



Diné Be'azee': Diné Traditional Medicine

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by Marilyn Dempsey

Introduction

Traditional Diné medicines have been used by Diné for many generations and are still used today. Traditional Diné medicines are derived from natural plants. Keeping tradition by preserving culture and language is extremely essential today with the young people today as well as for the next generations. The culture knowledge and language may be gone if we do not work to preserve it. We need to keep language and culture alive. We, elders of the community, need to teach the young people to carry on all aspects of cultural knowledge. Elders still have information and knowledge to share with the young generation. The cultural knowledge and language has to be taught through current technological mediums young generation know and use such as iPads, computers, and new ways of communication for example twitter. Traditional ways of learning and teaching have also become a barrier and is a rarity to see in this 21st century. We are in crises of losing our indigenous language and culture with Diné and many indigenous people in this country if it has not already occurred.

More science needs to be taught in all grade levels at our school. The focus on providing more science lessons and activities is essential. Currently, teachers only teach science on an average of 30 minutes per week or less. This is unfortunate for our students in this science and technology age. Furthermore, hands-on and experiential activities need to be implemented to teach science so students may apply their knowledge to their real world beyond the classroom. Lack of equipment is another area for a weak curriculum and providing an effective quality science instruction. Students need to know how to be scientific thinkers and be taught science in all grades kindergarten through eighth. Students will then be appropriately prepared for the varied science areas in high school. Students will then also be able to meet the state examine with success.

I teach on Diné Nation at a Diné language immersion school. This is a rural and an Indian reservation school. The immersion school includes grades Kindergarten through Eighth. The demographic population is 99% Diné students and one percent western white. My students are fifth, sixth, seventh and eighth grades. I teach our heritage language, Diné, as a second language. Students have difficulty in acquiring Diné language in conversational settings. Moreover utilizing the target language for real world problems is a bigger obstacle. Few of my students find learning to speak Diné as irrelevant to their lives. Providentially, more students understand the relevancy of being bilingual and bi-literate, and work hard to acquire Diné language along with Diné culture, which is an integral part of the language, and vice versa. I am working and teaching to change

the paradigm for my students to master Diné language and be able to apply it to science skills and other disciplines that make a positive impact on their lives for years to come.

As an indigenous teacher in the western learning (classroom) environment, I realize that what motivates students in the past years has definitely changed due to technology and changing times. It has become a real challenge to motivate students to enjoy and acquire Diné language and culture using my current teaching methods, techniques, and strategies. As a result of this observation with my teaching and lesson delivery I am going to challenge myself to provide lessons and instructions using more experiential learning and inquiry based learning via science. In addition so students may understand the world around them, I want to have students visualize and become aware of how Diné language and culture can be, and is a part of science through the knowledge on plants and medicine, thereby gaining insight to the way the world works. Diné language attrition, revitalization, and maintenance will be the endeavor of Diné as well as other indigenous nations here in the United States for the next foreseeable future; I look forward to having my students become truly successful in a multicultural society and life-long learners as our school's vision and mission states.

Instructional Strategies

My unit will include the traditional Diné perspective on using, acquiring, and preparing native plants for healing purposes. There will be some information that can be shared on the sacredness of the plants from a ceremonial perspective and its uses. Of course, other plants that are used more generally will be studied and researched by students to determine how the plant can and is used for healing and medicinal purposes by Diné for generations. The discussion will focus on sage brush, juniper, pinon trees, and possibly include other plants and herbs.

The unit will also include some information on western medicine, its history, purpose, affects, side effects, and future research. Students will acquire knowledge on how western medicine works with the human body to fight infection, relieve pain, as recreational drugs, and other areas. Students will acquire this knowledge through research using various media and technology.

The unit will compare and contrast Diné traditional medicines and western medicines used in human health and to protect or enhance life. Students will accomplish this through research, interviews of western medical doctors at the local medical center and local traditional medicine people and herbalists (who are willing to share their knowledge). They will conduct simple experiments while incorporating the scientific process, fieldtrips to locate and collect native plants used for medicines by Diné still use today.

