracker represents continental crust, which is thicker and less dense than oceanic crust (Fruit roll up). It floats high on the asthenosphere so don't push it down. Gently push the continent (graham cracker) towards the ocean plate (fruit roll up) until the two overlap and the graham cracker is on top. The oceanic plate is subducted below the continental one.

Continent-continent collision (Convergent, moving together)

Tell students that they will next model what happens when two continents collide. Have them remove both the cracker and fruit roll up from the frosting asthenosphere. (Students can eat or discard the fruit roll up.) Place one edge of both crackers into the glass of water for just a few seconds. Place the crackers onto the frosting with wet edges next to each other. Slowly push the graham crackers towards each other. Notice how the wet edges crumple? This is how mountains are made at convergent plate boundaries!

Transform plate boundaries (moving along side the other)

Pick the two crackers up off the frosting and turn them around so that two dry edges are next to each other. Push one cracker past the other to simulate a transform plate boundary like the San Andreas fault! Final step: eat all remaining model materials (except, of course, wax paper and plastic utensils)!

Conclude the activity with measuring the objectives:

Have students draw what each situation looks like in cross section (by looking at the edge of their model).

Ask them which boundary they think is the kind that we live on. (Continental-oceanic collision or Convergent where we have a subduction zone, as well as living near a Transform boundary along the San Andreas fault.)

We are always moving along on the edge of the plate, at the rate that our fingernails grow! So what happens to Rocks as they move? As mountains are being built?

II. Facilitator states and shows the sub-theme (2) The Rock Cycle represents the never ending story of the movement of mountains. Take the Jr. Rangers on a tour of the Rock cycle (use a diagram). Starting with how volcanoes (igneous rocks) rise up as magma as the other mountains, like the Santa Monica Mountains, are being uplifted by the metamorphic forces of heat and pressure: Explain that all the mountains are being eroded away and sediments are always being deposited.

Facilitator, at this point you will be pouring the sand and flour layers of sediment in the mountain building box. Put a layer of sand about 1 cm thick on the bottom of the box. Sprinkle a layer of flour on top of the sand along the front. Add another layer of sand, another flour layer, and another layer of sand. The box should be about half full by now.

Continue with description...which then becomes sedimentary rocks which can then be heated and metamorphosed or melted to go back and become mountains again in a never ending cycle of rock transformation and change. Facilitator, now finish activity by moving handle in slowly and gently towards the other end of the box. Stop when it is about halfway across the box and look at how the layers have moved. Some have bent; other layers have slid up and over others along a sliding line. What happens and why?

Did the pressures 'make mountains'? Did the 'rocks' bend and break? This is what happens when rocks are squeezed between two plates moving towards each other. Mountains are formed at the top and the rocks become bent into folds and some parts slide over others in faults. How could we use this to find out where mountains used to be long ago before they were removed by erosion?

This is how the Santa Monica Mountains were formed— by uplift, faulting and folding. This process of metamorphic uplift of sedimentary rocks due to plate collisions is always happening just as the process of erosion is then always weathering the mountains back down to sediments.

