

Seminar Title: Food and Health

Curriculum Unit Title: Alchini bida'ak'eh: Teachings from the Corn Field

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Everything has a beginning, and with our people we have a beginning which we know of as the “Creation” story. Whether you perceive our “Creation” story as mere myth or historical truth, I think most can agree that there are deep rooted lessons within its words.

...And when white corn, yellow corn, blue corn, variegated corn, and plants move this way, you will be seeing a holy one...

Creation

Our creation story begins with what is known as “The Emergence.” It is called the Emergence because it is where life began. It begins with mist, air, warmth, and coolness that was present in a dark world. No humans existed, only the “Air People” or Nilch’ih Diné’e, as well as insects. Within this world of darkness and mist there was a thought, and from that thought merged clouds of different colors. From different directions these clouds formed First Man and First Woman and with them two ears of perfect corn. Black and white cloud met in the East and when they came together along with the thought, there emerged First Man along with a perfect ear of white corn. In the opposite direction, West, two clouds of blue and yellow came together along with the thought and from there emerged First Woman and a perfect ear of yellow corn. It is said that the ears of corn are what the first beings were made from, not just mist (Zoldbrod, 1984).

Diné Lifeways

There is a misconception that Diné tradition is a religion. It is true that it is a spiritual belief system that we have, and there are individuals that can be referred to as “gods” but they are not really gods. Words can become lost in translation, and things may seem to be comparable to that of the Christian or other world religions, but in actuality Diné culture and its traditions should be considered as lifeways. We do not “worship” the sun, or any deity for that matter. Prayers should be seen as positive affirmations in which we create positivity and happiness for ourselves. We do not pray to a god or a specific being for goods, and health, we make it happen for ourselves by putting beauty and positive thoughts into our minds. By mentally and spiritually visualizing the beauty of nature, of all things that are good, and pure, we make life beautiful for ourselves. We affirm that we will live to old age, and we mimic the power of nature and the power in our self for good health, and by doing so, we must make it happen. This is done to achieve hozhó, which can otherwise be known as the pursuit of happiness.

Four Sacred Foods

In the Diné lifeway, four is a complete number. There are four seasons, four stages of life, four sacred colors, four directions, and four sacred mountains. So naturally there are four sacred foods and these four sacred foods are corn, squash, beans, and tobacco. According to Gibson Gonnie (1996), seeds of corn, beans, and squash were brought to Talking God, Haashch’eelti’i, while he was thinking about planting tobacco on Corn Mountain. Turkey flapped his wings, and out from his many-colored feathers fell varying seeds. Talking God planted the seeds along with songs of mist and rain. Within four days the corn grew and matured. Talking God harvested the corn and gave it to the people, he taught them how to plant and grow corn. As stated in, “Bioactive vegetables integrated into ethnic “Three Sisters Crops,” garden targeting foods for type 2

diabetes-associated health disparities of American Indian communities” (Mishra, et al., 2017), “Other tribes that have a history of cultivation often hold these same foods as sacred, or as traditional foods, and they are often referred to as the Three Sisters. Traditionally plant-based diets rich in health relevant bioactive compounds potentially played an important role in providing protection against many diseases in these native communities for centuries” (Mishra, Walker-Swaney, Sarkar, and Shetty, 2017). These foods when paired together make up a complete protein and when eaten regularly may prove in reducing glucose levels, obesity, high blood pressure, and Type-2 diabetes. The inclusion of traditional cultivated crops such as the Three Sisters, as well as other varieties of vegetation have beneficial results in managing, reducing, and preventing Type-2 Diabetes among Native people (Mishra, 2017).

Corn

Corn is an essential element in our lifeway as Diné. It is what the first two human-like beings were created from (Gonnie, 1996). White corn, and yellow corn people were made on top of Corn Mountain. To this day, our bodies are still a physical representation of corn. Our right sides, the male side, is that of the white corn, and our left side, the female side, is that of the yellow corn. Our teeth are fashioned of white corn kernels (Aronilth, 1991), and to the Holy People, we are the seed. We, the people, are the plants in the eyes of the Holy People as we grow and live out our life. In being a plant, we are closely related to plants, and water, and how we identify that relation is that we consume plants, and water. From the white and yellow corn, our Diné language also appeared giving us our first 6 words of the Diné language (Aronilth, 1991). For this reason, the creation of language, we sing to our corn when we plant.

The importance, the significance, and use of corn is deeply rooted in our Diné lifeways. Corn has many uses. It is ground up and used for praying. Ground white corn is used in the morning, while ground yellow corn is used in the evening. Corn has its place in ceremony, and in our everyday life. Corn comes in different varieties and each type has a specific use in our lifeways. There are white, yellow, blue, red, black, and grey corn. The white and yellow came into existence with the First Man and First Woman (Zolbrod, 1984); while blue, red, black and grey came from the turkey who kept these seeds within his feathers. As mentioned, white and yellow are most used for ceremonial purposes either as offering, or ceremonial meals, while blue is the most used type for everyday food. The sacredness and importance of these foods like corn can be expressed in our understanding of its nutritional content. Our people knew of the value of these foods and understood the concept of, “you are what you eat”, before it became a common euphemism. Our Diné corn (specifically blue corn) as a meal, has daily value, of 34% Fiber, 10% Iron, 10% Magnesium, 28% Phosphorus, 18% Protein, 24% Vitamin B-6 (USDA National Nutrient Database for Standard Reference, 2018).

