

Stewardship of Trees and Forests for Environmental and Human Health

Emory Oak: A Tree of Life and a Native American Pride and Resource

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## Introduction

Every community has its own pride; a kind of pride that is passed down from their ancestors to the new inheritors of the great treasure they have in life. Part of this pride is the ability to use one's own resources to offer a sense of pride toward their homeland and the resources that their land provides. Native Americans' innate resourcefulness becomes a steppingstone to a promising future. Their knowledge of their own land provides potential for improving the sustainability of their traditions, lifestyle, life skills, food, and culture. Bringing awareness to the younger generation of how fruitful their land is in terms of history, pride, tradition, culture, and resources, will open their eyes and provide a meaningful perspective of their land and bring them hope for the future.

A resource that is present on the land is the trees and shrubs that are within their reach. There are lots of trees and other plants that are beneficial to the lifestyle of Native Americans. Trees and shrubs can be used from their roots to their fruits. According to Dr. Kim D. Coder (1996) of the Warnell School of Forestry and Natural Resources of the University of Georgia, community trees and forests are valuable.

He explains that trees provide many goods and services to the population that lives in either urban or suburban areas in the United States. Their values are being realized by those who own the trees, who are nearby, and by society in general. He says that because of the benefits that trees give, whether from a single tree or benefits from groups of trees functioning together, people plant, maintain conserve, and covet trees significantly.

Through this curriculum my students will come to understand the value of the natural world, especially the benefits of trees that they see every day near their homes. They will recognize how their ancestors who came before they were born and even before reservations were established, used these resources to live. Their ancestors have left a legacy that imparts their way of life and traditional knowledge to their people so that they know the importance of these 'trees of life' that are available in their community and understand how they must be stewards of their own land.

## Context

I was born and raised in the island of Luzon in the Republic of the Philippines, an island nation located in the western Pacific Ocean in Southeast Asia between the Philippine Sea and the South

China Sea. The country is an archipelago which comprises of 7,107 islands in the South China, Philippines, Sulu, and Celebes Seas, the Luzon Strait, and is near the countries of Vietnam, Malaysia, and Indonesia. As of 2020, the Philippines had a population of roughly 115 million (“2022 World Population Review,” 2022). During my childhood years, my parents and I used to visit the family’s farm where we checked on vegetables and fruits that are ready for picking. There were also some farm animals on the farm. At an early age, I saw that these plants and animals really give so many advantages to our family. Now, I realize that there is a great deal on being a steward of the environment because it will really provide you with so much that one could ever imagine. Our family’s farm became our source of everything. It feeds us with so many resources that I can now see and realize evidence of the reciprocal goodwill that was mentioned during this curriculum sessions on how plants, animals and human beings have a mutual responsibility among each other in order to have the kind of environment that everyone wanted.

The Dishchiibikoh Community School is a K-12 Title I Grant School funded primarily by the Bureau of Indian Affairs since 1991. Dishchiibikoh is an established 501(c) 3 Non-Profit under Cibecue Community Education Board Inc. (“Dishchiibikoh Community School,” n.d.). Our school is focused on academic achievement and the preservation of Apache Language and Culture. The school was funded to serve the families of Cibecue and the surrounding communities on the White Mountain Apache Reservation. For the 2022-2023 school year there are roughly 298 students enrolled in the elementary department, 56 of which are in kindergarten that is divided into three sections that are each taught by one teacher and one paraprofessional.

The White Mountain Apache Tribe is a very unique home for many Native Americans. It is located in the east central region of Arizona that is 194 miles northeast of Phoenix (“ITCA Online,” n.d.). The White Mountain Apache are the direct descendants of the original tribes that lived on the reservation. The Apache’s livelihood depends mainly on livestock, agriculture, tourism, and various tribal enterprises. They hold their traditions from their strong beliefs to the Crown Dance and basketry (“ITCA Online,” n.d.). Here on the White Mountain Apache Reservation, four seasons are experienced and enjoyed by many people.

I teach Kindergarten in the heart of the Cibecue Community. We accept children four to six years of age who mostly come from either Head Start and preschools. There are a few children who are first timers in school. We accept all children who are enrolled and divide the total number of children into three different classrooms. There are three kindergarten classes that at present have 18 to 19 students and two staff members in each. The morning classes run from 8:00 a.m. to 3:00 p.m. with breaks for breakfast and lunch. The class usually consist of different subject areas which are taught by different teachers. Kindergarten classes are self-contained classes with special subjects such as Apache Language, Physical Education, Apache Culture and Arts, Contemporary Arts, Music, and Computer. These subjects are taught by different teachers other than the Homeroom Teacher who teaches ELA, Math, Science, and Social Studies. The school has several buildings and trailers. There are buses that bring children to school from the Cibecue Community and the nearby communities such as Whiteriver and Carrizo.

