2012

Stone Oak Park Exploration: 4th Grade

Canyon Ridge Elementary School (San Antonio, Tex.)

Stone Oak Park – 4th Grade

Title: Stone Oak Park Exploration **Subject/Course: Science**

Topic: Plant Adaptations, Weathering, Erosion, Food Webs **Grade: 4th Grade** **Designer(s): Canyon Ridge Teachers**

Stage 1- Desired Results

Established Goals:

Understandings:
*that different plant adaptations allow plants to survive in its environment
*The natural processes of weathering and erosion can change landforms and affect the growth of plants and trees
*herbivores, carnivores, and omnivores are all an essential part of the food web and rely on each other for existence.

Essential Questions:
*What is soil erosion?
*How does soil move?
*What would happen if you took one of the essentials away from a habitat?
*What are some different ways a plant might adapt to its habitat?
*What are some of the challenges that plants have to deal with?
*How does a food web help sustain life?
*How does erosion affect different materials?

Knowledge and Skills:
(7) The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:
- observe and identify *slow changes to Earth's surface* caused by weathering, erosion, and deposition from water, wind, and ice.

(10) The student knows that organisms undergo similar life processes and have structures that help them survive within their environment. The student is expected to:
- explore *how adaptations enable organisms to survive* in their environment **such as** comparing birds' beaks and leaves on plants.

(9) The student knows and understands that living organisms within an ecosystem interact with one another and with their environment. The student is expected to:
- investigate that *most producers need sunlight, water, and carbon dioxide* to make their own food, while *consumers are dependent on other organisms* for food.
- (B) describe the *flow of energy* through food webs, beginning with the Sun,

Materials Needed:
Plant Adaptation Cards, Science Notebooks, backpacks, cameras, food web cards, yarn or string, sand paper (small piece for each student), chalk (small piece for each student), Spashdown Targets, dirt, pipettes (5), water, grass plugs (5)

Stage 2- Assessment Evidence

Performance Tasks:	Other Evidence:
The student will create a newsletter using Mircosoft Publisher. There should be an article representing each of the activities from the park, including details and explanations of lessons learned.	Responses in Science Notebooks

Stage 3- Learning Plan

Before the Trip to the Park:

- The students have learned about what a plant needs to survive: food, water, and shelter. Ask the question: What are some of the challenges that plants have to deal with? During this activity the students will gain knowledge to be able to answer the question: What are some different ways plants might adapt to their habitat? On a piece of chart paper or the board, make a list as students brainstorm ideas (altitude, lack of water, too much sun, high winds, etc.). On the right side make a list of how they think plants might be adapted to survive these difficult environmental conditions.
- Brainstorm with students, listing all the different animals they can think of and then labeling them as an herbivore, carnivore or omnivore. (Turn this into cards that the students can wear around their necks at the park.)
- Obtain field trip permission slips from each student

At the Park:

Activity #1:

- Divide students into small groups for a total of eight groups. Walk to where each group can be assigned a small search area and given a card with specific information. Have each group study their card and look for something in their area that illustrates the adaptive characteristic.
- The students should take a picture of their "adaptation" and draw/label their observation in their science notebook.
- Have all the groups share their plant with the rest of the class and discuss the adaptation the plant has and why.

Activity #2:

- To act out the food web, give each student an animal along with the correlating title of herbivore, carnivore or omnivore, these cards should have been previously made.
- Have them each pick a place to stand within an arm's length of each other. Give one student labeled as a carnivore the string and have them pick an herbivore or omnivore that they would eat if in nature. The student throws the string to the other student, holding onto the end. The next student throws the string ball to another student animal that they would eat, continuing the food web. Keep throwing the string until each student has become a part of the food web.
- Have the students draw one of the food webs in their science journals.

Activity #3:

- Give each student some sandpaper and a piece of chalk.
- Have them find a spot where there is both concrete and a limestone rock.
- Have them sand each substance with the sandpaper to see which they can easily "weather" and which are too hard.
- Explain to the students that the sandpaper is similar to how the wind and rain weathers rock. Have students look at their limestone rocks and notice that the rocks are not entirely solid but rather are porous enough for water to seep in.

- Ask students what would happen if that water then froze. Explain to them that the expanding ice would cause large chunks of the rock to splinter off, which is a much faster erosion process than the sand-paper-like wind and rain.
- Have student reflect about the activity in their science journals.

