

Forestry and Climate Change

“If the Forest Could Talk and the Water Could Flow”

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Diné Institute for Navajo Nation Educators (DINÉ)

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Introduction

The earth's atmosphere is changing at an accelerated rate as compared to long ago. In this Millennium, the atmospheric carbon dioxide is at its highest level, 409 in 1912 (Lindsey, 2020), which should be a concern for humans. Unfortunately, human activity is the leading cause for the changing climate. The climate change is also affecting flora and fauna of forests. How does one know that changing climate is a concern? Many changes in the earth's natural processes show that we should be concerned about climate change, such as rising sea levels, loss of permafrost in the Arctic and Antarctic, increasing temperature, warming ocean, extreme weather, including frequent drought. The world we live on is known as Earth, which is our only means of survival. The beauty it provides is essential for our minds and souls. Unfortunately, the beauty of the land and the people is disappearing right before our eyes.

Life on the Diné homelands is also being affected by the climate change. In the recent New York times, it was mentioned that the Native Americans who live on the reservations are most affected by the climate change (Falvalle & Goodluck, 2021). I am glad that the reporter acknowledged the reason behind why most Indigenous people are more affected than others. I always thought to myself, why is this happening as if it was the fault of the people, when in fact they were forced to move onto an undesired land that lacked many resources to begin with by the government. Many changes are occurring such as lack of water. In the recent COVID -19 pandemic, resources for the people were obviously very limited. This caused so many lives to be lost especially for the elderlies who sustain the culture and language of the Diné. This is disheartening to hear of the many lives that were affected due to limited resources, such as water resource which topped the list and the main factor for lives lost. Other resource was having a few hospitals across the reservation that services the Diné Nation. Hospital beds were limited and choices had to be made who can make it. Drought has an issue since the 1990's. The land is drying due to climate change. Some animals are disappearing with the water. It is also harder to vegetate on the lands. Animals that roam in the area such as cows and horse are unable to find grass. The land is so dry that it is becoming more of a sand dune. In addition, the weather is getting crazy that is beginning to hotter in June. These problems are some of the reasons that the Diné people need to take action as well as get help from the government. The people are hoping with the help of new elected United States president, Joe Biden, will address this problem as he sees a connection with global warming. (Flavalle & Goodluck, 2021). Hence, this is all the reason to make students aware of their environment, as well as the problem they face or will be facing in the future. The curriculum will look into some of the areas of concern and may change the few, but it only takes one or several, then spreads out to others.

Context and Rational

While resources such as energy or materials provides for our needs in order to inhabit the earth, we are now faced with the problem of even more limitation of resources, not only on the reservation but globally. The future generation will be the ones to suffer even more so, if appropriate actions are not taken sooner and seriously. This unit will relate to just that, what can

students learn and do today in order to provide a safer tomorrow. The unit provides hands-on activities for students to learn about the plants that surrounds their area or environment. In addition, what kind of changes can students do to help the environment be livable. Students will practice from home on a daily basis to create a habit as individual and or with family members to save the earth. There is only one direction, which is the future. There will be no future if we don't start today.

Some of our elders already know what lied ahead through their environment. I remember as a young girl, my grandparents use to tell us grandkids that the future will be different. My grandmother would sit outside her log cabin home each evening and gazed around her and into the sky. One day, she took a deep sigh and verbalized her concerns as I took interest as to what bothered her. She then said, "I am not sure where you guys are heading in the future my children, but it looks as if life will be a little harder, the trees look different, the sky looks different as to when I was a child. I see streaks of white smoke across the sky. The future holds many troublesome values"