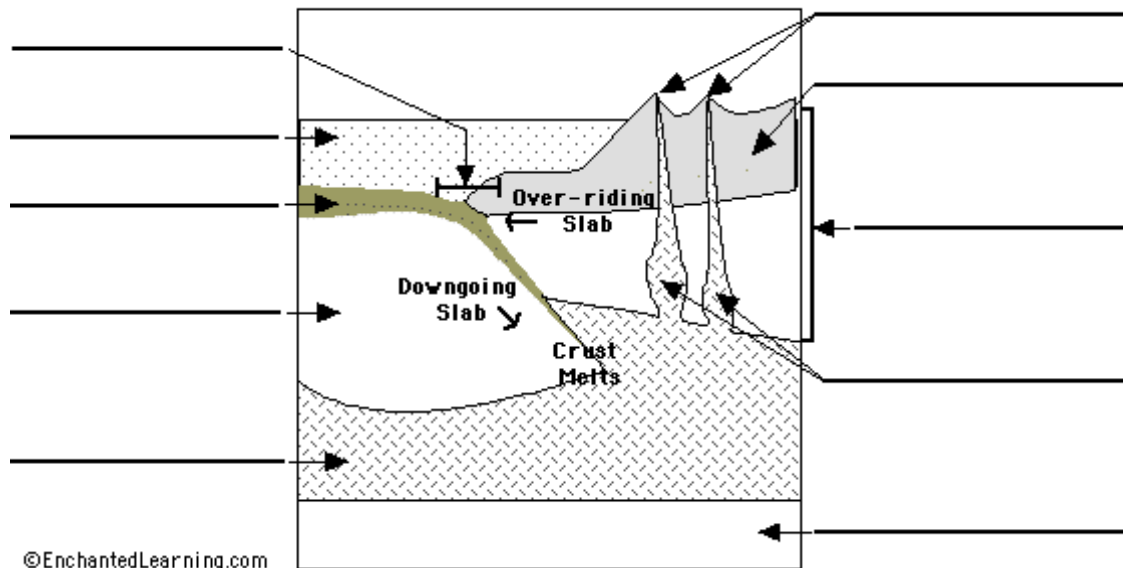
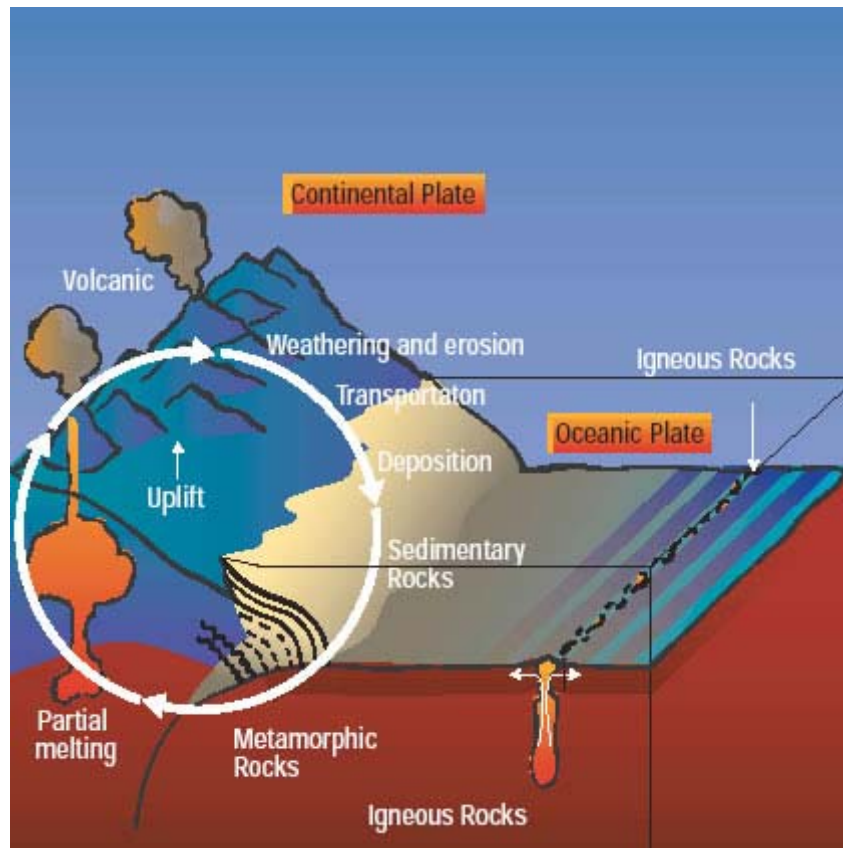
III. Facilitator states and shows the sub-theme (3) The History of geologic change is written in the rocks of the Santa Monica Mountains. When we see a rock laying on the ground it may not appear to be trying to tell us something...(put a rock on the table dramatically, and jump back looking puzzled) but a rock can teach us a lot if we know what to look for. Start with the types of rocks found in the Santa Monica Mountain Range and show locally found examples of igneous, metamorphic and sedimentary rocks and where they came from. From these rocks help them piece together the story of volcanics, uplift, and faulting as the plates subduct along the Pacific coast. Refer to the facts given on the www.lalc.k12.ca.us website, from "A Brief Investigation Into the Geology of Southern California" by Ruth Lebow, to relate the stories of the rocks that you brought in. You will also find helpful Geologic History information on members.aol.com. Have your rock facts ready.

As you tell the story, draw a picture of what the story looks like because you will use the drawing in the conclusion. Ask them questions about how to draw stuff while you go along to help measure the objectives.

CONCLUSION

As we now look at the geologic story (the drawing) we learned from these little rocks of the Santa Monica Mountains, we can see what it means to live on the edge. It means....(have them write in words to describe the drawing) living on a Convergent boundary of the Continental and Oceanic Plates, where the subduction zone builds the Santa Monica Mountains by uplift and faulting as erosion weathers them down and deposits the sediments only to uplift them again in a continuous rock cycle and constant motion. (Feel free to add anything else to the diagram and conclusion statement.) Now we know what to look for when a rock is trying to tell us something.

Examples of Rock Cycle and Plate Boundary Diagrams



TOPIC:

Insects

**CURRICULUM
FRAMEWORK:**Interdependence
CommonalitiesAll living elements of an
ecological system are
interdependent.**KEY TERMS:**Life Cycle
Adaptation
Bio-indicator
Ecosystem
Benthic Macro-
invertebrates**GRADE LEVEL:**

Grades 3rd - 6th

DURATION:

1.5 hours

GROUP SIZE:

10-15

SETTING:

Outdoor/Indoor

SUPPLIES:Life cycle poster
Small plastic containers
Larger buckets or tubs
Ice cube trays
Strainers and spoons
Dip nets
Waders and boots
Field guides and ID key
Microscopes
Magnifiers
Clipboards
Data collecting sheets
Paper/colored pencils**SOURCES:**Water Insects, by Sylvia
Johnson,
Pond Life, by George K.
Reid
[www.lalc.k12.ca.us/
target/units/river/tour/
aqa.html](http://www.lalc.k12.ca.us/target/units/river/tour/aqa.html)
[www.ksu.edu/butterfly/
aquatic.htm](http://www.ksu.edu/butterfly/aquatic.htm)
WODOC Library

INSECTS

Underwater World

THEME:

Let us dive down and explore the mysteries of the underwater world of insects. We will have the chance to come face to face with the creepy crawlies of the deep and listen to what they have to tell us about the world that they live in.

SUB-THEMES:

- (1) The life cycle of many insects involves spending most of their life underwater.
- (2) **The diversity of insect life dwells beneath the surface of the water.**
- (3) Aquatic insects are the bio-indicators of a healthy ecosystem.

GOALS:

Junior Rangers will learn about aquatic insects in a way that increases their awareness about diversity and the health of ecosystems.