The instructional strategies I will implement are second language acquisition strategies: Accountable Talk, Balanced Instructional Approach/modeling strategy and cooperative learning strategies.

Native language acquisition strategies generate/produce language learning when: English is omitted (not used); use of non-verbal communication such as gesture, facial expressions, pictures and objects are used to convey meaning; taught in full sentences by embedding words in sentences and paragraphs, and avoid teaching isolated word lists; planned for real communication in speaking for comprehension; language is also understood as culture by teacher and learner so customs, values and appropriate social language is learned; language is learned and taught through hands-on, interactive activities by doing daily life activities such as

eating, walking, reading, etc. and traditional activities are included; learners are helped to be active learners while in the process by taking cues about what to teach from the learners themselves so teacher is the facilitator; there is sensitivity to learner needs, patience, and encouragement because language learning takes time and will vary according to different learners. It is important to respect personalities and language needs, and avoid being overly critical of mistakes, because mistakes in learning language are natural as students try out the language in their attempts to use what they have learned.

Accountable talk strategies are implemented with developing speakers of second language learners. Daily talking or discussion sessions allow students to share feelings, ideas, and problems. Discussion topics are real life situations either selected by the teacher or student(s). Through discussion, teachers introduce vocabulary words on the topic. Students listen and use vocabulary words in speaking (and writing). Each student has the opportunity to speak using appropriate grammar and vocabulary to present information on selected topic.

Balanced Instructional Approach or Modeling is demonstrated by the teacher to show students how to appropriately use vocabulary words and grammar in Diné language. The teacher utilizes vocabulary words repeatedly along with gestures, pictures, acting out, and repeating for students to comprehend meaning of vocabulary words. The teacher uses vocabulary words and grammar in various situations to show students how to use the words in speaking. Sentence patterns are used to assist students with forming proper sentences in Diné language.

Background

My people, Diné, have been using plants as natural remedies for healing, food, cleansing, and other purposes for many centuries. Individuals have used native plants to heal ailments/illness, or rejuvenate for generations in ceremonies by medicine people, traditional herbalists, and in homes. All traditional medicines are natural. Many of the native herbs and plants used for healing have been forgotten due to the introduction of western medicine, and easier access in hospitals and drug stores. Today, many Diné utilize few or none of traditional Diné herbs/plants for healing or rejuvenation. Herbs/natural plants are used primarily by medicine people and traditional herbalists who still have the knowledge and training of how and where to acquire the plants for healings or rejuvenation purposes.

Many of the native plants were initially used by people including medicine people and traditional herbalists to assist individuals who needed healing in a specific ceremonial setting or, for a specific purpose or ailment carried out in a ritual. Healing from native plants required a specific method in acquiring and preparing the plant/herbs for healing which included an offering, a prayer, and or a chant for a specific identified individual requiring the healing or rejuvenation from the plant.

Today, there are individual Diné who claim to have knowledge of herbs for healing as they were once made by people two and three generations ago. The purpose and sacredness of the herbs for healing have become commercialized to follow the western "thought" to sell, monetary purposes have become the initial reason while healing and the sacredness of using the native plants are forgotten or ignored.

Traditional Diné Medicine

It is important for students to know how to traditionally obtain plants or herbs for aze'e' (medicine). Learning

and knowing how it is done is particularly important because of the sacredness of life and the wish to have health and longevity. Understanding traditional Diné philosophy on how all living things have special powers and have a purpose is important for students to know. It is the way of our Diné people to heal physically, physiologically, and spiritually. All healing is to obtain harmony and balance with one's environment in reverence.