Today, thinking back to that very day, I can relate to what my grandmother's exact thoughts and words meant. She has taught my siblings and I the value of life as best to her knowledge; our connections with earth and nature, asking and offering prayers, and to develop the mental strength against hardship. The Native science in her perspective was valuable. As the world became more modern with many technologies, her concerns deepened which shown through lines across her forehead as she squinted as far as her sight could take her. She was relating to how humans are using the earth's materials for wants rather than needs. As humans destroy the beautification on earth, they also are destroying the living things on earth. In addition, humans are not giving back to Mother earth or restoring, but taking in all possible resources from earth without any respect to the generations ahead. I believe that our culture way of life was to respect all living things. My grandparents would talk to nature. My grandmother would talk to the sky, the clouds, the trees, plants, and the weather. She would tell the weather to take it easy if the thunder became scarier. She would say, "Hazho'o yee' táshóodi" meaning "please, take it slow, do not be naughty." As if the thunder or the weather could hear her and understand her, but it would listen! I believe that is one example of respect for the environment that built a relationship between all living things. The modern sciences, such as ecology, are just now beginning to understand. The question of believing if there is a relationship with Native Americans and the Nature. "Their reciprocal relationships with nature permeated every aspect of life from spirituality to making a living and led to a different way of seeing the world, what they might call a more "environmental" way of seeing the world. But is this a true picture? Increasingly there has been debate over the nature of the Native American's relationship to the land, both past and present" (Booth, 2003). My grandparents always mention how everything comes back in circle, that we exist in a form of a Hogan, we are all living in one world. As in this quote that explains the thinking of Native Americans when it comes to the earth and all live things by a Native American, "You have noticed that everything an Indian does is in a circle, and that is because the Power of the World always works in circles, and everything tries to be round. ... The

sky is round, and I have heard that earth is round like a ball, and so are all the stars. The wind, in its greatest power, whirls. Birds make their nest in circles, for theirs is the same religion as ours. ... Even the seasons form a great circle in their changing, and always come back again to where they were. The life of a [person] is a circle from childhood to childhood, and so it is in everything where power moves.” (Black Elk, cited in Neihardt, 1959)

The trees and plants in the forest are important. Much of the forest provides oxygen to humans and animals. Furthermore, forest is home to humans and animals. Ice cores drawn from Greenland, Antarctica, and Tropical Mountain glaciers show that Earth’s climate responds to changes in greenhouse gas levels. Ancient evidence can also be found in tree rings, ocean sediments, coral reefs, and layers of sedimentary rocks. This ancient, or paleoclimate, evidence reveals that current warming is occurring roughly ten times faster than the average rate of ice-age-recovery warming. Carbon dioxide from human activity is increasing more than 250 times faster than it did from natural sources after the last Ice Age. (J. Fourier). Current generation and future generation should be taught the value of forestry because it has many benefits to humans and animals. In addition, students need to be aware what they can do to slow the climate to say, “buy time” to the future generation. As we deal with climate change, forestry is important. It provides food and shelter as well as fresh air. Although, forest has many usages for its energy, students around the world need to be aware of the climate change as well as the effects on forest.

Demographics

This unit is intended and developed for students at Tsaile Public School as well as students all over the world of all ages. Tsaile Public School is located in the heart of the Navajo Nation. Navajo Nation is vastly located in a dry desert area. Although, Tsaile is located right along Chuska Mountain where there are many trees and animals that inhabit in the area. The outskirts of Chuska Mountain or the base of the mountain begins the dry desert area and the canyons which cultivate sage bushes, yucca or juniper trees. While the Chuska Mountain, rested at 2,700 above sea level, flourishes green grass, ponderosa trees, Spruce, fir, Douglas fir or aspen trees. Small lakes surround the mountain which many outsiders or local people camp or fish at. A local field trip to observe and learn about the plants and trees is possible without going out for miles, because the school is located right at the base of the mountain.

Nearby, Tsaile Public School is an active school. It is one of the schools with Chinle Unified School District. It is approximately 25 miles east of the other 6 schools. Tsaile Public School is an elementary school and a Jr High combined, from preschool to eighth grade. The school’s yearly enrollment ranges from 420 to 450 pupils. There are several other schools outside the district where students can also enroll in. This is sometimes a concern for the teachers because students who hop between schools are not stable academically because they do not always acquire all standards and skills. The ethnicity of the students is primarily Diné people or a descendant of another tribe. The school provides free meals for all students enrolled through a grant that it qualified for. Since the people are so isolated, many of the things are done manually,

at times without electricity. Which gives us the idea of students learning style which they best learn through hands-on and visual-aids.