Squash/melon

Squash and melons from Diné accounts came from Big Snake who brought the seeds of squash and melon, which is why it is low to the ground, crawls outward, vines around what’s near and sometimes may take the shape of a snake. Today squash and melon are much different than what Diné people used to know as squash and melon. Today we know of squash as crook neck, zucchini, orange pumpkin, butternut, acorn, and spaghetti and we know melons as watermelon,

cantaloupe, honeydew and muskmelon. Although there aren't too many written accounts of what type of squash and melon is direct from Creation story, we now have access to many types of heirloom seeds that have originated from and are well adapted to our land area through different seed bank organizations. From what I recall from my cheii and masani's, (maternal grandfather, and grandmother) garden, our native squash is striped, is in the shape of a gourd, and has a slightly bitter taste to it. Now, as I look at charts for nutritional value of more well-known squash like Native Grey Mexican Squash, and commercial zucchini, they have a nutritional daily value of 4% Vitamin A and 25% Calcium for the former and 2 grams of protein, 4% Vitamin A, 28% Vitamin C, 3% Calcium, and 2% Iron for the latter for a serving size of 100g (USDA National Nutrient Database for Standard Reference, 2018). Almost every single type of squash that I have read about contains a good percentage of essential vitamins and minerals. Melon is also high in vitamins and minerals, including the well-recognized watermelon. However, muskmelon, cantaloupe, and honeydew have a higher nutritional value while also having a lower glycemic index.

Beans

Unfortunately, I have not found how we as Diné came to have beans. It is present in our stories of creation and is present in all oral and written accounts that refer to the sacred foods, however I cannot find where it came from, or which being brought it. I can only assume that it was ever present. It will be my mission to find the inclusion of beans in our sacred food. I have found that there are 111 types of beans native to the Southwest. Quite a few are from Hopi, O'odham, Pueblo, and from Mexico. I wonder why there is little to no mention of the details to beans as a sacred food because it is a powerhouse of a food! My search of nutrition facts for just White Tepary beans shows 55% DV Potassium, 208% DV of Fiber, 21g DV Protein, 60% DV Calcium, and 60% DV Iron for a half cup of beans (Ramona Farms, 2018)!

Tobacco-Prayers-Affirmations

Tobacco are beings of their own, they are alive and have always been present along with the medicine that First Man had with him, gifted by the Holy beings. I have heard a story that I received from my mother and read about in passing about tobacco people that grow on the San Francisco Peak. This area they grow is known as Taala Hooghan, and it's where my cheii's clan originated. They are beings that allow themselves to be used to clear and focus the mind. Tobacco, when smoked with intention can bring those that have, in a sense, gone "crazy" come back to sanity. Like pollen, it can be used as an offering, and used with prayer, or affirmations (Gonnie, Tracy, 2018).

Affirmations, or prayers, are an important part in our Diné lifeway. Through prayer we are able to put into view what we want our lives, the lives around us, and the environment around us to be like. Daily reminders of the things that are needed to make yourself achieve the greatest happiness one can acquire is what they're about. Through prayer and Hozho, the path to happiness is good health, which is what gardens are for. Affirmations, or prayers, are just as important for corn fields and gardens as they are for creating Hozho, or happiness in our lives. The plants, whether cultivated, or wild can hear, and recognize the Diné language. They

understand the vibrations of our words, and especially our prayers, and the act of planting itself, is a prayer and a request for rain.

Da'ak'eh - Garden

The role of da'ak'eh or garden is important to Diné life. It is where we grow what nourishes our bodies and souls through food and physical connection to the earth. Beauty is within every garden, it is sacred ground because the act of planting, caring for, and nurturing the seeds that have been sown to a fruitful plant is like caring for another life much like a child, it is a prayer. It is a prayer for rain, for good soil, for good physical, mental and spiritual health. In the garden you feel the soil in your hands and under your feet which is your mother, Nahasdzaan. In the garden you feel the warmth of the sun, and the cool relief of a passing cloud which is our father, Nihitaa'. We are the children, us five fingered beings, and the plants that we care for within the garden, we are nestled between the safety of our parents. We are holy in the garden, we are creating our health, we are creating the calls for rain, we are creating beauty and happiness by being present in the garden. We are Tadidiin Ashkii and Anilt'anii At'eed, the Corn Pollen Boy, and the Corn Beetle Girl. We become the child-like deities that represent the garden.