Diné and other the indigenous people have been utilizing plants in everyday life for medicine and foods, and in certain ceremonies for healing. Diné hataa[ii (medicine people) and azee' nideigeed7g77 (herbalist) collect plants for medicinal purpose only when there is a patient in need of the plant for healing. A Diné hataa[ii is an individual who has been initiated into performing certain ceremonies after years of apprenticeship with a hataa[ii learning all the plants, songs, prayers, and process of a ceremony for healing. A Diné azee' nideigeed7g77 (herbalist) also is initiated into being a healer to have the knowledge of which plants and how to acquire the plants for the healing of a specific individual who needs healing for specific cure.

In recent years there have been individuals who claim to have the knowledge and expertise of the hataa[ii or azee' nideigeed7g77 but have not had the extensive training in learning the traditional knowledge of preparation of the plants for healing. This information is important to this unit so students are aware of the difference in how azee'(medicine) is made, and who makes the azee'.

A person who needs the plant for healing will go to a hataa[ii or azee' nideigeed7g77 and request their service, and pay him or her a biyeel (fee). The hataa[ii or azee' nideigeed7g77 will have a fee in dollar amount or may be willing to trade silver and turquoise jewelry that is equal the dollar amount. The individual goes to the home of the hataa[ii or azee' nideigeed7g77 to consult regarding the health issue, and then request for the azee' to be prepared by the hataa[ii or azee' nideigeed7g77 . The health issue may become known through another medicine person who is a diagnostician or from the evidence of the pain or characteristic(s) of a disorder or illness.

The hataa[ii and azee' nideigeed7g77 consults with the individual/patient to tell the patient the length of time the ceremony or azee' preparation will take. In certain ceremonies or healings the hataa[ii or azee' nideigeed7g77 will request for the patient's sacred warrior name. This sacred warrior name is utilized to request for healing from the plant and Holy People for the patient. In ceremonies patients may be instructed to collect and obtain other materials such as traditional basket, cloth, and other items to be used in the ceremony for the patient.

During the ceremony the hataa[ii will have all the herbs for azee' (medicine) prepared to heal the patient. The hataa[ii will prepare and use the plant in one or more of the following ways: a tea mixture or infusion, powder, ointment (used with sheep fat and red ochre), or dried leaves. The prepared medicine from the plant will be used during certain parts of the ceremony. After the completion of the ceremony the hataa[ii will take the used medicine plant and return it to Mother Earth with an offering. Other times the hataa[ii will instruct the patient to return the used medicine him or herself. When and where the used plant is returned to Mother Earth varies on the type of ceremony. The hataa[ii (medicine man) will instruct the patient.

The person who is the azee' nideigeed7g77 (herbalist) does not perform a ceremony for the patient. Azee' nideigeed7g77 gives the patient the prepared medicine and provides instruction on how to use or apply the medicine to cure or heal the patient. The patient takes the medicine home and follows the instruction of azee' nideigeed7g77. When the patient is done with the medicine he or she will take the residue of the plant, and return the used medicine plant to Mother Earth with an offering of corn pollen. How and where to return the used plant will be instructed by the azee' nideigeed7g77 to the patient. The patient must do as instructed

otherwise; the healing or cure may not work to its potential.

Returning the used medicine to Nahasdz11n (Mother Earth) is called n11jiilnih which means to return with an offering for the use and healing of the plant. There are various ways to return the used medicine plant to Nahasdz11n (Mother Earth) but, the most common way is to locate a young juniper or pinon tree that has branches touching the ground. Corn pollen is offered by sprinkling the pollen south to north or west to east on the ground in a small area where the used medicine plant will be placed. The used medicine plant is then placed on the corn pollen and a prayer of thankfulness maybe offered. The used plant is placed on the south side under the tree near the base of the tree out of sight. One turns clockwise to leave the tree.

Plants for medicine are carefully collected by the hataa[ii (medicine people) or azee' nideigeed7g77 (herbalist). The hataa[ii or azee' nideigeed7g77 makes a journey to the area where the medicine plant grows. The hataa[ii or azee' nideigeed7g77 brings an offering of corn pollen (in most cases) or sacred stones and approaches the medicine plant. The medicine plant is approached from the east side then a pinch of corn pollen is sprinkled on the medicine plant from the east, south, west, and north sides. A prayer is then offered to the medicine plant and Holy people to take the plant for healing of an individual. Here the patient's sacred warrior name is spoken for the medicine plant and Holy people to know who and why the plant will be taken for healing. The hataa[ii or azee' nideigeed7g77 then takes the plant from a different plant of the same species. The medicine plant that is given the offering is not taken to be used for medicine.