The community of Tsaile is small and peaceful. An estimated number of 1,200 people live in Tsaile. On the weekends, families often go fishing at a nearby lake or basically stay home. The nearest big town or city would be about 75 miles toward east. There is only one convenient gas station, and a community college, known as Diné College, which is considered the main campus throughout the reservation. Most people, whom are Diné, live by the traditional values and beliefs of the Diné culture. Some of the children are engaged in learning their own Diné language and practicing the culture of Diné involving tending to livestock, especially sheep, hunting, fishing, and family events. Others choose to live in a more modern culture of the western civilization. Those families basically watch movies and be on the internet or video games and attend church. Older generation families practice ceremonies to maintain harmony in their household. They often gather for ceremonial purposes or casual get-together, for trips or social activities and events in the community. Younger generation families are typically not home. Grandparents often take care of their children. Most of the time, grandparents are a great resource to our school. But since the COVID pandemic, many are home keeping safe. It is unfortunate, that some of the elderlies in the area, or even across the reservation has passed on due to the COVID-19. The young parents have to work or live off the reservation to provide for their families. Some live in the cities or town and do not come home as often as they should. But the people in Tsaile seem to know each other very well. Extended families live nearby or by cluster by each other to support one another. The life in Tsaile reflects the lives on the Navajo Nation, as most families have livestock. This affects the plants as the communities on reservation faces overgrazing. Furthermore, a long time ago, our ancestors' daily job or resources were farming and hunting. Many families live in a westernized way of life, where they do not live that life style anymore of hunting and especially planting.

Content Objective

This unit addresses the ecosystem of plants and the reliance of the plants to living and nonliving organism. The students will learn the importance of plants in the forest in Chuska mountain and in around their environment. They will be able to identify the name in English and in Navajo language as well as their usage in their own Native culture. Furthermore, students will learn the earth's condition today and how it has negative effects on the plants and human life. In learning about how trees such as ponderosa trees, juniper trees, oak trees and even to the types of smaller plants or bushes such as sage and yucca are of importance to humans and animals. The plants are also known to be of importance to the Diné culture and its usage. Students will learn to name some of the plants such as yucca, sage, and other know bushes in their environment. They will learn the usage of plants such as to cleanse, make a basket, or take it as an herb for medicine or food.

Furthermore, the unit focuses on the effects of the climate change in one's own environment and extend that to the world climate change. The climate change is a form of a cause and effect of

human activities off and on the Navajo Reservation. The water is scarce throughout the reservation or everywhere due to lack of rainfall as well as the weather is getting warmer. The water well hardly filled up for people and animal to use. A local man in Tsaile, who is a founder of helping the community by monitoring water wells feels helpless and sadden by the fact that the water level has really gone down in Tsaile. He believes that by 2025, there will definitely be less water to supply the community around the Chuska mountain. The community basically relies on the mountain to store and receive water. The trees and plants around the mountain, as well as the outskirts of the mountain are drying up. Many of the family are not as aware and concern about the shortage of water, or the problem ahead. Some people in and around Tsaile, choose to waste water by allowing their children to play in the ponds or lakes that animals rely drink from. The concern man goes out daily to ensure that the people are not wasting water. So for this reason, due to the environment awareness, students will need to learn the importance of reserving water, planting, and less grazing to make it possible for plants restoration.

In addition, the community and the students will in hopes understand why climate change is real and happening. Although climate change has been existence and has affect the earth for a long time, now it is more serious and important than ever before. Students will learn how fossil fuel and the greenhouse emission is connected to climate change. When the solar energy from the sun hits the earth, the atmosphere traps in the heat which causes the heat to warm the earth. Other fuels or gas emission that contributes to the climate change, resulting in global warming, is burning of fuels such as, electricity, heat and transportation. According to the EPA (Environment Protection Agency) there is a climate change. There is a global climate change that has been happening for many years. This is seen through pattern of change, especially noticeable trends in the average temperature of the Earth. The temperature has been increasing for many years which is identified as global warming. (U.S.EPA, 2016). The global warming effects all areas of earth in a pattern. The effects are such as stronger hurricanes, melting glaciers, and the loss of wildlife habitats. "That's because the Earth's air, water, and land are all related to one another and to the climate. This means a change in one place can lead to other changes somewhere else. For example, when air temperatures rise, the oceans absorb more heat from the atmosphere and become warmer. Warmer oceans, in turn, can cause stronger storms." (U.S. EPA, 2016)