OBJECTIVES:

- (1) 75% will learn the life cycle and some adaptations of an aquatic insect.
- (2) 75% will be able to collect and identify at least 3 different aquatic insects.
- (3) 75% will understand that aquatic insects are bio-indicators and why.

METHODS USED TO MEASURE OBJECTIVES:

Junior Rangers will draw and label one of the insects they collect to show its underwater adaptations and what stage it is in of its life cycle.

Junior Rangers will be able to count and classify the insects they collect on their data sheets. Junior Rangers will be able to make predictions about the health of the ecosystem being sam-

PREPARATION TIME: 20 MINUTES

1. You will want to get collecting equipment sorted and ready before you start.
2. Have enough clipboards and data sheets ready
3. You should always scout out the collection site before you go.

EXPANSION:

You can play the Life Cycle Game or the Food Chain Game.

Other art projects on life stages or making their own Caddisfly case or the giant water bug craft project can be added.

Write a short story or poem about an aquatic insect.

SPECIAL CONSIDERATIONS:

Go over any water safety rules with the Rangers to keep them safe in the field. Also be sure to keep your bugs safe by not letting them sit in the sun too long (get them drawn, counted, identified and back in the water). The best seasons for collecting aquatic insects are in the spring and fall. Rivers and ponds have different kinds of bugs, you may need to adjust the program to the habitat you are collecting from.

INTRODUCTION:

Let us dive down and explore the mysteries of the underwater world of insects. We will have the chance to come face to face with the creepy crawlies of the deep and listen to what they have to tell us about the world that they live in.

Another name for aquatic insects is Benthic Macroinvertebrates—that is a big name for such small creatures. The name literally means “bottom dwelling visible animals without backbones”. So you see just the name tells us a lot about them. The diversity in the insect world can only be described as amazing. More than 1/2 of all known species of living things are insects (about 751,000 known species=3/4 of all animal species on the planet). Most insects live on land but their diversity includes many aquatic species, more than 8,600 species in North America live underwater during some part of their lives. Have you ever wondered what lies beneath the surface? What kind of strange creatures dwell at the bottom of the lakes and rivers?

ACTIVITY PROCEDURE:

I. Facilitator states and shows the sub-theme (1) The life cycle of many insects involves spending most of their life underwater. Some leave the water as adults and others (the truly aquatic insects) spend their entire life under water.

Aquatic insects can be divided into two predominant groups: beetles and true bugs. The beetles (Coleoptera) have hard front wings. These tough wings protect the hind wings which are more delicate. The word Coleoptera means "sheath wing" in Latin. Beetles have chewing mouth parts and are considered some of the most tenacious predators in the pond. A few examples include: the whirligig beetle, predaceous diving beetle, and the water scavenger beetle. Beetles develop in 4 different life cycle stages: eggs, larvae, pupa, adult. (Show the life cycle poster as a visual aid.) True bugs (Hemiptera) are equally fascinating inhabitants of the water. Hemiptera means "half wing" and these insects have piercing/sucking mouthparts. They receive nutrients by inserting a long siphoning mouthpart and drawing out the vital juices from the prey item. True bugs develop in three life stages: eggs, nymph, adults. The nymph stage is a fun process to watch. Many nymphs will have a crusty exoskeleton. Underneath this exoskeleton are wings waiting to fly. In dragonflies, the nymphs will crawl out of the water and fasten themselves to a rock. The exoskeleton will split down the middle and peel away. Soon after this happens... beautiful, translucent wings will start to pump up (fill with fluid). The whole process can take place in 20 minutes. The end to the scene is an adult dragonfly taking off on its first flight!

Observing insect behavior and life cycle changes like the differences between nymphs, larvae, and adults can keep almost anyone occupied for hours.

II. Facilitator states and shows the sub-theme (2) The diversity of insect life dwells beneath the surface of the water.

When we go down to the water and collect some insects we will observe how they have adapted to their underwater world. How do you think aquatic insects are adapted to swimming? Some, like the water boatman, have oar like legs covered with hairs, and others like the stonefly nymphs have streamlined bodies. What do you think happens to them in fast moving water? Many attach themselves to rocks and logs, and others have flattened bodies to lessen water resistance. What do you think they eat? Dragon fly nymphs eat other insects (predators), mosquito larvae are scavengers, but most eat plant material that is growing or floating in the water. What do you think eats them? (*Fish, turtles, other insects, water snakes, and birds*) How do they breathe? Breathing for most aquatic insects is more of a chore than one might think. Some have gills along the abdomen or thorax, others use tubes. These tubes are called spiracles and when projected out of the water they act like an oxygen straw. Some insects use air pillows or bubbles. Many beetles have hair on different parts of their bodies. These hairs can hold air bubbles for later use.

One of the most amazing things about aquatic insects is the diversity of habitats in which they live. There is no body of water that is too small, too large, too cold, too hot, too muddy, with oxygen too low, with currents too fast, or even with too much pollution for some kind of aquatic insect to live in it. When we sample the diversity of the species we find in that habitat, reveals what the water quality is like in that particular environment.

III. Facilitator states and shows the sub-theme (3) Aquatic insects are the Bio-indicators of a healthy ecosystem. Some insects are very sensitive to pollution, while others are tolerant. If you take a sample of the aquatic insects in a particular place, and analyze the samples in terms of the sensitive kinds, versus tolerant kinds, you can get a good measure of the overall health of the whole ecosystem. Healthy aquatic environments have a lot of different sensitive kinds, while polluted environments have only a few kinds of tolerant aquatic insects.