Today, there are individuals who do not follow the "process" to collect and obtain the plant to use for medicine. Today, there are individuals who sell already prepared azee' (herbs) in flea markets on Diné Nation. This is important to know and be aware of when purchasing azee' (herbs) from non-medicine people for healing purposes. Traditionally, medicine should only be made for a specific person for a specific purpose or healing. Further, non-medicine people may not use the right medicine plant, but use similar plants as medicine to sell for monetary means.

Medicinal Plants

Sagebrush, juniper, and pinyon trees grow in the Upper Sonoran Zone, between 45,000 feet to 65,000 feet elevation, in the Southwest United States. Sagebrush, juniper, and pinon grow in warm temperature. The indigenous people and animals use the vegetation.

Ts'ah - Sagebrush

The common English name for ts'ah is sagebrush. Big sagebrush is the species that grows on Diné Nation. Ts'ah is an evergreen with silvery-green leaves. Ts'ah can grow as tall as six feet and has a strong aromatic smell. It is bitter to the taste. Ts'ah grows at an elevation of 4,500 to 7,500 feet. Sheep, cattle, goats, deer, and other herbivores eat the plant for food.

The sage comes from the sagebrush. Sagebrush grows four to six feet high. The plant's main part of the plant is woody with stem and branches and is a non-herbaceous plant. The plant grows in the spring and summer then loses it leaves during the winter months. The leaves are silver green and measure one-half inch to one inch in length. The width is usually one-fourth inch. Sage has a distinctive scent that is strong smelling. The plant is bitter tasting.

Ts'ah is used to treat colds, indigestion, constipation, and fevers. Ts'ah leaves are collected and boiled into a tea. The warm tea is consumed without the leaves. The tea can be very bitter if it is not diluted. Ts'ah is also used to cure headaches and sinus. In this case the patient holds the leaves of the ts'ah and breathes in the odor. This is repeated several times until the pain subsides.

Gad Bik2'7g77 - Juniper

The Diné name for juniper is gad bik2'7g77. Gad bik2'7g77 can be found to be a shrub of up to 25 feet high. Gad bik2'7g77 grows at an elevation of 4,500 to 7,000 feet. It is also known as Utah juniper. Gad bik2'7g77 grows in woodland, forest, and shrub land on the Diné Nation.

Gad bik2'7g77 is one of the plants used as medicine by Diné. Gad bik2'7g77 is used as medicine for stomachaches, headaches, colds/influenza, abdominal pains from child birth or menstrual pain, and body aches. The gad bik2'7g77 is used for abdominal pains and body aches. Small branches, about eight inches long, are collected and bundled in a towel about the size of a rolled up newspaper. The bundle is heated in an oven or on a skillet. Then the heated bundle is placed on the abdomen or aching area. The process is repeated until pain is relieved. The cloth maybe dampened, and then wrapped around the gad bik2'7g77.

To use juniper for a cold, you need lots of blankets to cover the body from the neck down. This is done to break a sweat. The juniper is heated. Fill two pillow cases with the heated juniper then the patient lays on the pillow cases. Cover the body with blankets until a sweat is broken. The body absorbs the juniper fumes and will be "cured" in a day or two. This procedure is repeated to heal the body from the flu.

Ch1'o[- Pinyon (Tree)

Ch1'o[known as the Colorado pinyon is the size of a shrub to 30 feet tall. The ch1'o[tree bark is blackish brown on the outside and reddish on the inside of the bark. The bark is rough and can be one-half inch to one inch thick depending on the age of the tree. The ch1'o[has 1 1/2 inch needles, and sporadic cones. Like the juniper, the ch1'o[also grows at an elevation of 4,000 to 7,000 feet, and grows mostly the woodland area on Diné Nation.