Students need to be educated about how our dependency on fossil fuel has effects humans and animals. As younger generation get dependent on materials, fossil fuels such as natural gases or petroleum are oil, coal and fuel, even water wind and solar radiation. The idea is to teach younger generations about their surrounding and learn to adapt and enrich their habitat through their culture and belief where it is safe and clean. Students will focus on the plant unit and climate as a total of 15 days. It is important for students to learn and be aware of the plants, especially the native plants and their usage for Diné people in surviving. Many elders believe that the environment is changing because of human action. If people continue to take less interest in the needs of Mother Nature and abuse it by wasting energy or trashing and disrespect it, the nature will fight back. I believe that our Diné culture has many values and important resources that could support the beauty way of life, as described by the elders. The way of life for our ancestors and elders was to respect the earth. Respect the living and nonliving things that belong to the earth. To this day, the value and respect has changed a lot. This in turn is causing for changes to the earth such as climate change or global warming and its effects on forest and

animal. The warnings of our elders are more visible as we see people, animals and plants (any form of life), seeking shelter, food and water. It is a sad case to

The curriculum will involve students to learn of ways they can make changes to their way of life so that they can help save or contribute to earth as well as lives. Students will take actions in solving problems that the Navajo Nation faces as well as the world. They will be involved in problem/solution such as recycling, planting, refusing materials that that cause trash on in their environment. Books such as; *What is Climate Change (Gail Herman, 2018)* and *The Great Kapok Tree (Lynn Cherry, 1990, The Fly Guy Presents Garbage and Recycling, and Earth Ninja: A Children's Book About Recycling, Reducing and Reusing* are some of the readings to be done by students. Students will also watch a video about climate change. One video shows the effects of the climate change on the reservation, *A Record of Change: Science and Elder Observations on the Navajo Nation*, will be viewed by the students. In addition, students will see the possible changes that are occurring within their own environment, such as the solar panels installation for many of homes. Students should get a better understanding of why these changes are happening around their area, and start making a connection to how it relates to them and to their future. One Navajo person is taking the initiative to help with not only the environment, but to power homes through Solar power. What does this mean to the students, to the future of the Navajo Reservation. They will work in groups and do activities to solve what they can do to help and possible reach out to communities begin to make a difference. We will have special guest for our local college land management office do a lesson as well. Students can make valuable posters to advertise how to protect our planet and conserve nature. They will be the heroes of the future.

Teaching Strategies

The type of strategies for lesson is critical. For this unit, there will be hands-on activities, field trips whether it will be virtual or in person, cooperative and effective strategies so the students will be able to understand the goal and outcome. Below are strategies that will be used for this unit.

This unit requires active participation through projects and collaborations. Students will be involved in teaching strategies that will guide them to learn the most effective way. Here are some strategies that is incorporated into the unit lesson and a brief description to help one understand it. There will be different approaches such as pairing students, whole group, use of graphic organizers, video viewing as well as a guest speaker.

Questioning and Experimenting (Higher Order Thinking Skills)

According to Bloom's Taxonomy, students learn through steps to get them to the level of being able to apply and be creative independently when using the HOTS (higher order thinking). Bloom taxonomy is a concept of education reform that guides students to higher level thinking. Because Students vary a different level in the classroom, teacher lean on these taxonomies to level students' academic performance. Teachers use questioning skills to be able to adjust to the

level of the students and the goal is to get them to a higher-level thinking based on the taxonomy. In this unit, teacher will begin at a lower level to basically identify then to applying knowledge. As student progress in the activities, students will also begin use questioning skills in their assignments. They will be utilizing the scientific methods and process at times to develop questions. Student will use question starters such as who, what, how to ask questions about what they want to learn about or find out. Students will use questioning to understand the concept of climate change- why it is happening? What can be done to help? What are the cause and effects? Another is to understand the concept of forestry. What is happening to the plants and the forest? What kind of changes need to happen to help land management?

Gradual Release Model (I do, We do, You do Model)

Some of the activities will involve the teacher to demonstrate certain action and movement. The students will also be involved in demonstrating through this model. This model is considered a gradual release from modeling to independent practice. This strategy is great for students to understand how to do the work through modeling by the teacher, then to guided practice with the teacher, and finally to independently. This process ensures students to learn effectively. As teachers, use this strategy, the students begin to learn to listen and watch, do and gain the independence to complete the work.