Now let us dive into this mysterious underwater world!

Activity

1. Macroinvertebrate sampling is a great way to see a lake or a stream. Before arriving at your intended sample site, the Jr. Rangers should know the expectations of the trip. Respectful treatment of animals, moist hands when handling, how deep can we wade, and take only memories policy will help make the trip more enjoyable for everyone.

All items taken to a sample site need to be counted so that each team returns with the same number of items they started with. Preserving natural areas through thoughtful use is a valuable life lesson. Each group will have clipboards with Data Collecting Sheet and blank sheets for drawing. The group should sketch the body of water they will be sampling as well as describing in words what the environment looks like (what plants and any other animals they see, water conditions, etc.).

Divide Jr. Rangers into small groups. Each group should have sampling equipment and an identification key for macroinvertebrate life in the pond or river. Slow, careful steps will help with water clarity. Jr. Rangers may want to use a walking stick to feel for unexpected drop-offs. Sampling groups should spread out and give each other space for exploration. Ask Jr. Rangers where they think the best place to look for insects might be. Are weedy areas more productive than open water? After the Jr. Rangers find their first water boatman they will start looking even closer for small stuff.

After a fair amount of sampling, it is a good idea to start identifying and counting. (Pass out microscopes) The students can bring the organisms to a large bucket or pan. This container will serve as the temporary zoo. Use the spoons and tweezers to pick up the insects and separate them into look-alike groups. On the Data sheets, some students should draw the organisms. Other students can be working the field guides and counting the numbers of specimens.

Let Jr. Rangers share what they learned and ask them questions such as, based on the sampling you have done, is this a healthy ecosystem.

CONCLUSION

After taking the plunge into this underwater world, it is not so mysterious under there... and the benthic macroinvertebrates (ask them—which means?...*(Bottom dwelling visible animals without backbones)* aren't so "creepy" after all. We have since how they have adapted to life beneath the surface in such amazing diversity. As bio-indicators they have told us about the health of the ecosystem that we all share.

TOPIC:

Astronomy

KEY TERMS:Constellations
Mythology**CURRICULUM
FRAMEWORK:**Patterns and Solar
Systems, affects of
Gravity and the stars.**GRADE LEVEL:**

Grades 3rd - 6th

DURATION:

1.5 hours

GROUP SIZE:

10-15

SETTING:

Outdoor/Indoor

SUPPLIES:Star finder handouts
File folders
Glue, scissors, stapler
Flashlight**SOURCES:**

[www.emufarm.org/
~cmbell/myth/myth.
html](http://www.emufarm.org/~cmbell/myth/myth.html)
[einstein.stcloudstate.
edu/Dome/constellns/
constlist.html](http://einstein.stcloudstate.edu/Dome/constellns/constlist.html)
[www.windows.ucar.edu/
tour/link=/mythology/
stars.html](http://www.windows.ucar.edu/tour/link=/mythology/stars.html)
WODOC Library

ASTRONOMY

Let's Go To The Movies!

THEME:

Constellations are the oldest picture shows

SUB-THEMES:

- (1) We will go behind the scenes to meet the directors and the scriptwriters.
- (2) We will go on location to see how the scenes were shot.
- (3) Let's take a trip to the movies and see a real classic playing right now on the big screen.

GOALS:

To make constellations more dynamic and meaningful to the junior rangers and provoke them to write their own stories in the stars.

OBJECTIVES:

- (1) 75% will be able to identify at least one of the constellations mentioned and be able to tell its story.
- (2) 75% will be able to demonstrate the use of the star finder and locate one constellation mentioned in the night sky.
- (3) 100% of the audience will get the chance to create a constellation that is meaningful to them and write their own script

METHODS USED TO MEASURE OBJECTIVES:

Junior Rangers will be able to respond to questions with detail and demonstrate that they can use the star finder when asked. All Jr. Rangers will turn in their own constellation myths.

PREPARATION TIME: 30 MINUTES

1. Star Finder activity supplies ready, and enough for everyone. You may choose to make these before the program depending on if you have time for the activity. Directions are written on the handout.

EXPANSION:If you have time you may consider doing the Star Locator Activity (which is more hands on experience with using the star finder) or the **Readers Theater: Sky Myths** (which is a Native American myth about the big dipper; this is good to show different cultures wrote their own stories in the stars.). Both of these activities are found in the NASA packet available at WODOC or Temescal.**SPECIAL CONSIDERATIONS:**This program can be given at night or in the daytime. The night sky gives you the big screen visual aid, but it is not required. For the **Make Your Own Constellation** activity they will need a light source.**INTRODUCTION:**

Today we have movies playing at local theaters every night that we can go see, but in the past the ancients used the night sky as a screen for which they projected the stories of gods, sacred animals and mortals for all to see. Like the movies of today they were full of Drama, Horror, Suspense and Romance...**These are the constellations-the oldest picture shows of all time.** (Introduce yourself and then the Theme and sub-themes) Today I am going to take you to the movies, but first we will (1) **go behind the scenes** to meet the directors and the scriptwriters, then we will (2) **go on location** to see how the scenes were shot and then (3) **I will take you on a trip to the movies** see a real classic playing right now on the big screen.