## **Rationale**

Growing up in a rural town in the Philippines, I was surrounded by different types of plants. Some trees bloom throughout the year for there are only two seasons in the Philippines: the sunny and rainy seasons. The people in my town would use the trees and plants for a variety of purposes. Some such as Bamboo, Mahogany, Narra, Coconut, and other lumber that are used to build and sustain a strong foundation for a house. Other uses include food and medicine. Most of the people rely on plants and trees for almost everything. Medicinal plants are used to perform rituals based on folktales and superstitious beliefs. I was born in an age when these rituals and medicinal uses of plants and trees were depended upon. I remember seeing different medicinal leaves used to bathe newborn babies and their moms which were believed to cleanse and bring back strength from the labor of pregnancy and delivery. The clan that I belong to was dependent on plants for almost everything.

I have created this curriculum unit to educate young children about the ‘trees of life’ that they have in their community and that exist in many locations in their vast land. The unit is created for kindergarten students ages 4-6 in the Dishchiibikoh Community School. The Unit is designed to give knowledge and experience of what their ‘trees of life’ can offer as part of their culture, traditions, and lifestyle. They will use this knowledge and experience about their own ‘trees of life’ to be stewards of trees and the environment they live in and they will be able to educate the younger generations as they grow old and learn more about these concepts. It will also help them become a productive member of their community in spreading their stewardship and keeping their pride. Just as I have seen how my ancestors in the Philippines use our ‘tree of life’ to help us in our daily lives, I want the children whom I teach become confident and knowledgeable about their homeland and the resources that their land provides. Moreover, I also want them to be able to pass this knowledge on to the future generations. Not all my students know about the trees and or the forests around them, so it will be beneficial for my students to be able to have this kind of instruction and these activities. This will also give them opportunities to use what they have in the community to have a sustainable lifestyle like what I used to have growing up.

As part of becoming a member of their respective tribe, my students will need to know their own traditions. Plants not only give an identity of place but also of the people that live there. In order to learn this, students will have to leap one foot forward at a time to know about the different plants that were used by their tribe and how they were used to sustain life and uphold their culture and traditions. One of these plants that became a ‘tree of life’ for the Native Americans is the Emory Oak.

### **Content Objectives**

“A tree is beautiful, but what’s more, it has a right to life; like water, the sun and the stars, it is essential. Life on earth is inconceivable without trees.” (Anton Chekhov, 2013).

This curriculum unit is backboneed by two important backgrounds. First is the reason for the need of my students to meet the expectations of the Kindergarten Science standards specifically in Life Science. The lessons in this unit will build the content of the science standard such as K.L.1U1.6 and K. L1U1.7 from the state standards for Kindergarten Science (updated “Arizona Science Standards,” 2018). These standards include lessons on the different characteristics of Emory oak. From the background of the plant, different parts of the plant and their functions,

importance and benefits of Emory oak, plant adaptation, reproduction, and external inputs, struggles of Emory oak and the efforts and initiative for its restoration. Second is to bring awareness to my kindergarten students of the importance of upholding the sense of pride of their homeland and the resources that their land provides such as Emory oaks. Emory oaks are important because they help sustain life and have provided many benefits to the Apache community over many generations. Furthermore, as a plant in general, they also provide many benefits to other plants and other living things such as animals and individuals in many ways including protection, food, life, shelter, and much more.

This unit is about teaching kindergarten students the topics related to the state standards on helping students develop an understanding that the world is comprised of living and non-living things. Students will investigate the relationship between structure and function in living things and will learn that plants and animals use specialized parts to help them meet their needs and survive. This will be split into different subtopics such as plant name, external parts of the organism (plant), and their uses, plant adaptation, reproduction, needs, and external inputs (Arizona Science Standards, 2018), and finally the struggles of Emory oaks. To introduce stewardship to the students, I will include in the content the different struggles of Emory oak in terms of the scarcity of the species and the different efforts to use restoration techniques to encourage young oaks to thrive. Also, in connection to stewardship, caring for plants will be part of this unit. Discussions, brainstorming, and activities on the different ways one can help take care of plants around them and the effects of these ways will be included as a topic.