In our stories of the past, there stood a corn field, and a rainbow had appeared from the sky and touched down to that corn field. It was a beautiful sight. The Holy People looked at this corn field and two children appeared. The Holy People wondered who the two children were, and they were given names. Tadidiin Ashkii, and Anilt'anii At'eed, Corn Pollen Boy and Corn Beetle Girl (Gonnie, 1996). From the *Foundations of Diné Culture*, Wilson Aronilth goes on to say that the two children deities are representations of thought, and language in our beings. The Corn Pollen Boy controls our ability to speak and think with kindness and thoughtfulness, while Corn Beetle Girl is the part of the emotional side of us and gives the emotion happiness. These two children represent the corn field, or gardens, and with their representations they bring forth kindness and happiness. Being that the two are from the garden, we can assume that our children's presence in the corn field is a blessing and brings forth kindness and happiness to them. Happiness in their presence, actions, and partaking of the food from which they cared for.

The contribution of allotment gardening to health and wellbeing: A systematic review of the literature (Genter, C., Roberts, A., et al., 2015), states the physiological and psychological benefits that small plot or allotment gardening has a positive impact on health and well-being. Allotment gardening is gardening in land areas that are smaller than 2,700 square feet which is a garden the size of a large house. It is a decent sized garden, which would be able to yield vegetables and fruits for a large household. Benefits that one may gain from regularly being present in a garden is greater blood circulation, regulation of blood pressure, decrease in obesity, diabetes, depression, and anxiety (Genter, C., Roberts, A., et al., 2015).

Students and children that were involved in a school-based gardening program or followed a garden-based curriculum had greater knowledge of food identification, how food is grown, and had a greater chance of eating what they had planted and harvested. Being given ownership and responsibility to what children had in front of them on a plate made an impact in whether or not he or she wanted to consume the product (Davis, K.L., Brann, L.S., 2017).

The garden that is present at Ganado Primary School is located on the Southwest area of the school and can be seen from Highway 264 but is not located directly adjacent to. To my knowledge it was established in 2013 using grant money from Community Investment Project through Partnership with Native Americans. It had been spearheaded by Christina Arthur, 21st Century Community Learning Center Grant Coordinator. There is no further evidence through photos, curriculum, or data to show what had been done with the garden that could be passed along to someone else who would want to begin a garden or take over the allotment after Ms. Arthur who no longer is present.

Water

Water is life. Water makes up over half of the earth's surface, and human body weight. Water is an essential compound made up of two hydrogen molecules and one oxygen molecule and all living things on earth require water to survive. Water is the most important element in Diné culture because it was what was present in the First world and every world that followed. Water is also what destroyed every world in order for new possibilities to grow. It is what we as embryos, then fetuses were surrounded by while safe in our mother's womb. The moisture that is present in our bodies are referred to as To Altahnaschiin, or the Water of Birth, and Tobiyaazh, the Sons of Waters. Long hair represents the rain, which is also the keeper of our thoughts, and knowledge. Our relationship to water is not only of our understanding of the elemental need for its presence in all of growth, our relationship goes as far as to us being the water, brothers and sisters (Aronilth, Gonnie).

Water is important to people and to plants, and both need the right amount, to grow to its greatest potential. At the present time the Navajo Nation is in a state of drought, which makes it difficult to garden, and this is a frequent excuse for why many people don't plant anymore (Eldridge, 2014). Fortunately, our ancestors had experience in periods of drought, and had engineered their seeds to be drought tolerant. There are ways to plant, and successfully harvest good yields with little water, which is what I am hoping to achieve in the garden. If I don't reach my expectations of what success may look like, then I will keep trying unless I became well aware of what methods of watering is best during drought conditions.

Water is essential for our bodies to function properly. If we become dehydrated, our brains, and physical movements are hindered, and are not able to operate at its full potential (Serra-Majem, Nissensohn, 2016). Comprehension of subjects in school are made challenging when dehydrated. Dehydration can trigger headaches, increase vulnerability to sickness, and fatigue. Many students in rural communities on the Navajo Nation don't have immediate access to water in their homes. Many families have to go to their nearest well, or chapter house to fill up barrels of water to take home and use for bathing, cleaning, cooking and drinking.

Movement

In order for a person to achieve optimal health, there needs to be movement. It is recommended that a person walk at least 30 minutes a day or do some type of exercise to prevent high blood pressure, diabetes, heart problems, obesity and mental health (Williams, Thompson, 2013). Our Diné people used to move all the time, whether it was running in the early morning, hunting for

food, gathering firewood, grinding corn for meal, herding sheep or tending to gardens. The movement was linked to survival of course, and in turn, that movement led to good health and good health achieves Hozho, or the pursuit of happiness. A person must have good health, ways to achieve hozho are by eating healthy, setting good thoughts and intentions through prayer or positive affirmation, and running to the east in the morning. Our people were told to outrun our enemy and make ourselves stronger every day. We must not think of our enemies as beings like us, humans that we need to be at war with, but as the illnesses that plague our world. Our people were runners, were walkers, were herders, were foragers and were builders. We were hard working people who didn't have a need to sit around all day, and they were stronger than their enemies. With that in mind, we must arm ourselves with cultural and modern knowledge of how to combat the monsters of our day such as diabetes.