ACTIVITY PROCEDURE:

I. Facilitator states and shows the sub-theme (1) Behind the scenes of these ancient picture shows, are the directors who were said to be the gods themselves. They put the characters in the night sky so humans would remember them for all eternity. The scriptwriters were all the ancient people of the world. Throughout human history, all cultures recognized different constellations with their own myths and stories behind them. The characters and arrangements of stars were symbolic, born from the imaginations of the ancients. They followed the motions of the stars out of necessity because to them, they were the clocks, calendars and compasses. They also wrote the scripts in order to make sense of the unknown, to bring order to chaos. And normal everyday life became infused with celestial symbolism. Like a golden thread running through history binding together all the people of earth. Everyone under the stars and wanted to tell their stories. These ancient scripts of the constellations were taught and repeated down through the generations. Which brings us to how the scripts that we know today made their way down through history to their present location.

II. Facilitator states and shows the sub-theme (2) The oldest picture shows were shot on location in the northern hemisphere, where we see the scripts written by the ancient Greeks and Romans. The Greeks and Romans kept great records, and held great power in Northern culture and so they were able to influence many other cultures to adopt their versions of the constellations. They became the standard in the northern night sky and a convenient way to communicate location, distance and time by using a map of the constellations. So this is how the scripts came to be known today.

Facilitator, this is where you introduce the star finder, follow along with the story using the star finder as a guide to the cast of characters.

III. Facilitator states and shows the sub-theme (3) It is time to take a trip to the movies and see a classic playing right now on the big screen. It is playing right now in the autumn sky. The Drama all begins with Cassiopeia, the vain queen of Ethiopia, who boasted that she was more beautiful than the sea nymphs. The nymphs heard this and complained to their father Poseidon, the god of the sea, of this insult. To teach her a lesson Poseidon created a great flood and sent a horrible sea monster, Cetus, to ravage the Ethiopian coast. The horror of seeing Cetus rise from the waves and devour humans alive caused King Cepheus to consult an oracle to see what could be done to stop the terror. The oracle told him that his land could only be saved if he were to sacrifice his only daughter Andromeda to appease the monster. As king, he had no other choice, he had to sacrifice his daughter to save his people. So Andromeda was chained to a rock on the waters edge, where she stood weeping at her fate. Fresh from his triumph over Medusa, the famous hero Perseus flies by on his winged horse Pegasus. This is when "Romance" steps into the picture! The beauty in distress (Andromeda) captures his heart. He flew over to her and asked who she was and why she was chained there at the waters edge. Andromeda was shy and did not answer right away, but he persisted, and finally she began to tell him her tragic story—but she suddenly cut off the story with a scream as she saw Cetus rising from the waves. Now Cetus had enormous jaws, front legs of a land mammal with claws, attached to a scaly body like a serpent...an unlikely creature....more comical than frightening. Andromeda trembles and screams at the monster as it makes its way toward her. The Suspense builds....as Perseus pauses politely to ask the king for his daughters hand in marriage in return for her rescue. They agree and then Perseus pulls out Medusa's head and turns the monster into stone, freeing Andromeda. Cassiopeia however got substitute punishment from the gods. She was condemned to circle Polaris forever, where sometimes she suffers the humiliating position of standing on her head, twisting on her throne in awkward misery for all to see for eternity.

CONCLUSION

Now that we have gone behind the scenes of the oldest picture shows of all time, and been introduced to the divine directors and ancient scriptwriters, and learned how the scripts came to be to be shot on location, and ended up with a trip to the movies to see a real classic. I hope that you will all go out (with your new star finders) and watch these ancient shows as they circle by every year as the characters act out their eternal scripts of Drama, Horror, Suspense and Romance on the big screen of the night sky. I hope that you write your own scripts in the stars like the ancients did long ago. Ask Jr. Rangers to remember a constellation that was mentioned and tell a bit of the story, as well as demonstrating how to use the star finder to find that constellation. Introduce the Make your Own Constellation activity. Have them look at the stars and then make their own constellation and write their own script (using a map of the stars as reference during the day). Then have them share it with each other in a group.

TOPIC:
Plants

KEY TERMS:
Survival
Necessities
Pleasures

**CURRICULUM
FRAMEWORK:**
Interdependence
Commonalities
All living elements of an
ecological system are
interdependent.
Humans and wildlife
have similar basic needs.

GRADE LEVEL:
Grades 3rd - 6th

DURATION:
1.5 hours

GROUP SIZE:
10-15

SETTING:
Outdoor/Indoor

SUPPLIES:
Pictures:
Elderberry Tree
Yucca, Cotton,
Oak Tree, Walnut
Grazing Cow
Native Home,
Contemporary home

Props:
Yucca Cordage
Needle & Thread
Acorns/Chia Seeds
Empty Jar Labeled AIR
Several plant derived
musical instruments
(Guitar, Flute, Rattle,
Clapperstick)
Woven basket

Program Materials
Flip Chart, dry-erase or
chalkboard
Poster/Dry-erase
Markers or chalk

PLANTS

Plants with a purpose!

THEME:

Plants provide us with the necessities and pleasures of life.

SUB-THEMES:

- (1) Plants play a necessary role in our survival on Earth.
- (2) People of the past and present use plants to enhance their everyday lives.

GOALS:

Jr. Rangers will increase their awareness for the necessary role plants play in our survival on Earth, and develop an increased appreciation for how plants enhance our daily lives.

OBJECTIVES:

- (1) 95% will be able to state at least 3 reasons why plants are a necessity in our lives
- (2) 75% will be able to state at least 3 ways people of the past or present used plants to enhance their everyday lives.