The needles of the ch1'o[is removed from the branches and boiled with juniper leaves in a pot to make a tea mixture (made into decoction). The mixture is then consumed to treat diarrhea. The pitch of the pinyon is also used to treat cuts and abrasions. The amount needed is collected for the cut or an infected area of the skin. A gauze-like cloth or dressing is used to place on top of the pitch and bandage with breathable material. The dressing is left on until it comes off on its own. The pitch will heal the cut, or draw out the pus and heal the infected area.

Western Medicine

Western medicine frequently uses plant products for healing. Aspirin comes from a plant. Aspirin's active ingredient salicylic acid comes from the willow bark. The willow bark was used to relieve pain by a Greek physician by the name of Hippocrates in 460 – 370 BC. But salicylic acid is bitter and can irritate the stomach. Later a German chemist at the Bayer Company modified the salicylic acid and created a related compound that was better to take for pain, because it was not so irritating, and came up with aspirin in 1899. Today aspirin is used all over the world for all types of pain such headaches, toothaches, muscle pain, and more.

When the human body is in pain, the area of the pain produces a chemical called prostaglandins. The

prostaglandins affect nerve endings and a message is sent to the brain about the pain. Aspirin or other types of analgesic will stop the production of prostaglandins, and the pain stops after a few minutes. A dose of aspirin is about 600 milligrams that travels all over the body to stop the pain along with the area of pain, for example a headache.

The aspirin is swallowed and goes to the stomach and then to the blood stream, which carries the aspirin molecules all over the body, including to the pain site. The small intestine filters molecules according to size and chemical structure before entering the bloodstream. Some molecules are fat-soluble and others are water soluble. The fat soluble molecules pass through the filter easily because of its fat content. The aspirin molecule is small enough to pass through the wall of the small intestine where it is absorbed into the bloodstream.

The aspirin molecules continue to travel through the liver through the hepatic portal vein. The liver's function is to breakdown molecules that are foreign to protect the body. This process is called metabolism. This is where the magic happens. The aspirin's chemical unit is acetylsalicylic acid which is the salicylic acid with additional carbon, hydrogen, and oxygen atoms. The carbon, hydrogen, and oxygen cluster is called an acetyl group. The liver removes this acetyl group forming the salicylic acid that stops the pain. The aspirin will then re-enter the bloodstream which the heart will pump to transport the aspirin around the body. The aspirin travels to where the prostaglandins are to stop the pain by stopping the productions of the prostaglandins.

Prostaglandins are not just produced at sites of pain. They are also made by the body in the stomach. Prostaglandins protect the stomach from the gastric juices that are acidic. Along with the pain, aspirin also stops the production of prostaglandins in the stomach allowing the gastric acidic juices to penetrate the lining of the stomach causing damage and pain. This is a side effect of aspirin. The body stops producing the protective prostaglandins for about four hours.

The aspirin molecules stay in the body for about 24 hours, although the number of molecules drops below a critical point earlier than that (after 4–6 hours), so that the aspirin loses effectiveness. If pain persists after the aspirin wears off then more aspirin has to be taken to stop the pain. The body's circulatory system discards the aspirin molecule through the liver and the kidney. Generally this is how drugs work in the human body.

There is the biochemistry of how life exists. The body has about 100 million different molecules all doing different things. Some examples of molecules are sodium chloride, water, DNA, protein and carbohydrates. The body is a mixture of simple and complex molecules all working together to make life possible. Biochemistry is what allows the human body to read, play, learn using muscles, and all the process that we do as human beings. Biochemistry occurs within cells, which are the basic building blocks of the body. In the cell (building block) are enzymes and receptors that carry out the biochemical activity. Most drugs act by interfering with the regular functions of the enzymes and receptors. For example, the drug aspirin—described above—interferes with the enzyme that produces prostaglandins.