Plants like corn, squash, and beans move too. They wiggle in the ground to root and rise up to break through the ground reaching for the sun. They stretch and grow upward and outward. Plants sway with the gentle breeze, and high winds, bending with resistance to breaking. They stand tall and resilient to rough rain pounding down during monsoon season. If you watch plants closely, you'll see them turn in the direction of the sun, always moving to grow stronger, and bigger.

Introduction of running and walking programs in classrooms, school settings, or the home have shown an increase in mental health, academic performance, and overall physical wellness (Wright, 2016). It is recommended that children achieve 60 minutes of daily moderate to rigorous physical activity. There is currently a school-based walking program that is promoted by Tsehootsooi Medical Center, the area Indian Health Service, and provides an incentive to participate in the program. There is also no significant difference concerning running vs. walking in order to reduce, or manage type-2 Diabetes, both show notable benefits.

Rationale

Among Native American communities nationwide there is a serious presence of food related illnesses on an epidemic scale. Obesity, Type-2 Diabetes, Type-1 Diabetes, or Diabetes Mellitis, Hypertension, Coronary Heart Disease, Sleep Apnea, and even cancer is swallowing up our communities like a monster (Narayan, K., 1996). What can we do to address what is happening? These food related illnesses which devoured adults between the ages of 35 and 70 are now becoming widespread amongst our children. As educators and schools, we see our children about 40 hours every week, and in that time, we can decide how we may influence our children's health. Are we going to ignore the problem and hope that these very real issues be addressed by IHS, or by our children's family, or are we going to be proactive and be a part of the solution?

Food Related Illnesses

Type-2 Diabetes, Hypertension, Heart Disease, Obesity, and some cancers are food related illnesses and can be prevented and treated with a change in diet, and with the inclusion of regular exercise. At present, 1 out of 3 Diné adults are Diabetic, or are diagnosed as being pre-Diabetic. That is 33% of our Diné population having this preventable disease as compared to 8% of the general United States population (Eldridge, 2014). With age, the presence of diabetes may lead

to End-Stage Renal Failure which is kidney failure, Lower Extremity Amputation, or even death. Diné people with diabetes are 9.6 times more likely to have renal failure than whites in the U.S. Native nations, compared to the rest of the United States show 160-fold increase of amputation for people 15-44 years of age. Lastly, death rates of diabetes related complications are 4.3 times higher than whites and twice for black people (Narayan, 1996). Obesity, which is often directly food related, may lead to more difficult complications such as those listed above. Obesity is prevalent amongst our youth today, and with the advancement and availability of technology, more sedentary lifestyles like watching TV, playing video games, surfing the internet, and sitting in a classroom seat all day may contribute to increased accumulation of body mass.

Loss of culture

While researching the topic of food and health in Native communities, I keep coming back to the issue of colonization. Colonization was the settlement and gaining control of power in indigenous communities by an outside nation (Eldridge, 2014). We Diné, are a colonized nation, and along with colonization comes assimilation, which is the gradual loss or shedding of culture, language, and identification of one's self with his or her indigeneity. There is a definite loss of cultural knowledge in our Diné communities. Our children are speaking less and less Diné, they are without knowledge of their clans, they have no knowledge of their relation to nature, of hozho, of the da'ak'eh. Our children are experiencing physical health crises as well as mental and spiritual ones. How do we help our children reclaim their identity? How do we instill pride, and passion to know of our culture and its many valuable teachings? How do we maintain hozho?

Reclamation of Health and culture

This curriculum is designed around the use of the da'ak'eh, the corn field, because there is where we can find the lessons to reclaim our health, and our culture; there is where will find hozho. The reclamation of our health can be attained through our return to our sacred foods, our sacred corn field, by maintaining proper hydration, and movement. Planting of the three sisters will show us how to take care of our bodies by treating our health in the same way we would care for our plants. Running and walking, stretching, food preparation, and increasing our water intake will help address the many health issues.

The way the garden we will utilized to address physical health issues, will also help strengthen our issues regarding loss of culture. In order for the teachings to be efficient, there must be the teachings of the plants, and their place in our lifeways. A return to our da'ak'eh on the level of reaching hozho must be said in Diné, and must be told, and expressed through Diné prayers, or affirmations.

Community and Classroom Demographic

The school I teach at is Ganado Primary School. Ganado is located in Northeast Arizona and is considered central Navajo Nation. According to the 2010 Census, the local population is 1,314, but our school serves the communities; Nazlini, Kinlichee, Wide Ruins, Greasewood, Steamboat, Jeddito, and Whitecone. There is Sage Memorial Hospital which became famous in the early part

of the 20th century due to its Nursing school which is no longer in existence, however the hospital still is in operation. Hubbell's Trading Post brings in tourists during the summer and is considered a National Historic Site. The elevation is 6,386 ft above sea level. The soil is red clay that sticks to tires, and shoes when it becomes muddy, and we experience cold, dry winters, and hot, dry summers. Ganado is just off of the Defiance Plateau and the mesas of the surrounding area.