I Do is a phase where the teacher tells and shows (models and demonstrates) what students need to do and how they do things. This phase is important especially for students who are visual learners. It is the effective and efficient learning process for students to grasp what they should do and be able to do.

We do is next phase of the learning process. This is also an important phase where the teacher is involved with the students by doing things together. The teacher is a support and guides with the students to ensure the learning of the objective is taking place.

You do is the last phase where the students will work independently and demonstrate the work they are assigned without the teacher's help. This phase helps the teacher check for understanding and see if there needs to be a re-teaching.

Graphic Organizer

Graphic organizer is a process for students to construct meaning so they better organize their understanding in visual and mental images. The ELL students or ESS student learn best by use of graphic organizers. Graphic Organizer will be used to identify the behavior in a certain text. I will be reading literary text or short stories that will be based Native science and western science view on plants. Many cultures, use plants or trees. It is embedded in their culture. Using the graphic organizer, students will be identifying the experiments or projects they conduct and chart it. The graphic organizer can be a simple such as students drawing pictures of plants and labeling them. Students will be able to use the information from the text and share them with each other. Some of these charts can be used to compare and contrast with their findings in team or pair

work. This is a great way to remember the content that is learned as well as what using as a resource to recall.

Cooperative Learning

Students will be involved in a group discussion of 4 to 5 students at to complete the graphic organizer about their factual findings, or simply discussion. Students will also be involved in *think pair share model* during and after teacher has read scenario or situation. This strategy forces the students to be accountable and is supportive to their learning. Furthermore, students will learn in whole group settings at times when such as when the teacher will involve students in teaching the climate change, or video viewing. Students will be involved in talking and sharing about a given scenario. They will also be sharing verbally and often use graphic organizer to share and gather their thoughts on paper. This will give the students visual aid to help the other participant to understand. Other activities where students will be involved collaboratively is when they read a passage from a text. Students will do jig-saw activity. Jig saw activity is where students help each other comprehend a text by reading different parts together and then putting it back together to understand what the text is talking about. This activity elevates pressure on students who do not feel comfortable. It also makes everyone accountable.

Visualization

Students will be exposed to images through picture books and videos from You Tube: Student will see different types of trees and plants around Tsailé. As we learn about the forest, samples are important to make a real-world connection for the students. Visual- aid helps students see the picture much more clearly so they can better understand what the topic is about. They can make the connection as teachers provide visual aid, especially students that are English Language learners. It has been researched that student learn best when provided with visual aids.

Technology in the classroom

Use of Eno board (like a smart board) will be used to show interaction with science video. An Eno board is an interactive board that allows students and teachers to engage in the lesson. Use of Eno board will make learning visual for students. The documentary camera will be additional tool to use when showing students how to complete graphic organizers. During the viewing of the clips or short videos, students will discuss and take notes of the forest or climate change that is taking place. Each student will be provided a laptop for their own use, since the pandemic, the school opt to have paperless assignments. Assignments will be uploaded to “Schoology”, which is a program that houses lessons and activities including assessments. Use of technology provides motivation for students to learn, especially if they have to interact. It makes it more virtual reality as if they are really there. Although, the teacher must watch out for students that tend to get off tract by surfing the internet other than their assignment.

Vocabulary

As one of the main weaknesses, vocabulary development has been one strategy that the students do not do so well. They struggle with vocabulary terminologies. In the standard, it is related to “context clues”. This standard pertains to understand the meaning of a word. So when students read, they have trouble with unknown words because it is not their everyday language. Hence, teachers need to focus on the vocabulary words that will be tied to the concept. In this activity, students will be learning the types of plants and forestry words. In addition, words that deal with climate change. There are a lot of words that will be covered in order for students to comprehend the objective. Students will also use a vocabulary book to keep track of all the academic words they learn, as well as related words. In addition, there may be some songs played during some activities to reinforce vocabulary words. Students who are special needs or English Language Learner need the most reinforcement. One way to reinforce is to have students act out certain words to help remember what the word means. As students learn the vocabulary or terminologies, introduction of the lesson should be implemented. For students that are English Language Learner, using TPR (Total Physical Response) is a way for them to gain and retain the words they learn. TPR is an approach to have students physically involved to learn the meaning of words. The involvement helps with retention of the activities and words. Learning the science words for this unit will be difficult especially at the third-grade level. Fortunately, with many visual aids, repetitive lessons, and activities will help students learn about the goal of the lesson.