METHODS USED TO MEASURE OBJECTIVES:

Jr. Ranger s will be able to respond correctly to facilitators questions and conclusion statement.

PREPARATION TIME: 15 MINUTES

1. Gather and organize pictures (listed in supplies) to use throughout the program
2. Have several examples of products used in our daily lives that are derived from plants such as: cough drops, paper, instruments, cosmetics, etc.
3. Gather cultural items derived from plants, such as: instruments, jewelry, clothing, etc.

EXPANSION: Encourage Jr. Rangers to list an entire days use of plants.

SPECIAL CONSIDERATIONS: If including live plant specimens, be sure to know the plant removal restrictions/policy of that area.

INTRODUCTION: Plants provide us with the necessities and pleasures of life. Ask Jr. Rangers what the word necessity means? (*Something we can not live without*) What are some of those necessities of life, ones that we just can't live without? (*Food, water, air, shelter etc.*) Facilitator, write these responses on the board. If we removed even one of these necessities from the list, could we survive? Facilitator, write the word, "NECESSITIES" on the board above their responses. Next, ask Jr. Rangers what the term "pleasures of life" mean? (*Things we can live without*) What are some of those things in life that we can live without? Facilitator, write these responses on the board. If we remove even one of these from the list, could we survive? (*Yes*) Facilitator, write the word "PLEASURES OF LIFE" on the board above their responses. Do any of these things on the board come from plants? (*Yes*) Let's go through each together, and check mark those that come from plants. According to this list, plants provide us with the "NECESSITIES" and "PLEASURES OF LIFE". Facilitator, be sure to point to the words on the board as they are being stated.

ACTIVITY PROCEDURE:

I. **Facilitator, state and show Sub-Theme (1) Plants play a necessary role in our survival on Earth.** Show Jr. Rangers a picture of a native home (Ki, or Op) Ask, what is this structure? (*A house*) How is this house different from yours? How is it the same? What function do walls serve? (*Protection*) What would we need protection from? (*Wind, rain, sun, various weather conditions*) Do we need protection from the same conditions? (*Yes*) Did they use the same materials as we do today to build their homes? (*No*) What materials did they use? (*Plants*) Bring out the woven basket. These homes are similar to the structure of this woven basket turned upside down. They didn't use nails, screws or wires, only plants and natural materials they found in their environment. What materials do we use to make our homes today? (*Wood, concrete, nails, screws, wires, etc.*) Do these materials protect us? (*Yes*) Do any of these materials come from plants? (*Yes, wood*) Imagine our homes without wood? Would you feel protected and safe? (*No*) Just because the walls in our homes look different, do they serve the same purpose? (*Yes*) Plants are a necessary material to home building.

II. Next, show the empty jar labeled "AIR". Ask Jr. Rangers, if they think "AIR" is necessary in our lives? (*Yes*) Refer back to the "NECESSITIES" list. What would happen if we didn't have air? (*We would not survive*) Who thinks they would survive the longest if, right now, we didn't have air on Earth. Let's all hold our breath's and see who would survive the longest. By a show of hands who here needs air to survive? (*All hands should go up*) So then what exactly is in this jar that is so important? Let's open the jar and find out. Do you see any plants in there? Plants take Carbon Dioxide which comes from us and other living things on earth and gives off Oxygen, necessary for us to be able to breath.

III. How many of you like to eats plants? Who likes to eat pizza? Facilitator, discuss with Jr. Rangers the different ingredients in a pizza and how they are derived from plants. Do this with a few familiar foods.

IV. **Facilitator, state and show Sub-Theme (2) People of the past and present use plants to enhance their everyday lives.** Return to the "PLEASURES OF LIFE" list. Are these things that we can live without? (*Yes*) Then why do we have them? (*Enhance, or make our lives easier*) Ask them if they think music comes from plants? Show group a picture of a plant derived musical instrument, i.e., clapperstick, flute, guitar etc. A lot of the sounds we hear in music come from plants. Show picture of an elderberry tree. Tell Jr. Rangers that this tree is called the Music Tree by the native people that lived and still live in this area. This tree is special because the center of its branches are soft and can easily be hollowed out. What type of instrument do you think could be made with a hollow stick or branch? (*Flute*)

The elderberry tree was also used to make jewelry. Remember the hollow branches? They would be cut into small pieces, painted, then strung together into a necklace or bracelet. What would they use as string? Show picture of the yucca plant. Try to guess how this plant could be used to make string. The native people would pound this plant down with a rock until it started to break apart. Inside its leaves are fibers that are really strong. They can be breaded together to make string. Notice the pointy tips of the leaves. Can anyone guess how this made peoples lives easier? (*Needle and thread*) Do we still use a needle and thread? (*Yes*) Where does our thread come from today? (*Cotton*) What else is made with cotton? (*Clothes*) Does cotton come from plants? (*Yes*) Show picture of cotton plant. Imagine how our lives would be without cotton? Would this change the way we dress? (*Yes*) Do plants enhance our everyday lives? (*Absolutely!*)

CONCLUSION

Plants play a necessary role in our survival on Earth. List three ways plants keep us alive. People of the past and present use plants to enhance their everyday lives. List three ways plants enhance your everyday life. Today we have seen that our lives would be very different without plants, if fact our survival depends on them.