The enzymes speed up the chemical reactions in the body. One type of enzyme in the stomach is responsible for the breakdown of proteins, fats, and carbohydrates in foods. Enzymes in the body are catalysts. They make things happen more rapidly. These enzymes are proteins, and have certain shapes that allow enzymes to carry specific processes in the body. The enzymes are made up of building blocks called amino acids. The enzymes have a particular shape with an active site that has a particular shape and structure, sometimes called a cleft. The cleft is where a certain chemical will fit. The chemical, once in the active site, is changed by the enzyme.

The place where the enzyme and the substrate fit contain atoms that create a chemical bond that makes the enzyme and substrate bind together. After the bond occurs the enzyme can do its job by creating molecules. This process is continuous. Each enzyme can match with only one type of substrate. If the substrate is not the right one then the enzyme and the different substrate will not bond and no reaction is created.

Many drugs affect the human body by interfering with enzymes. The drug molecule that is similar in shape to the natural body's substrate can take its place in the enzyme active site. Instead of the substrate the drug molecule will attach itself into the active site of the enzyme. Drugs that block the substrates are called enzyme inhibitors. In the example of aspirin molecule, the aspirin molecule is an inhibitor of an enzyme called cyclooxygenase or COX. COX's natural process is to bind with arachidonic acid to produce prostaglandins, but if aspirin is present this doesn't happen. The result is the pain that is caused by the production of prostaglandin is blocked.

Another part of the cell that is frequently involved in drug action is called the receptors. Receptors are also proteins that are found on the surface of the cell. The receptors are bumpy all over where smaller molecules called ligands can attach themselves. The receptors are located between the inside and outside of the cell. Receptors then bind with ligands sending signals to the cell causing some type of biochemical activity to take place. Hormones and neuro-transmitters are two types of ligands. Both are very important to the body's biochemical activity.

Some drugs cause addiction. Addiction is caused by molecules in the human body being inhibited by recreational drugs such as marijuana, cocaine, caffeine, and heroin. Drugs that are water soluble can easily enter the bloodstream. Other drugs that are oil soluble can enter the brain much faster than water soluble drugs. Caffeine from coffee, chocolate, and tea is a drug.

A Comparison of Diné medicine and Western medicine

Diné medicine

Traditional Diné medicines are all from natural plants. The plant when used as medicine is basically unchanged. The plant is not processed into a different form, and the chemical compound is not changed into a different compound. The plant is used as medicine in its natural form and therefore does not create addictions or bad side affects other than allergies.

The plant is respected for what it is and its power of healing. The plant is carefully selected from its environment for a specific healing. There is a ceremonial process to collect the medicine plant using prayers and offerings of sacred stones (white shell, turquoise, abalone shell, black jet), corn pollen or other offering that is appropriate. Prayers are offered to ask for healing from the Plant People for a specific person and the specific ailment or sickness. There are sacred plants in the traditional Diné way of life that include corn, beans, squash and tobacco. These sacred plants represent all plants used for medicine, food, shelter, and other uses to live. Medicine people and other people use this traditional teaching to respect Mother Nature's environment.

Traditionally, only the amount that will be used of the medicine plant is collected to treat the illness. Because of the respect and the sacredness of the plant and the environment the medicine plant is not exploited or

misused. The medicine plant is not collected in large amounts to supply many different individuals unless it is for a large group of people for example in a ceremony where there will many participants using the medicine. The patient's sacred name is used in a prayer before the plant is collected for medicinal purposes.

Traditional medicines have been tested through generations of use. Animals are not used to test the herb for its effectiveness. There is spiritual healing that is connected with traditional medicines. After the medicine plant is used then the leaves or plant is put back in nature again with prayer and offering of corn pollen. Corn pollen is considered one of the four basic elements of life in Diné traditional teachings.

Traditional medicines are used in several forms. Traditional medicines can be ground and made into salve or used as dry power. It can also be made into a tea concoction. The plant can also be used in its natural state. The most common form the medicine plant is prepared and used as is with water to make a tea to drink or to be put on the body like a lotion.