Furthermore, this unit will also include some topics on the importance of caring for the plants around us. Basically, in this topic, the teacher will include talking about the different benefits that plants give to other living things in general. Discussions and brainstorming on the relevance of plants in the survival of other living things including providing air (oxygen) for people and animals to breathe in, food to eat, shelter they give, materials that they provide, and protection they give in natural calamities such as flood and drought. This lesson will also touch a little bit of the disadvantages of having too many plants in a certain place causes a clog in the ecosystem and the plants have to fight for nutrients and minerals they can get from the soil. Finally, discussions on the relationship of the plants to other living things such as animals and human beings in terms of mutual responsibility of being stewards of each other and reciprocity will be included.

These general topics and subtopics of this curriculum unit are focused on a single plant, the Emory oak. The unit will introduce background information of the oak family to help the students build an understanding of Emory oaks as a species and to clarify that this particular plant is not the only one of its kind. Furthermore, it will include additional information on the places where oaks can be found, and the importance of it in general. North central Arizona has eight species of true oak which makes identifying these species tricky as they are known to intergrade or hybridize with each other. Emory oaks are one of four fairly common species of oaks (McDougall, 2012).

### Importance of Emory oak to Apache Nation

The Emory oak is a culturally significant tree for Native Americans to which they have been using for a lot of its benefits especially to health. These trees are believed to have multiple

nutritional contents such as fats, protein, beta-carotene and important vitamins and minerals (Forest Service U.S. Department of Agriculture, 2021). Emory oak is not just used as a food source but is also used in ceremonies and other traditional cultural practices. To further elaborate this specific topic of the curriculum unit, the teacher will invite the class's Apache teachers who have knowledge on the benefits of Emory oak, or who know of the different uses of the shrub.

### Characteristics of Emory Oaks

A characterization of Emory oak will begin the unit's focus. The following content will be included in this curriculum unit as part of the characteristics.

#### Name of Plant

This part of the curriculum unit focuses on teaching the name of the plant with the use of videos, illustrations, and even real external parts of the Emory oak if possible. This will help the kindergarten students visualize what the shrub is and be able to share their experiences of Emory oaks if they have encountered them before or can share what they have heard from their parents or other family members. Young students are fond of learning when they can use their senses. The use of their sense of sight, touch, hearing, smell, and taste will help them understand the subject matter even better. Children naturally uses their senses to explore their environments and learn more with multisensory learning than they do through a single sensory system (Rose & Ruff, 1987, & Titzer, 2022).

With that being said, this part of the unit will move closely with the information on the life form of Emory oak as a shrub. This part will help the students learn the height of the tree which can reach up to 40 feet or more and the special characteristics of it including its leaves, having a round crown, very furrowed black bark, and leaves that are green, glossy, leathery, and arranged in whorls like the holly leaves ("Lady Bird Johnson Wildflower Center," 2015). Furthermore, the flowers, the fruit, the stem, and the roots. These parts will be discussed in the unit separately.

#### External Parts of Emory Oak and their Uses

To further elaborate on the characteristics of Emory oaks, this part of the unit will discuss subtopics on the parts of the plant and their uses aligned in the Arizona Kindergarten Science Standards. This will bring general information about the scientific uses of these parts and the uses they serve in the lives of the Apaches. Stories and descriptions on the importance of these parts will be part of this subtopic.

Discussions include Emory oak's acorns (fruit), leaves, flowers, roots, and stem. Here, each plant part will be discussed separately and will encourage students to familiarize themselves with the external features of the shrub. This will include the following:

Fruits – Emory oak produces acorns about the size of a small pine nut. Raw acorns are sweet, edible, and gathered for commercial markets. They were used for flour and meal and the nuts were eaten raw or stewed in soups by Native Americans. There are oblong red acorns with yellowish caps that ripens in the early fall. Originally, acorns were gathered in accordance with

Yavapai and Apache Traditions where they placed blankets under the trees, shucking the acorns free from their branches, and then shelling and toasting the nuts around a campfire. However, in the present times, Emory oak acorns have little to no marketability (“Slow Food Foundation for Biodiversity,” n.d.).

Leaves – Emory oak leaves are green, evergreen, or semi-green in color. They are 1 to 3 inches long, alternate, and are wavy toothed. Leaves drop in fall and then new leaves appear (Southwest Desert Flora, 2022).

Flowers – Emory oak’s flowers are yellow in color. Male flowers are long drooping yellow while female flowers have small spikes (Southwest Desert Flora, 2022).