TOPIC:
Biological Diversity

KEY TERMS:
Habitat
Biodiversity
Relationships

**CURRICULUM
FRAMEWORK:**
Interdependency
Interactions
All livings are affected by
and interact with their

GRADE LEVEL:
Grades 3rd - 6th

DURATION:
1.5 hours

GROUP SIZE:
10-15

SETTING:
Outdoor/Indoor

SUPPLIES:
Parachute
Blow up Globe
Cast of Character Props
Abalone Shells
Pump Drill
Wood Board
Tray for water

BIODIVERSITY

One Land Many People Many Ways

THEME:

Biodiversity of Earth is made up of balanced communities of living things working together.

SUB-THEMES:

- (1) Natural and cultural communities work together and need each other.
- (2) The landscape is composed of a variety of overlapping communities/habitats that have been impacted by natural and cultural events.
- (3) The comparison of modern and ancient lifestyles show us we are personally responsible for the future.

GOALS:

Jr. Rangers will understand the concept of biodiversity.

OBJECTIVES:

- (1) 75% will be able to identify that the world is made up of communities.
- (2) 75% will be able to identify at least one global community connection.
- (3) 75% will be able to identify at least one harmful impact to global diversity.

METHODS USED TO MEASURE OBJECTIVES:

Jr. Ranger s will be able to respond correctly to facilitators questions and conclusion statement.

PREPARATION TIME: 30 MINUTES

- I. Set up parachute activity: blow up giant Earth ball, lay parachute flat on the ground
- II. Set up play props: all props for the Oak Woodland play. All props for plant characters, the stream and Acorn Grinder need to be located by the oak woodland scene. Read through the play and you will notice that some of the plants need to be located by the stream area, under the shade of a tree, etc. Place those props where you will want the Jr. Rangers to stand in the scene.

Now determine how many other characters you will have and which characters you want in the play. Since there aren't as many cultural roles, make sure all cultural community tags and props are used. If you do not have enough Jr. Rangers to play all of the natural roles, it is suggested that you eliminate some of the animal roles such as the second mule deer, steel-head trout, etc.

Place all needed props/character tags out on the 2 mats. One mat should contain all the cultural character parts while the other should have the animal character parts. Some of the roles will have props while some will be only tags identifying roles.

- III. Set up abalone station: fill large container with water and abalone shells. Pre-assemble wooden drill sets. Pre-cut 20 necklace length strings.

IV. Create an Oak Woodland area (which represents the natural community). All props for plant characters, the stream and the Acorn Grinder need to be placed in the Oak Woodland Scene. Read through the play and you will notice that some of the plants need to be located by the stream, under the shade of a tree, etc. Place those props where you will want the Jr. Rangers to stand in the scene.

Now determine how many other characters you will have and which characters you want in the play. Since there aren't as many cultural roles, make sure all cultural community tags/props are used. If you do not have enough Jr. Rangers to play all of the natural roles, we suggest that you eliminate some of the animal roles such as the second mule deer, steelhead trout, etc.

Place all needed props/character tags out on the 2 mats. One mat should contain all the cultural character parts while the other should have the animal character parts. Some of the roles will have props while some will be only tags identifying roles.

INTRODUCTION: Begin this program asking Jr. Rangers what they think they would have eaten if they lived on the Earth thousands of years ago? Would our food, and therefore survival depend on a healthy environment? (Yes) Discuss with Jr. Rangers that we successfully survived on this earth for thousands and thousands of years as a result of the diversity of plants and animals; this is called Biodiversity.

ACTIVITY PROCEDURE:

I. The parachute will be lying flat on the ground when Jr. Rangers arrive. It is divided into four communities: Grasslands, Forests, Arctic, and Oceans. The Earth is made up of communities. Facilitator, identify the four communities on the parachute. Review a plant/animal relationship in each community on the bio-chute. Inform students they are representing all the living things on the Earth – plants, animals and people. Next, define biological diversity. Life, Variety, Relationships. Do the “Biodiversity Rap”:

Bi-yo-di-ver-si-ty, Bi-yo-di-ver-si-ty
People and nature, working together, just like a team.
Bi-yo-di-ver-si-ty, balances the Earth!

Tell the Jr. Rangers that they are going to balance the earth. All living things have a relationship. What is a relationship? (*Interaction or connection between two things or more*) Our job is to make sure the Earth (blow up Earth ball) stays in balance on the bio-chute. Have Jr. Rangers keep the Earth on the bio-chute while doing the “Bio Rap”. Explain that our actions illustrate what happens when the Biodiversity of Earth is in balance.

Next, remove the Earth from the bio-chute. Have Jr. Rangers put the bio-chute on the ground again. Facilitator, select a few Jr. Rangers from the Arctic, Forest and Grassland communities to walk over to the Ocean side and place hands on an Ocean Jr. Ranger's shoulder. Explain that these people represent those who have not been wise in their actions and have harmed the Earth and have not been friends to Biodiversity. Perhaps their business or carefree lifestyle led them to accidentally spilling tons of oil in the sea, or perhaps sprayed toxic pesticides on crops, dumped motor oil in the gutter near their houses, which made its way into the sewer and eventually to the sea. Perhaps they didn't recycle, and too many trees were cut down in the forests. After many years of abuse, all the sea creatures and the people that rely on the ocean as their home and way of life, become sick and eventually passed on. (All sea life and land partners step away from the bio-chute, they are dead. Have the selected Jr. Rangers pull the Ocean Rangers away from the bio-chute. The Ocean community must let go of the bio-chute now and sit down on the ground.