Classrooms from Pre-K to 12th grade are 99% Native American students. I have 20 students in my classroom and all are Diné. There are 2 students with an individual education plan (IEP) in my classroom and two students who receive speech therapy. 50-60% of the students in my class live off the main highway, not in a neighborhood housing development. All students at the school receive free breakfast and lunch. 80% of my 2nd graders are reading at Pre-Primer and are at the Intervention level or below as notified on their STAR reading tests. None of my students speak Diné but come from households where one or more people speak Diné.

Content Objectives

There are two to four content objectives for subjects. One is by no means expected to implement all subjects. Pick and choose which subjects that you want to use in your classroom.

English Language Arts (ELA) Standards

Students will be able to create a book explaining the process of growing food.
Students will recognize closely related verbs and adjectives.

Present what adjectives are, and how they're used, this will lead into students being able to recognize and utilize adjectives with different shades of meaning, i.e., small, miniature, puny, tiny, baby. Students will use a vocabulary list of words related to the garden to create a small booklet explaining the process of growing a plant. Garden vocabulary will be added to weekly spelling quizzes. Writing topics about why gardens are good to have, how can we begin a garden, what is a garden, and where is a garden will be posed, and students will answer using thoughtful planning based on knowledge of our own garden. Writing topics will be done as bell work, post garden time, or quick writing exercise. Students will use adjectives to write/describe the way certain seeds look, as well as describe plants within their writing journal as a writing prompt.

Math Standards

Students will estimate and measure items using centimeters, inches, feet, yards, and meters.
Students will draw a picture graph to represent data.
Students will tell and write the time from an analog and digital clock.

Time spent in the garden to prep the land area for winter and then spring will allow for the use of measuring tools. The identification of objects and their sizes in the garden and choosing the right measuring tool for the job is a goal that will be attained through constant use of measuring tools and taking measurements. Graphing the amount of water intake that is consumed by the children

throughout the day will be done, as well as the amount of water cans that we track for the month, or the week. The intake of water will align with the comparison of what needs the human body and plants have in order to grow. Tracking of time by reading the analog clock will be recorded when leaving the classroom and upon returning to the classroom. Students will use beans as counters to skip count, make equal groups, place in arrays, and create a number sentence. Students will monitor and record time to the hour, the quarter hour, and half hour and determine how long we've been outside in the garden, or out running. Students will be able to distinguish length of time: the difference between a second and a minute; a minute and an hour.

Science Standards

Students will understand what a lifecycle is.

A great deal of exploration and observing occurs in the garden and even just a few days in the garden pulling weeds has gotten the children so interested in what happens there. We see the bees cross pollinating, flowers of the squash and melons, fruit growing from the flowers on the squash and on the vine, and roots of weeds that we pull. Students have seen the eggs of squash bugs and what damage their feeding can cause to a plant. However, students still say that the squash have eggs, not the squash bugs have eggs. Much clarification is needed there, and even that, the lifecycle of a bug will get them to understand that plants don't have eggs, necessarily, and that bugs do have eggs. These standards align with the cultural part of the objectives in this curriculum.

Diné Education Standards

Students will listen to the oral narratives that express the cultural significance of gardens, and plants in Diné identity and way of life.

Students will identify the four sacred foods, and their Navajo names.

Students will be able to analyze how plants and people are related through k'e.

Students will be able to identify life as sacred and special.

The objectives of this curriculum are based on healthy living, but at the root it addresses the social injustices that Native people and Diné people have faced with an attempt to solve the health disparity of the mind and spirit. The oral narratives, and the text that support the concept of culture, food and health will all have Diné identity at the base. The creation story is to be told and segue into the four sacred foods, the corn field, and the story of Corn Pollen Boy and Corn Beetle Girl. Positive self-identity, and self-worth is what I feel when I hear these stories, and that is something that I want to share with my students.

Teaching Strategies

The content of the curriculum is very oral, visual, inquiry based and cooperative. In fact, Diné teaching style and strategies are taught in this way. As teachers, it is important for us to be well educated and very knowledgeable about the content we are giving to our students. Information about the cultural aspect of a corn field or garden was told in the context and rationale portion, however it isn't enough. As mentioned in the Content Objectives portion, the kids know when

you are passionate about something because when you speak to them about it, they hear it, they see it, and they feel it. When I tell my kids about tales from our culture they can sense the pride I have in these stories. So, it is up to you, the educator to become aware of these stories yourself. I have made a curriculum unit before where I typed out the whole narrative that was to be given to the children, but it's not as effective. Please read different texts regarding the Diné creation stories. If you don't feel comfortable telling the story, but you really do want to continue with this curriculum there are institutions on the reservation that have knowledge holders and Diné practitioners that are well versed in the stories. They are available through the hospitals and through Diné College to assist with cultural modalities. I will leave a list of books that you may use for your educational resources as well.