Stem – Emory oak’s stem grows upright and hard. The trunk is short, and the bark is dark and deeply fissured (The Trees of North America).

Roots- Emory oak’s roots are like most of the roots of any oak tree. They are strong and extend to great distance underground. These helps the tree get enough nutrients from the soil to its other parts.

Aside from the general characteristics of the parts of the Emory oak, topics such as the importance of each part in the survival of the shrub itself and the help each provide to other living things will be part of the discussion. The goal of these topics is to help students realize the benefits that Emory oaks give not just for its own survival, for the significance it serves to the Apache people, but also to most of the other living things as a plant.

#### Plant Reproduction, Adaptation, and External Inputs

Students will be taught about plant reproduction, adaptation, and their external inputs as well as their growth. Stories of how oaks live will be read to the students as part of the teaching strategy.

In this part of the unit, information on how Emory oak is grown, its growth rate, and how pruning helps it grow even better will be tackled.

Emory oaks are taken care of with full sun, low water use, and with the use of clay, loam, sand, acidic, alkaline, and well-drained soil. It has a slow growth rate. Moreover, pruning is also a technique to help Emory oaks grow even better (PlantIn, 2022). According to Downer (2018), pruning helps a plant exhibit its most desirable attributes by promoting health through enabling you to get rid of sickly or diseased plant parts.

With these topics in mind, the teachers will connect the following discussions to the reciprocal relationship that plants including the Emory oak have to other living things. Benefits of Emory oak to other living things and to its survival and reproduction as a plant will be part of this discussion. The goal of this topic is to bring awareness and realization to the students that each living thing has mutual relationship with each other in order to survive, adapt, reproduce and thrive.

## Struggles of Emory Oak

Based on the different scientific articles that detail initiatives to mitigate the problem of the absence of new oak seedlings, this subtopic will bring awareness to students on how and why the plants should be protected and what will happen if they are gone.

Even before Emory oaks were already in trouble. From 19<sup>th</sup> and 20<sup>th</sup> century when Apache homeland was claimed and occupied by white settlers, Apache elders begun to worry about the absence of new oak seedlings due to cattle grazing and wildfire suppression which made the forest unnaturally thick because woodlands are choked with woody vegetation. This decreases availability for oaks to have water and other nutrients (Sevigny, 2020).

Apache elders have observed that cherished Emory oak stands are yielding fewer acorns, producing fewer seedlings, and declining in overall health. This trend is alarming from both a cultural and an ecological perspective (“Forest Service U.S. Department of Agriculture,” 2020).

To address all the problem of oak decline, an initiative called the Emory Oak Collaborative Tribal Restoration Initiative (EOCTRI) was formed consisting of the Forest Service, Northern Arizona University, the San Carlos Apache Tribe, the Tonto Apache Tribe, the White Mountain Apache Tribe, and the Dilzhe’e Apache of the Yavapai Apache Nation. Their goal is to have long-term availability of acorns to the public. To make this goal happen, one way is to develop restoration treatments including vegetative thinning to clogged woodlands to lessen competition from Emory oak which will also decrease severe wildfire. With the combined efforts and expertise of Apache elders, scientists, and land managers, the initiative will integrate information from project actions to maximize the efficacy and efficiency of the restoration treatments for the benefit of the future generations (Lyndon, Randall, & Souther, 2021).

## Teaching Strategies

The teacher will use different teaching strategies to teach the topics of this curriculum unit that will integrate subjects such as reading, science, social studies, and math. Since the class is self-contained with the homeroom teacher teaching most of the subjects, it will be helpful for the class to have an established continuity of topics being discussed and worked on. Moreover, other teachers in Apache related subjects will also be tapped to give inputs to the lessons by either requesting them to include some topics on Emory oak in their discussions in Apache Language or incorporate them in their activities, especially through stories that show experiences from their people on how Emory oak has been part of their lives. Also, since the students are grouped in class during the enrollment process heterogeneously, there will be differentiated activities that will cover the lessons in this unit. The students will then be asked to work in whole group, in small groups, and individually to accomplish their tasks.

Generally, the teacher will use the strategy *I Do*, *We Do*, and *You Do*. The idea of this strategy is to first teach and model the lesson to the whole group which is *I Do*. Then, the teacher will assign works that will usually require the teacher and the students to work together to accomplish something in response to the *I Do* teaching. These activities will serve as the *We Do* activities to give examples of the lesson and the expected output from the students at the end of each lesson

or to serve as an assessment for the teacher to plan for intervention and re-teaching. The last part is the *You Do*, where students are given work that they need to accomplish on their own without the teacher. Here, the teacher usually uses this kind of strategy to see if the students understand the lesson for the day and plan for the next step of instructional activities which could be proceeding to the next planned item in the lesson or possible small group instruction and re-teaching.