Classroom Activities

Forestry

Week 1 Day 1-Day 3 (30 minutes daily)

Identify Plants and Vocabulary Building

Learning about plants is fun if students are able to have the actual artifacts. One of the fun activities is to take the students out into the field. In Tsaiile, we are surrounded by different types of trees and plants; ponderosa, juniper, pine trees, sage bush, etc. To create interest, motivation and knowledge. Students will take a local excursion. This activity taps into prior knowledge as well as build on prior knowledge. In addition, students will collect artifacts to use later to create a leaf rubbing. As teachers take students out, students will take notes. Teachers may go over the main parts of plants, such as trunks, roots, stems, leaves, flowers, trees, or other plants. In addition, collect seeds that are nearby such as pine cones, leaves, pine cones, seeds. Teachers can also use a KWL chart to connect prior knowledge to new learning. It is important to write the vocabulary list, such as stem, leaves, etc. The vocabulary words should be displayed that the teacher has introduced. They can be listed so students can refer to it as a resource. Students will then take a nature walk to look for plants and trees surrounding the school. Students will have a graphic organizer to help them draw the tree and its parts. They will also draw other plants, such as sage bush, flowers, etc. as they see it. Teachers will guide by asking questions about what they notice and what they see. As students collect their findings and write them down. Students will then pair students and have a discussion, compare notes that can be shared in pairs or whole

group. The teacher will review each day with the students about the different types of plants and ensure that each plant in the student's environment is learned. Another activity is to learn of other places around the reservation, such as Chinle. They can then compare different places as they learn about plants. The focus is to identify plants and what the environment looks like. In addition, are the plants survive, how do they know. What the plants need in order to survive?

Week 2 Day 1 -5 (30 minutes to 50 minutes daily)

Comparing and Contrasting Tree and Plants

For this Activity, students will be involved in creating an art work by doing leaf rubbing art. Each student will use crayons or colored pencils and do a leaf rubbing activity on paper. As students make different types, teacher let students name the parts of the plant and associate with which type of tree or plant it may be. Students will then name and label make it like a diagram. To reinforce the naming and learning vocabulary words, such as stem, leaves, truck, etc., students can be partnered to review and learn together. In addition, with the collection of the leaves and diagram, the class can combine the picture to make a book for the class to share and to continue reinforcing vocabulary.

Importance of Plants from Cultural perspective

Students are now ready to learn about the importance of plants. Students will be asked where they see plants being use? How do humans and animals use or need plants? What is importance of plants and trees? Do we need it? Teacher will introduce the use of plants and trees. Students will be involved in view videos and read a book about the plants and trees listed below for student resource. They will watch a video on how humans and animals used plants and trees as well as read the book, *The Great Kapok Tree* by Lynne Cherry. In addition, they will learn about the cultural perspective of plants. They will watch a video, *Navajo Cultural Uses of Native Plants in the Four Corners Region* with Arnold Clifford, who is ethnobotanist from San Juan Basin of New Mexico, he is a member of the Diné tribe. on YouTube. This video may be divided into two days as it is a long video, or can show only a few plants to focus on a few plants. After getting some insights from the video, students will also interview a family member, such as grandparents to ask about their own plant usage. How plants are important in the life of their own culture. Students will document on a graphic organizer to refer to later as they think, pair share.

In addition to learn the cultural perspective, students will learn about the importance of habitants of the plants to the animals. For this activity, teacher or students can read the book, *Lost in the Woods: A Photographic Fantasy* by Carl R. Sams and Jean Stoick, to get a better understanding of who lives in the forest. It is a cute informational text that serves as a great visual picture of the setting and animals to support learning. As a fun activity, students will build homes out of wood sticks or paper such as bird houses, nests, homes, other home within their environment. This could include a diorama. They will see the importance of trees, grass, or plants that animals and humans need to survive. If there is enough time, students will take a local trip to Diné College to talk with the forestry or botanical area the plants and trees are house.