Western medicine

Western medicines are made from plants. Many of the Western medicines have plant compounds that are changed by adding other compounds or changing the chemical compound. The plant chemical compound is changed into a new or different compound to work with the human body. The plant chemical compound is also altered to work with other drug compounds for the human body to accept the medicine for the illness or disease. The drugs developed must work with the human body at the cell level for it to be considered a medicine for human use. Most drugs have many side effects that can be immediate or gradual from extended use of the drug. Western medicines can also have negative effects such as death from overdose or addiction.

There is an array of Western medicines available for human use. The drugs are available for use to practically anyone if a prescription is not required. For example, anyone can go to the drugstore and purchase drugs for headache and proceed to consume the drug anywhere. It can be taken at home, work, or other places without regard to its sacredness or the source of the drug. The accessibility of Western drugs allows for abuse.

Western medicines are tested hundreds of times before it is approved for human consumption and used for a specific disease. Scientists are constantly working to create new drugs. Initially, many chemicals are tested for an ideal reaction for an isolated disease. The chemicals are narrowed down until only one meets the desired reaction for the isolated disease. Once the chemical is identified as a possible drug it is tested on animals in several trials. It is then followed by testing the drug on a few human volunteers and if successful, testing is opened up to include more people with the targeted disease. If the tested drug is successful in treating the targeted disease the drug is approved as safe by the United States Drug Administration. The drug company patents the drug and profits from the sale of the drug.

There are a variety of forms in which Western medicines are prepared. They include injection, oral liquid or pills, transdermal patches, inhalant, and creams or lotion. Some drugs are produced in more than one form others are produced in only one form. For example, antibiotics can be given in oral pill and liquid, as an injection or a cream.

Classroom Activities

Students will develop a better understanding of how drugs work in the human body and acquire Diné language and culture via various activities, strategies, and methods such as graphic organizers, cooperative learning strategies, investigations, research, and interviews

Activity #1

The performance objectives for this activity include: (1) Students will identify types of plants found on Diné Nation. (2) Students will identify how each plant is used by Diné.

Arrange the students into groups of two. Hand out a list of plants found on Diné Nation. Tell students to read the lists of plants written in Diné and English. Hand out a graphic organizer that identifies: the Diné name for the plant, the elevation of the plant, how the plant is used, and the English name. Tell students to select ten plants and write the Diné and English name on the graphic organizer. Tell students to use the Internet to find the elevation the plants grow. Tell students to write how each plant is used by Diné. It could be as medicine, food, dye, or other purposes. Tell students to take their list home and have their family members assist them to identify the uses of the plant. Each group will share their information using Diné language.

Activity #2

The performance objectives for this activity include: (1) Students will identify the physical characteristics of pinon tree, juniper, and sage brush. (2) Students will draw each plant and label with Diné, English, and scientific names. (3) Students will write a description of the plant.

Have students work in groups of two. Provide small sample of each plant for students to examine and identify the physical characteristics using the five senses. Hand out graphic organizer labeled *Nanise'Baa hane'* for students to draw the plant using the sample. Have students write the plant's name in Diné, English, and the scientific name. Have students research the scientific name of the plant via the Internet or other resources available for students. Have students write a description of the plant on the graphic organizer labeled description.

Activity #3

The performance objectives for this activity include: (1) Students will actively listen and ask questions about traditional Diné plants used for medicine. (2) Students will write notes and a summary about the topic.

Invite a traditional Diné herbalist to the classroom to share traditional information on plants and herbs used for medicine. Have the herbalist discuss the plants: What are the names of the plants (specifically pinon tree, sage brush, and juniper)? Where would one find the plant? How to collect the plant? What part of the plant to collect and use for medicine, and how the plant is used for medicine? Have students write notes during the presentation. Arrange students into small groups based on the number of plants presented by the herbalist. Have students write summaries about the plants and share with class.