This unit will cover the Kindergarten Science standards; however, integration among other subjects will be discussed as the teaching strategic flow progresses.

### Whole Group Instruction and Activities

Whole Group Instruction will serve as the foundation to initiate the lessons for the teacher to lead the students to meet the objectives of the lesson. The teacher provides the entire class with the same lesson and evaluates their understanding throughout the lesson (Meador, 2019). Moreover, in teaching young children, teacher-led instruction and activities become the foundation for the students in achieving a background of the lesson and grasping the content. These will keep them on track for what they are supposed to learn. Then, other teaching strategies can just follow along as the lesson progresses.

The teacher will read a children's book titled "Little Acorn" which is about how a little acorn grows into an oak tree. The teacher will use the content of the book to initiate the discussion of the lesson. The lesson will be introduced to the whole class. From this book, the teacher will lead a discussion on how plants grow in general. Connection on how the oak from the story grew and evolved from a seed to a full-grown tree to how other plants grow will be part of the discussion.

### Small Group Instruction and Activities

After the whole group discussion and activities, the teacher will also plan for small group instruction with two goals in mind. First is to be able to communicate more effectively to the students in a personal manner. Small group activities will allow the teacher to talk and work with the students on a personal level so they can know what they have in mind and what they think about the lessons, especially those of the introverts and shy students. Second is to be able to identify students who need extra instruction from the teacher. Students who struggle in the lessons will be able to be retaught on certain topics they have difficulty with. This will cater to the needs of the students and allow them to ask questions, be able to clarify concepts, and for students to work closely with their peers. This will help fill in the learning gaps raised from the whole group instruction. Small group instruction provides an environment in which students feel comfortable practicing and receiving feedback and teachers can offer additional teaching and modeling of the content.

Students may work with a single learning partner or a few learning partners to work on tasks. This will bring the walls down if they were unable to share their thoughts in a bigger whole group discussion. During these activities, the teacher will walk around the classroom to guide the students on their tasks and answer or clarify any confusion or questions on the tasks given.

## Think-Pair-Share

The teacher will use think-pair-share whenever the task requires it. This is to help the students gain confidence in expressing their opinions and thoughts on the lesson. The students will work with their “learning partners” to work on tasks assigned or chosen. This will be used especially during brainstorming about the challenges faced by Emory oaks, the different efforts to restore them, what stewardship means, how they can be stewards, and how Emory oaks and other plants help each other in many ways and how reciprocal goodwill among living things happens.

## Integrating Curriculum

Integrating Curriculum in the classroom includes combining different subject areas and then teaching them in relation to a singular theme or idea. For this type of teaching strategy, the teacher organizes a list of standards from various disciplines around one common theme. The teacher will integrate science as the center of the unit with reading, math, and social studies as part of the integration. Furthermore, other special subjects such as Apache Language and Arts can be tapped to incorporate some concepts to their lessons. This will help bring consistency to students in terms of their learning goals.

## Outdoor Exploration

Part of this curriculum unit will be a tour or a field trip to the Ndee Bikiyaa, “The People’s Farm,” located in the White Mountain Apache Tribal lands. This will give students an experience to see how plants are grown. They will be able to see the different parts of plants, and how plants help each other grow. This will also help them see other native and non-native plants and trees that can be grown in this area as well. This field trip will happen if permitted.

## Read Aloud

As part of the whole group activity, books will be read to students in commencing and in support of the lessons. These read-aloud books are in relation to the lessons. The teacher will use these books to either initiate the lesson or to conclude the lesson.

## Songs and Videos

To be able to support the lessons in the unit, the teacher will include songs and videos related to the lessons. This will help bring interest and motivation to students. Also, songs and videos will help the students visualize the ideas being explained. Since the students are in kindergarten, songs will help them remember concepts just as well as formal discussions of the topics.

## Models, Illustrations, and Presentations

This strategy will include models, illustrations, and presentations not just to support the topics but also to emphasize the concepts in a visual way. Students learn better if lessons are multisensorial and that they can see, smell, hear, touch, and even taste what they are learning. The students will also create models as an output of some lessons.