ELA

Whole Group Instruction - Storytelling is an important part of our culture and the delivery of parts of the creation story of where we got corn, squash and tobacco must be told orally. The stories of the Corn Beetle Girl and the Corn Pollen Boy must also be presented orally. Handouts to do guided reading can be made, but it is important that the teacher also present the tales orally. The same goes with what is healthy and what isn't healthy.

Small Group Instruction - Small groups of students where you can have discussion about healthy and unhealthy foods would be better than whole group. Use of a Venn Diagram, or a T-chart to *compare and contrast* two categories or a list of items. Compare and contrast of two texts, one fiction, and one non-fiction would best fit a small group.

Visual - When visiting the garden, students must hear the name of the items in your garden, whether it's the beds, lattices, the fence, and the tools. A vocabulary chart can be made, along with pictures of what you have in your garden. A camera, or a camera phone may be useful in taking photos of what you have. The listing of vocabulary words is to act as a resource for your students to have when they begin to write in their journals, or create letters telling about what they're seeing, and experiencing in the garden. While listing the words, consider separating them into categories for long vowels, and short vowels, or putting them in alphabetical order.

Reflective Writing - The students don't just have to be telling about the growth of the plants, they could be writing about how they feel in the garden, or how they feel when they are outside.

Kinesthetic - The garden learning will be very kinesthetic. Students will be handling the tools and items that are listed in their vocabulary words, and students will be putting their hands in the dirt and on the plants to feel the different textures to write about. Students will also be handling seeds, and learning about closely related verbs, and adjectives.

Math

All regular instruction of time, picture graphs, and measurements according to your school's approved curriculum or how you like to deliver the standard is great. The activities in this curriculum that utilize the standard and objective will be supplemental to what you're teaching in your classroom. I say this because in my classroom we don't cover measurement and graphing at

the same time. The activities themselves are ways to continuously get the students to use the skills. I realized that the only way to really understand something is if you just do it all the time. This ah-ha moment came to me when my sister was telling me that she finally gets what the smaller marks between the inch marks on a ruler are. She had never fully understood what they were, and how they're used until she had to use them over and over again in her field of study. So, I want to use these methods before actually teaching them. Get the students to practice using them as much as they can before the standard is formally introduced by way of your school's scheduled pace from your school's published pacing guide.

Whole Group - Go over what a types of measuring tools there are and give the names of each measuring tool. Tell what an analog, and digital clock are. Instruct what each number represents for hour, and minute. Instruct how to tell time using an analog, and digital clock. Instruct what a picture graph is, and what it can be used for.

Small Group - Working in small group into your routine is beneficial because you are able to catch the students who didn't quite understand the standard and concept. However, it is difficult and takes some time to master. When I've done centers, I've always gotten students who are unable to self-manage, or keep focused on the topic at each table that I'm not directly monitoring. I'm the only in my classroom and it gets difficult to monitor the whole class and make sure each center is differentiated enough to challenge the students. At the small group go over where the hands are for hour and minute. 2nd grade will cover hour, half hour, quarter hour and quarter 'til. We will also have to know that there are 5 minutes between each numeral on the face of the clock. At small groups, go over each tool such as ruler, measuring tape, clock, timer, or picture graph. Introduce and review what it's called, and how to use it. In my experience, trying to get kids to measure things right away and expect them to know how to measure, and correctly choose which unit of measurement is correct requires constant use and review.

Visual - Students will definitely need to see the tools that are being used. Each classroom should have a set of rulers, and handheld clocks for the students to use to practice with. A vocabulary list with meaning would be helpful being that students will have to be able to read and understand what they're being told to do on District assessments. Students will be able to use a measuring tool and see the garden space, and determine which tool is needed to perform the task at hand.

Kinesthetic - The garden is fully hands-on, and the use of tools will be used, whether it's measuring the growth of the seeds to seedlings and deciding which unit of measurement to use for that purpose and to measure the length of the plowing line for soil turning. Students will also be using their hands, and full bodies to consume water, and recording it by creating a picture graph would be very kinesthetic and make for a fun way to track our hydration through a graph.

The same type of teaching strategies will be applied to the science portion. Utilization of graphic organizers, reviewing vocabulary, planning for whole, small, and learner preference.

Classroom Activities

ELA

How to Grow a Carrot

Students will create an instructional book on growing a carrot, squash, corn, or beans, or whatever food you're growing in class, or in a garden.

Materials needed: construction paper of different colors, lined paper, blank white paper, crayons, scissors, glue sticks, yarn or string, hole punch, and washable markers.

Teacher: You will have to create an example book to show the students the finished product. You will have to do your how-to about planting or some other type of activity based on what you believe your students' abilities are. Share your activity with the children, let them know that they will be creating a book on How to _____. For this, students should have their growing process in sequence. A graphic organizer to organize their sequence of events should help them.