Have Jr. Rangers try to balance the Earth ball again with the damage created. Do this while singing the “Bio Rap” again. The Earth should fall off of the bio-chute where the Ocean community was. Ask Jr. Rangers if the lack of balance we just witnessed represented a healthy planet? (*No*) Biodiversity needs our cooperation to have a healthy

II. Facilitator, state and show Sub-Theme (1) Natural and cultural Communities work together and need each other. Biodiversity Play (Jr. Rangers will perform a short play) Setting the Scene:

CAST OF CHARACTERS

<u>Cultural Community Village Residents</u>	<u>Natural Community/Oak Woodland Residents</u>
1. Food Gatherers (1 person)	6. Plants (2 people)
2. Acorn Grinder (1 person)	7. Oak Tree (2 people)
3. Basket Weaver (1 person)	8. Stream (2 people)
4. Musicians (1 to 3 people)	9. Steelhead Trout (1 person)
	10. Grasses (1 to 2 people)
	11. Frog (1 person)
	12. Mule Deer (1 to 2 people)
	13. Coyote (1 person)
	14. Squirrel (1 person)
	15. Birds (1 person)

Quickly go through the roles, including movements, sounds that accompany each part. Tell them that whenever they hear their character mentioned, or the group in which their character belongs, (plants or animals), they should make their assigned movements, sound or act out their corresponding jobs with the props. Discuss the relationships between the two communities. Make sure that Jr. Rangers understand that there is a connection between the natural and cultural communities. Example: the food gatherers and acorn grinders need oak trees and so do the squirrels. Communicate that all community residents need to be respected. Emphasize the necessity of having balanced relationships between all living things to keep a community healthy. Facilitator, assign roles and rehearse parts. Read the play slowly.

After the play, ask Jr. Rangers to think about the human and natural impacts that could harm these environments. What if all the trees were cut down in the village area? What happens if there is a drought? Which community members would be impacted? (*Everyone*)

III. Facilitator, state and show Sub-Theme (2) The landscape is composed of a variety of overlapping communities/habitats that have been impacted by natural and cultural events. Ask Jr. Rangers to define what would be some natural, and cultural events that would impact the landscape? Discuss that everything in nature is interconnected. Describe ways that we depend on the earth and ways the earth depends on us.

IV. Facilitator, state and show Sub-Theme (3) The comparison of modern and ancient lifestyles show us we are personally responsible to conserve for the future. This activity should be set up before Jr. Rangers arrive. Here you will provide the natural/cultural history background of the abalone and the importance of the ocean to the Chumash/Tongva people. Ask Jr. Rangers, what the Chumash/Tongva used the ocean for. (*Fishing, swimming, trade to islands*) Do we need the ocean today for anything? (*Yes*) Facilitator, hold up a large abalone shell, ask if anyone knows what it is, what kind of animal lives in it? (*Marine snail*) Where is it found? (*just 8 miles down the road, along rocky coastline*) What did they use abalone for? (*Food, bowl, decoration, jewelry*)

Discuss abalone as a member of the marine community. They are disappearing because we took too many and the abalone could not reproduce. Others died from disease maybe because of pollution. Ask Jr. Rangers what it is called when something disappears forever? (*Extinction*) The white abalone is very close to extinction while other abalone (Red, green, pink, black abalone) species are rarely seen. Have any other animals disappeared around here? (*Yes, grizzlies, black bears, wolves, mountain lions*) What happens to the food chain when animals become extinct? (*There is an imbalance that then affects other animals*) This results in a loss of biological diversity.

Let Jr. Rangers know that there aren't many abalone left in the ocean today. Discuss how people have altered the balance of the ocean by polluting it. Hold up empty jugs and bottles – bleach, insecticide, etc. and explain that what we use on the land can end up in the ocean. Refer back to the parachute game. Is there anything we can do to personally help the ocean and its animals stay healthy?

Facilitator, allow 15 seconds for Jr. Ranger to pick up only one shell from the abalone tray. If the activity works, they will take the largest abalone shells, leaving the small ones. Have them hold up their shells and look back into the tray. Ask them to describe what happened. Why did they take the large ones? Discuss with Jr. Rangers that people have over harvesting the largest abalone shells in the ocean resulting in the loss of the reproductive adults. What's left behind are the immature animals that can't reproduce and are more susceptible to pollution and disease (which then leads to the extinction of that species). Can anything be done to restore the abalone population? Discuss how abalone farms are used to replant around islands. Making the Shell Necklaces – Explain that the shells they are drilling today come from an abalone farm not from the ocean. Explain how to use the pump drills. Emphasize safety and that nobody should hold the shell while the drill is in use. Recommend that Jr. Rangers use an existing hole to begin drilling. Once hole is big enough, sting through to make a necklace.

CONCLUSION

Living with a diversity of plants and animals is called what? (*biodiversity*) Does our survival depend on having balanced Earth communities? (*Yes*) What are some of those communities? (*Grassland, Forest, Arctic, and the Ocean*) What are some ways that these global communities are connected? What is our relationship to them? In what ways, or by what actions have the Earth become out of balance? What can we do to be friendly citizens to our Earth and maintain a healthy balanced biodiversity? Do the "Bio Rap":

Bi-yo-di-ver-si-ty, Bi-yo-di-ver-si-ty
People and nature, working together, just like a team.
Bi-yo-di-ver-si-ty, balances the Earth!