## Games

Just like songs and videos, the teacher will use games to commence most of the activities in whole group instruction. Games will help gain the students' interest, attention, and further engage them in the different activities. It can also be done in the middle of the lesson as part of the learning activities. This will keep students energized and will keep their interest for the lessons.

## Classroom Activities

For the classroom activities, the teachers will integrate different subjects. Science is the focus and the center of the unit; however other subjects will contribute and support the lessons. Since the class is a self-contained class, continuity of the topic will enable the students to have a clearer understanding of the lesson through repetition, follow-up activities, and different learning activities.

## Personal Reflection

The teacher will show a video of plant destruction. Then, students will begin this unit with a self-reflection about the different effects of these destructions to different living things especially to themselves. At the end of the lesson, the teacher will also use this method. Students will end this unit by self-reflecting on what they have learned and how it has changed their perspectives, ideas, and actions they could personally take to uphold the resources they have in their homeland.

## Cause and Effect

Students will create a diagram (drawing) depicting the causes and effects of stewardship of trees such as Emory oak to people, animals, other plants, and the environment in general.

## Model Drawing/Framework

Students will draw a model of the life cycle of plants. They are given lectures first and are asked questions to elaborate the discussions. As an ending output, they will make their own model of how plants grow and reproduce using a guided format of a life cycle model.

## Videos and Songs

Videos 'How Does a Plant Grow? (Lifecycle of Plant) by Miss Molly Sing Along Songs can be searched online in YouTube [https://www.youtube.com/watch?v=nrz3WM3x\\_HA](https://www.youtube.com/watch?v=nrz3WM3x_HA) . It is an excellent video/song to initiate and conclude the lesson on how plants grow. The song is suitable for my kindergarten students.

## Sequencing

Students will cut and paste pictures of the different stages of plant cycle of an oak tree. They must arrange those pictures in order to come up with the correct cycle. This will be part of the assessment process at the end of the lesson.

### Outdoor Exploration

Students will collect different parts of a plant outside the classroom and within the school premises. They will look for sample specimens of leaves, roots, stems, flowers, and fruits. Then, using these specimens, they will create a nature collage or a chart of the different parts of a plant.

### Reading

The teacher will use the story *Little Acorn* written by Melanie Joyce and illustrated by Gina Maldonado as a starting entry to introduce the topic to the students. The teacher will show the cover page to the students and ask them to say what they think the story will be about. Then, the author's and illustrator's name will be introduced. The teacher will talk about what they do. The teacher will show the rest of the images from the book and ask the students to predict what they think will happen in the story. From there, the teacher will look into connections to begin reading the story. As the story is read, the teacher will brainstorm with the students on connecting illustrations and text which will focus on the growth of an acorn as told in the story. This will include text and graphic features as a strategy to help students comprehend what is being read. The teacher will ask questions to begin the discussion and brainstorming. The teacher will also allow the students to ask questions for clarification. As part of this activity, the teacher will explain an individual activity which may include asking the students to illustrate their favorite scene or event in the story, favorite character, one of the settings, or the main details of the story.

The teacher will give information about the growth of oak trees around them. The teacher will introduce Emory oaks. The lesson will then continue with showing the students images that show the problems Emory oaks face. The teacher will ask the students about what they think about the images. The teacher will then introduce some people who are trying to restore these trees to the class.

### Life Science

#### *Whole Group/Small Group/Individual Activities*

As the challenges faced by Emory oaks have previously been introduced, the teacher will divide the students into groups and ask them to design an ecosystem depicting Emory oaks growing in the environment. They will use pre-cut out tree shapes, mountains, plants, water flow, etc., using crayons, glue, construction paper, and pencils. This activity can be in two-dimensional or three-dimensional form.

The lesson on the parts and functions of the plant and how to take care of them will then be introduced. Students will be taught how these plants should grow as shown from their

illustrations or design output. Other small group activities focusing on the above lessons will then be done according to the facing of the lesson each day. These activities can include assembling different printed parts of the plant with Emory oak as the model, labelling these parts, and writing descriptive words on each part.

The teacher will introduce the vocabulary word “stewardship” and “stewards.” The teacher will challenge the students to think of the ways they can be stewards of plants and the ways they can care for them. As a part of the whole group instruction, the teacher will introduce the importance of plants to all living things. Activities including connecting the first activity from the read aloud on assembling a healthy ecosystem to showing videos, illustrations, and presentations on the different benefits of plants such as Emory oaks to animals and people. These benefits will include giving air (oxygen) for animals and people to breathe, providing food to eat, shelter, materials to use for building, and protection from natural calamities such as floods. The teacher will also include discussions on the disadvantages of having too many plants in a certain area and how this will lead to a clogged environment making these plants fight against each other to get the nutrients and minerals they need to survive.