Students: Students will brainstorm about how they're going to sequence their book. What comes first, next, and so on. Students should have already planted a seed and observed what has happened in order to create a book. Students will use the lined paper to write their guide. The writing should come first, unless you have students who are more visual and need to draw first, however, they must know that there has to be writing done. Construction paper will be the pages on which the illustrations, and the text is glued. Students can trim their illustrations or lined paper to fit the construction pages, or the teacher can use the paper cutter to do that before writing and gluing happen. Once all the book's pages are complete, you will punch holes on the left side, and tie them together with strings. You can tie them as a teacher, or you can allow the students to try threading and tying. This is up to your knowledge of your students' abilities. Markers will be used to write in the title, author and illustration credit on the front cover. (Bemis, 2011).

Picture words

PWIM is the Picture Word Induction Model, and I have used it in my class, but not to the extent that will be described in this strategy. It is a strategy of Differentiated Instruction which can be found in the fifth chapter of Joyce, Weil, and Calhoun's *Models of Teaching*, Ninth Edition, 2015.

Materials: a photograph of the area of interest, a large easel pad, or butcher paper, a doc cam, or an easel, markers, and index cards.

The teacher will begin by introducing a photograph to display to the class. Teacher tells the students that they are to carefully observe the photograph. After students carefully observe the photograph's contents the teacher will call on students to begin labeling that picture. Sticks with names of the students drawn from a can works for me. The teacher will draw a line from the item to a white space and label according to what the student had said. The teacher will say the words, spell it, and say it again, asking the students to repeat her actions. This will continue until there are a good amount of words. The labeled photograph will be displayed on the wall in an area for the children to see. The teacher will make cards of the words and the students will practice reading, spelling, then reading the word again. If the student forgets how to read the word, the

student may go to the wall to find the “sight” word. This is to be done as long as it’s needed for the child to fluently read and spell the word without the picture.

The teacher should revisit the words on the wall daily to review some of the words and may even add new words. Bell work, or a short writing time should be given to allow students to write a sentence about what is seen in the picture. Students may be able to spell the words in the picture on their own or can go to the picture and use the labels. Teacher will use the sentences, display them, read them and ask the students to come up with a title for the picture using the topics of the sentences that were written. Spelling quizzes based on the words, and reading cards shall be given to assess their retention of the words from the picture model.

Math

Measure It!

After a few years as a teacher, I see that visuals are necessary. Students need to see what they’re using, handle it and have an illustration. If you have time, draw out the tools as well as show the tools, so students have an idea of what each unit of measurement is. Illustrate objects that are comparative to the lengths in the standard.

Materials: easel pad or butcher paper, markers, rulers that show cm, in, ft, yds, m., objects to measure that are in the garden or are used in a garden (i.e., seeds, weeds, veggies, posts, garden beds, tools), math journals or notebooks, pencils.

Teacher will have already introduced each measuring tool, estimation, and tools from the garden. This activity is for practicing. All concepts for measuring should have been taught, because this activity is to continue the learning, and practice the skill.

Students can keep a running log of growth process of their planted/sprouting seedling, or measure whatever is in the vicinity of the garden. The math journals or notebook would be where the record of what is being measured is recorded, what tool is used, what unit of measure is being used, and what the measurement is. A vocabulary list of what each item in the garden is called should have already been introduced and kept somewhere so the student can refer back to it.

Graph It!

The inclusion of the students being and staying hydrated will be covered in this activity. Students will be encouraged to drink water throughout the day.

Materials needed- easel board or SMART board presentation, markers, crayons, math journal or white paper, water bottle or reusable cups.

Teacher should have already taught the concepts of time; hour, half-hour, quarter-hour. This activity will be a continuous practice for students to use their time telling. Teacher will demonstrate recording time in a notebook, teacher will use a digital clock, then an analog clock.

Students will record the time in their math notebooks, or on a time keep chart of when they go out to the garden, run on the track or get any outside physical activity done. They will then return in 15 minutes and record the time that they get back inside. Give or take 2 or three minutes, but I want them to know an estimation of what 15 minutes is. Time in the garden, or classroom can be tracked with the notebook by the second, the minute, and the hour as well.

Science

Inductive Reasoning of Lifecycles

Students will use the inquiry process and Inductive Reasoning Model (Joyce, Weil, Calhoun, 2015) to understand the phases of plant, and insect lifecycles.

Materials needed - teacher made graphic organizer (visual included in appendices), photos of lifecycles for beans, squash and corn plants, along with bugs like butterflies, bees, and squash bugs, easel pad, chart markers.

Whole group direction followed by break out to a small group will work best for this plan.

Teacher will present the objective to the class as a whole and give direction as to what is expected at each group. Materials will be shown, and the teacher made organizer will be displayed for a visual of what the order of events will be regarding the lesson. The significance of the visual will be elaborated on at each groups' table for a better understanding of the lesson. Students will be divided into pairs and will be given a set of information: pictures of various plant and insect life cycles.

Students will observe the pictures in detail and will number or enumerate the pictures for easy identification. The teacher will assist the students with labeling the pictures.

Students will put the photos into categories based on their observations and discrimination of their characteristics.

Students will then share their data to the rest of the class and the teacher will then add more photos, titles (data), for the students to classify or reclassify.