Activity #4

The performance objectives for this activity include: (1) Students will actively listen and ask questions about

plants native to Diné Nation. (2) Students will write notes and a summary about the topic. (3) Student will identify the scientific information about plants found on Dine Nation (specially pinon tree, sage brush, and juniper).

Invite a botanist to the classroom to share scientific information on the type of plants that grow native on Diné Nation. Have the botanist discuss: the common and scientific names of the plants (specifically pinon tree, sage brush, and juniper); the altitude, climate, weather, and soil the plant grows in. Have students write notes during the presentation. Arrange students into small groups based on the number of plants presented by the botanist. Have students write summaries about the plants, and share with class.

Activity #5

The performance objectives for this activity include: The performance objectives for this activity include: (1) Students will actively listen and ask questions about traditional Diné plants used for medicine in ceremonies. (2) Students will write notes and a summary about the topic.

Invite a traditional Diné medicine person to the classroom to share traditional information on plants and herbs used for medicine in ceremonies. Have the medicine person discuss information on plants: What are the names of the plants (specifically pinon tree, sage brush, and juniper)? Where to find the plant? How to collect the plant? What part of the plant to collect and use for medicine? How is the plant used for medicine in ceremonies? Have students write notes during the presentation. Arrange students into small groups based on the number of plants presented by the medicine person. Have students write summaries about the plants used in ceremonies, and share with class.

Activity #6

The performance objectives for this activity include: The performance objectives for this activity include: (1) Students will actively listen and ask questions about Western medicines for patients. (2) Students will write notes and a summary about the topic.

Invite a pharmacist to the classroom to share information on the various types of drugs used for pain and diseases. Have the pharmacist discuss information on different forms of drugs available such as oral liquid, oral pills, injection, inhalant, creams and ointments, patches, and others. Have students write notes during the presentation. Arrange students into small groups based on the number of drugs described by the pharmacist. Have students write summaries about the plants used in ceremonies, and share with class.

Activity #7

The performance objectives for this activity include: (1) Students will plan and create videos on traditional Diné plants. (2) Students will evaluate and prepare videos for presentation. (3) Students will present videos to an audience.

Arrange students into groups of four. Have students work in groups to plan on the type of information the video will contain. The video can include: how to collect plants for medicinal purpose; how to prepare the plant for medicinal purposes; how to apply the medicinal plant for healing; where the plant is found; Describe the plant providing information including Diné, English, and scientific names; or the various uses for a plant. Have students plan for a five to eight minute video to include step by step information on how the group will show the information.

Activity #8

The performance objectives for this activity include: (1) Students will write step by step instructions for how to use a traditional medicine plant in Diné language. (2) Students will create a book of how to use traditional medicine from plants.

Arrange students into groups of two. Have students use information gathered and researched from Diné traditional herbalist visit or other sources such as parents or family members to write their directions to use a traditional medicine. Have students include drawings or photos with their written instructions.

Activity #9

The performance objectives for this activity include: (1) Students will identify and collect plants on field trip. (2) Students will record information on various plants.

Take students on a field trip to the areas where plants can be found. Have students work in pairs to identify the most common plants such as sage brush, pinon trees, juniper, yucca, and grease wood. Have students record information on environment of the plant and its physical characteristics, and surroundings. Have students collect small samples of the plant in a bag to take back to class.

Activity #10

The performance objectives for this activity include: (1) Students will identify a plant cell and animal cell using prepared plant-leaf cell and animal-blood cell (2) Students will locate organelles of animal cell and plant cell, and identify its functions. (3) Students will create a cell using various materials.

Arrange students into groups of two. Hand out diagrams of plant and animal cells for students to examine to identify the cell organelles. Have students research and write the function of the cell organelles. Students can see and discuss the similarities and differences between a plant cell and animal cell. Distribute materials to simulate a cell: sealable freezer bags for membrane, hair gel for cytoplasm, ball for nucleus, various colored foam to cut out for mitochondria, vacuole. Have students discuss and share the information of their cell.

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