Another part of this lesson is to also talk to students about how Emory oaks and other plants should be planted to be able to adapt to their environment. The teacher will proceed to talking about plant reproduction needed for plants to thrive so that we have these species for future generations to come. This will connect to the idea on the first activity about the struggles of Emory oak.

As part of the stewardship lessons, the teacher will incorporate the different needs of plants including the Emory oaks that they must have in order to grow and survive such as getting enough sunlight and how plants get their food and water from the process. Water which may come from the ground as a natural water resource or from the rain, soil which includes use of different types depending on the needs of specific plants, and oxygen or carbon dioxide. The teacher will explain the cycle of give and take and of reciprocal benefits that plants give to other living things mentioned above and how these living things give to plants as well, and the proper care needed for the plant’s sustainability and survival. Furthermore, the teacher will also include unlocking vocabulary words and discussions on each word to help the students comprehend the concepts related to the above-mentioned lessons.

### Visual Representations

While the lesson is being taught during discussions and activities whether whole group, small group or individual, the teacher will show images to represent the Emory oak such as individual photos that show each of its parts, other pictures that demonstrate the general uses of its parts, and pictures that show how to best take care of them including the different needs they must have to survive. Short video clips will also be used to help the students visualize the lessons.

The students will make a 3D model of the Emory oak as part of the activities in a form of Paper Mache or a diorama.

### Social Studies

## Whole Group/Individual Activities

Research Skills for History: Use of primary source materials to study people and events from the past. The teacher will conduct learning activities where students will research the uses of Emory oaks and its different plant parts.

## Community Resource Speakers

The teacher will show images and video clips of how the Apache have used acorns as source of food and relate to the students the importance of these acorns. The teacher will also invite an Apache Culture teacher to share their stories on how they use acorns and how they are important in their lives.

The teacher will include a discussion on one delicacy of acorns in the lesson. The students will try out acorn stew as part of the experience.

## Mathematics

### Whole Group/Individual Activities

Use of plant images will be used for counting, comparing, and classifying activities.

The teacher will teach and model measuring a real Emory oak tree using non-standard measurement as part of the lesson on height. Some other parts of the tree can also be measured for their length and weight. The teacher can ask the students also to compare the measurements of these parts.

During each differentiated activity, the teacher will walk around to monitor the students and facilitate the process.

## **Student Assessment Plan**

Assessment is part of the unit to ensure that its goals are met and to assess the learning instructions and activities for reflections and possible changes that could be done in the future.

The students will be assessed in four different categories depending on the output expected of them. The assessment categories are as follows:

### Oral Assessments

These assessments are based on each student's participation during whole group instruction, small group activities, and think-pair-share. These will be derived from teacher observations and class participation. This will enable the teacher to investigate possible interventions, re-teaching, and reinforcement activities.

## Written Assessments

These assessments are based on the lessons taught to test each student's knowledge and how well they understood the lesson. Visual presentation such as drawings, images, and models can portray this kind of assessment for kindergarten students. These include formative and summative assessments. The teacher will include daily outputs from the students in this category of assessment.

## Performance Based-Assessments

These assessments will come from tangible outputs or projects that the students will do. These include 3D Paper Mache, group designs, 2D representations, and think-pair-share outputs.

## Culminating Activity

The students will make an acorn stew as a culminating activity to show how acorns are used and eaten and are a part of the Apache delicacy. The outdoor exploration to Ndee Bikiyaa, "The People's Farm," may be part of this category.

Learning Goal	Assessment	Assessment Format
<ul style="list-style-type: none"><li>• Students shall be able to retell how plants grow.</li><li>• Students shall be able to describe the different parts of the plant and their functions.</li><li>• Students shall be able to share their ideas on being stewards of the environment.</li></ul>	<ul style="list-style-type: none"><li>• Oral Assessment</li><li>• Written Assessment</li></ul>	<ul style="list-style-type: none"><li>• Use of sequencing events based on the read aloud and discussions.</li><li>• Labelling and descriptive words of the different parts of the plant.</li><li>• Sharing on the stewardship and caring for plants.</li></ul>
<ul style="list-style-type: none"><li>• Students shall be able to identify the parts of the plant, their uses, and ways to take care of them.</li><li>• Students shall be able to identify, describe, and give examples of the different benefits of plants to other living things.</li><li>• The students shall be able to express how plants help each other</li></ul>	<ul style="list-style-type: none"><li>• Performance Based Assessment</li><li>• Written Assessment:</li><li>• Formative, Summative Assessment</li><li>• Oral Assessment</li></ul>	<ul style="list-style-type: none"><li>• Use of images such as drawings, designs, and 3D models</li><li>• Students will use verbal descriptions and illustrations to represent their ideas.</li><li>• Students will use concept maps, illustrations, and descriptions to depict their ideas.</li></ul>