Activity #4:

- Divide the students into small learning groups (four to five students) and distribute the materials.
- Instruct the students to place the soil in the center of their *Splashdown Target.*
- One student in each group should fill a pipette with water. Holding the pipette approximately two to three centimeters above the soil, drop ten droplets of water onto the soil.
- Count the number of droplets that have splashed into outlying zones on the target. Record this number on a tally sheet.
- Pass the pipette to another student in the group. The new student will hold the pipette approximately five to six centimeters above the soil (or twice the height as before) and drop ten droplets of water onto the soil.
- Observe and record the number of splashes on a tally sheet.
- Pass the pipette to the next student, who drops water from twice the height of the previous drop. Record the results.
- Once again, pass the pipette to the remaining one or two students in the group, holding the pipette twice as high as the previous student. Drop ten droplets of water on the soil. Observe and record the results.
- Ask each group to answer the following questions in a journal:

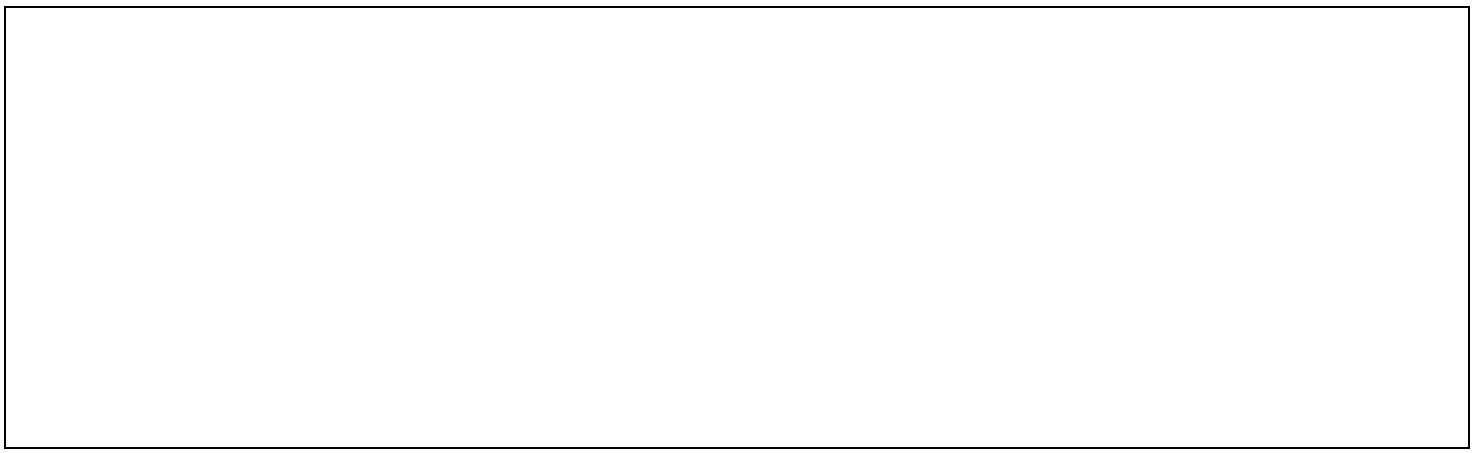
    1. What did you observe happening?
    2. What color are the droplets of water and why are they that color?
    3. What results were observed as the pipette was raised?
    4. Write a hypothesis about what they believe will happen if the pipette is raised even higher.
    5. Write a hypothesis about what they think happens when a raindrop falls onto the soil.

- Wash the *Splashdown Targets* and place a grass plug in the center of the target.
- Repeat steps above.

Discuss with the class the following information:

- None of the water splashed off the dry soil when the first water droplets were dropped.
- The soil needed to become saturated before any splashes occurred. When the soil became saturated and could hold no more water, the droplets started to splash onto the target.
- The drops were brown because some of the soil was being carried away with the water. This is erosion.
- As the water was dropped from a higher point, the splashes became more prolific, covering a larger area. This is because of the increased velocity of the water droplets. Raindrops hit with a great velocity because of the speed they are able to obtain as they fall through the atmosphere.
- The grass plug helped slow the process of erosion in two ways:

    1. the roots helped hold the soil in place, and
    2. the blades of grass absorbed the force of the falling water droplet, allowing the water to trickle into the soil instead of blasting it.



spines

Keep Away! Spines and thorns help stop herbivores form eating the juicy insides of a plant. Sometimes just the stem is spiny. Other times the entire plant is covered in spines.

bushy and low-growing

Hunker Down! Some bushy plnats stay warm during cold months by keeping close to the ground. A bushy compact plant will also hold in heat, by acting like a blanket.

root systems

Send out the Reconnaissance! Many plants send out exptensive root in search of water and nutrients and other places to sprout new "satellite" plants. Some have shallow, spreading roots and some have deep taproots.

hairy leaves, stems, or seeds

Brrrr….Time for a Sweater! Just like the hair on your head, plants produce hairs on their leaves, stems, and seeds for warmth. Hairy leaves can also help to protect plants from solar radiation and from dying out in the wind.

waxy leaves and stems

Batten Down the Hatches! A waxy coating can be found on some plants' leaves and stems. The wax prevents moisture from evaporating and helps to store water inside.

light colors

Sunscreen Please! Many plants have a light, gray-green color. This color helps to reflect harmful, destructive solar radiation. It is like sunscreen.

bright blossoms

I Demand Attention! Bees, hummingbirds, and other insects are attracted to colorful blossoms in their search for sweet nectar. When birds and insects drink nectar. they help with pollination.

seed dispersal

Stowaway! Some seeds have burrs and tiny thorns that catch on animal fur and clothing. That way seeds can travel many miles. Seeds with specialized "floating devices" may also travel by air.

Splashdown Target