Students will then have discussions with partner and classmates about what they're seeing, and how they're classifying their items. Discussions of what a human or mammal may be like in relation to the plants and insects.

Students will be assessed to determine understanding.

Student Assessment Plan

Learning Goal	Assessment	Assessment Format
Students will be able to create a book explaining the process of growing food.	Formative	Completed booklet with little to no guidance
Students will read and write words associated with the garden.	Pre-Assessment Post-Assessment Formative	Choral reading assessment Spelling quiz

Students will estimate and measure items using centimeters, inches, feet, yards, and meters.	Formative Assessment Pre-Assessment Post- Assessment	Multiple choice Explanation of choice
Students will draw a picture graph to represent data.	Formative Assessment Pre-Assessment Post- Assessment	Creation of picture graph with little to no guidance from teacher.
Students will tell and write the time from an analog and digital clock.	Formative Assessment Summative Assessment	Utilize record notebook for time. ATI-Galileo Assessment (District Assessment)
Students will understand what a lifecycle is.	Formative Assessment	Fill in the blanks

Standards

ELA

2.W.3- Write narratives in which they recount a well elaborated event or short sequence of events, include, details to describe actions, thoughts, and feelings. Use temporal words to signal events order and provide a sense of closure.

2.W.5 -With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.

Math

2.MD.10- Draw a graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple equations, put together, take apart and compare problems using information presented in a bar graph.

2.MD.7- Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

2.MD.1- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tape.

2.MD.2- Measure the length of an object twice using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.3- Estimate length using units of inches, feet, centimeters and meters.

Science

Strand 4: Life Science: Concept 1: Characteristics of Organisms. Understand that basic structures in plants and animals serve a function: PO1- Identify animal structures that serve different functions (e.g. sensory, defense, locomotion).

Strand 6: Earth and Space Science: Concept 2: Life Cycles. Understand the life cycles of plants and animals. PO1, 2, 3- Describe the life cycles of various insects. Describe the life cycles of various mammals. Compare the life cycles of various organisms.

Resources

- Gonnie, G. (1996). *Written Teachings for Na'nizhoozhi Center Inc.*
- Aronilth, W. (1992). *Foundation of Navajo Culture*. Navajoland, USA: Navajo Community College Press.
- O'Bryan, Aileen. (1993). *Navaho Indian Myths*. New York: Dover Publications, Inc.
- Zolbrod, P. (1984). *Diné Bahane': The Navajo Creation Story*. Albuquerque, New Mexico. University of New Mexico Press.
- Genter, C., Roberts, A., Richardson, J., Sheaff, M. (2015). The contribution of allotment gardening to health and wellbeing: A systematic review of the literature. *British Journal of Occupational Therapy*. Vol. 78 (10), p. 593-605.
- Mishra, L., Walker-Swaney, J., Sarkar, D., Shetty, K. (2017). Bioactive vegetables integrated into ethnic "Three Sisters Crops" garden targeting foods for type 2 diabetes-associated health disparities of American Indian communities. *Journal of Ethnic Foods*. Vol. 4, p. 163-171.
- Ramona Farms. (2018). White Tepary Beans [Store nutrition facts]. Retrieved from <http://store.ramonafarms.com/White-Tepary-Beans-STOTOAH-BAVI/productinfo/BTEPWH1/>
- Soga, M., Cox, D.T.C., Yamaura, Y., Gaston, K., Kurisu, K., Hanaki, K. (2017). Health Benefits of Urban Allotment Gardening: Improved Physical and Psychological Well-Being and Social Integration. *International Journal of Environmental Research and Public Health*. Vol. 14 (71).
- Narayan, K.M.V., (1996). 12 Diabetes Mellitus in Native Americas: The Problem and Its Implications. Retrieved from www.ncbi.nlm.nih.gov/books/NBK233089.
- Davis, K.L., Brann, L.S. (2017). Gardening among school age children and pre-school aged children also shows an increase in the consumption of fruits and vegetables. *Journal of Environmental and Public Health*. Vol. 2017.
- Serra-Majem, L., Nissensohn, M. (November 18, 2016). Beverage Consumption Habits around the World: The Burden of Disease Attributable to Hydration [Editorial]. *Nutrients*.
- Eldridge, D. (2014). *Diné Food Sovereignty: A Report on the Navajo Nation Food System and the Case to Rebuild a Self-Sufficient Food System for the Diné People*.
- Bemis, G. (2011, September 26). How to Make a One Page Zine. *Experiment with Nature*. Retrieved from <http://experimentwithnature.com/03-found/experiment-with-paper-how-to-make-a-one-page-zine/#.W8K-4BNKi9Y>
- Joyce, B., Weil, M., Calhoun, E. (2015). Picture Word Inductive Model. In *Models of Teaching* (pp.91-121). Upper Saddle Creek, NJ. Pearson Education.
- Joyce, B., Weil, M., Calhoun, E. (2015). Learning to Learn Inductively. In *Models of Teaching* (pp.37-69). Upper Saddle Creek, NJ. Pearson Education.