to survive and adapt in an environment.		
<ul style="list-style-type: none"> <li>Students shall be able to create representations of the Emory oak.</li> </ul>	<ul style="list-style-type: none"> <li>Performance Based Assessment</li> </ul>	<ul style="list-style-type: none"> <li>The students will use representations such as drawings, designs, 2D and 3D models, assembled cut-out papers, and sharing of ideas.</li> </ul>
<ul style="list-style-type: none"> <li>Students shall be able to create a traditional representation of the uses of the parts of an Emory oak.</li> <li>Students shall be able to participate in the outdoor exploration to ‘The People’s Farm’ in Whiteriver or the school’s orchard.</li> </ul>	<ul style="list-style-type: none"> <li>Culminating Activity</li> </ul>	<ul style="list-style-type: none"> <li>Students will make their own acorn stew, and/or other food recipes from any parts of oak trees.</li> <li>Students will participate in an outdoor exploration to a farm or an orchard.</li> </ul>

**Alignment with Standards**

This curriculum unit aims to cover and align with the ideals from the Arizona Standards for Kindergarten in Science subject. While the focus of this curriculum unit is mainly on science subjects, specifically lesson on life sciences, the unit is also designed to integrate other subject matter in kindergarten such as English Language Arts and Reading, Mathematics, and Social Studies. These standards include K. L1U1.6 which is to obtain, evaluate, and communicate information about how organisms use different body parts for survival. K. L1U1.7 which is to observe, ask questions, and explain how specialized structures found on a variety of plants and animals (including humans) help them sense and respond to their environment. K. L1U1.8 which is to observe, ask questions, and explain the differences between the characteristics of living and non-living things in Science (*Arizona Science Standards*, 2018), K.RL. 1-3 and K.RI. 1-3 (Key Ideas and Details), K.RI. 4-6 (Craft and Structure), K.RL. 7, 9 and K.RI.7-9 (Integration of Knowledge and Ideas), K.RI. 10 (Range of Reading and Level of Text Complexity) in ELA and Reading (*Arizona English Language Arts Standards*, 2016), K. CC. A which is to know number names and the count sequence, K.CC. B which is to count to tell the number of objects and K.CC.C which is to compare numbers (Counting and Cardinality). K.MD.A.1 Describe measurable attributes of a single object (e.g., length and weight), K.MD.A.2 Directly compare two objects with a measurable attribute in common to see which object has “more of” or “less of” the attribute, and describe the difference, and K.MD.B.3 Classify objects into given categories; count the number in each category and sort the categories by count (Measurement) in Mathematics, (*Arizona Mathematics Standards*, 2021), and SSOO-S1C1-O4 (Research Skills for History) in Social Studies are also used in this curriculum (*Arizona History and Social Science Arts Standards*, 2018)

The focus of the curriculum unit is based on two different factors. One of these factors is to teach

my kindergarten students about different concepts related to the standards mentioned above. These concepts aim to answer the objectives and the expectations of each standard. With this, the students will learn the name of the plant, its characteristics such as its different parts and their specific functions and value to living things, how plants grow, adapt, and reproduce, and how one can be stewards of the environment through plants. To further elaborate the concepts under the plant topics, the teacher will also include the different needs that the plant must have met in order to thrive and to sustain their species whether in the wild or under the care of people. The second factor is to be able to bring awareness to the students about the importance of plants to people and other living things. The lesson here will discuss different benefits that plants in general provide and most importantly how Emory oak became beneficial to the Apache community. After the lessons taught on characteristics of plants, lessons in the second factor aim to bring awareness that plants such as Emory oaks are natural resources that have a lot of history in Apache culture and traditions in terms of their use and valuable contribution to the people. Moreover, to help students acknowledge and appreciate the resources found in their homeland, the lesson will give more knowledge and experience to the students about the importance of this tree to them as a human being and as an Apache.

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