Saving Trees and Plants

Students are now knowledgeable about the importance of plants and forest. Teacher will introduce the problems that the earth facing because of trash in the environment, cutting of trees, lack of water, overgrazing, and plants dying. They will view video on the effects on earth. In addition, they will watch a video on the importance of recycling, reusing and reducing. Student will be involved in activities such as concept maps or graphic organizer to show what they can do to help the earth. Students will be planting a seed such as bean to show how the cycle of water occurs on earth. How plants and trees are important to earth. Through planting a bean in a paper towel and zip lock bag, they will take notes of the cycle of water to the earth.

Week 3 Day 1 –Day 5 (30 minutes daily)

Climate Change

Climate change may be a little bit of a challenge for the students, but students are able to get to the level of understanding the cause and effects, as well as to what they can do to make a change to their own environment. The activity involves to use a graphic organizer such as KWL to understand climate change. Students will begin with what they know, then onto Questions and end with what they have learned. In addition to this activity, students will view photos of landscapes or lakes, and see the before and today photos. The students will view photos from Lake Powel, Lakes near and around Flagstaff, and at the locate level, Wheatfields Lake. In addition, students will look and create drawings of animals that habitant the environment. Especially cows, sheep and horses. Other wild animals will include, bears, deer, and any local animals. Students can draw the pictures around their home area. The purpose is for students to see what happens to plants and the environment. Another activity for students to do will be to focus on the trash or land dumping with in their environment. As students focus on all their surroundings, they will take not of the weather each day in school. As students are collecting data or evidences, the climate change will be introduced through power points, videos and books. They will also look into solutions to solve simple problems that can help their environment.

Green House Effects

This activity will involve students to understand the human activity that also contributes to climate change. Students will be exposed and experiment the greenhouse effect using a jar. They will also look at other photos, or human activity that is causing global warming. Students will be involved journal writing about their experiment and also take notes about their daily learning. Some other weather activity will be experiment to reinforce how the atmosphere of the earth is effect when the sun's energy or heat hits the earth. We have been recently talking about the solar energy, so this would be another unit that can be taught to a class in connection in teaching the life on earth.

My Responsibility

To end the unit, students will discuss and make goals through writing about what should be done and what they can take home to share with family. They will complete the KWL chart and share with parents. They will commit to a change and follow throughout the year. One other activity the students can do is to make posters of importance of forest and climate change to hang in the school, home or classroom, as well as the community.

Alignment with Standards

Reading Standards

3.RI.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). Student will read books and analyze for important relevant information, such as reading diagram, charts, photos with caption, glossary, heading, etc. to gain the most information.

3.RI.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). In addition to gaining information, students will identify the cause and effects of climate change, forest restoration, water shortage, etc.

3.RI.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. Students will use graphic organizers to connect historical events, to ideas and or steps to preserving the culture, and leading into planting, and the changes that they can make at home to connect to the topic.

Science standards

3.L1U1.5 Develop and use models to explain that plants and animals (including humans) have internal and external structures that serve various functions that aid in growth, survival, behavior, and reproduction. Students will care for their environment such as to plants and animals. Develop ideas and behavior that they connect in a positive manner in order to habitant on earth or within their environment.

3.L2U1.6 Plan and carry out investigations to demonstrate ways plants and animals react to stimuli.

Navajo Nation Diné Standards

Concept: PO 3. I will identify and appreciate the teachings of life surrounding the home. Students will make connection with family members to learn of the old way of teaching in connection with the environment.

Concept 1:PO 4. S I will express and value my grandparent's way of life teaching. Interviews or story tell by grandparents, as well as teaching form teacher to elaborate the ways of life through Hozhó.

Concept 2:PO.1 I will use my cultural teachings about how to take care of earth and sky.
Reinforce of self-identity, self-respect and connection with the earth and the sky.

Resources

Books

Arnold, T., (2019). *Fly Guy Presents: Garbage and Recycling*. Scholastic Inc.

Cherry, L. (2000). *The great kapok tree: A tale of the Amazon rain forest*. Houghton Mifflin Harcourt.

Herman, G., & Hinderliter, J. (2018). *What is climate change?* Penguin Workshop, an imprint of Penguin Random House.

Sams, C. R., & Stoick, J. (2004). *Lost in the woods: A photographic fantasy*. CR Sams II Photography.

Videos

Parts of Plants and their Functions: <https://www.youtube.com/watch?v=GkVrSofcotk>

Importance of Plants: <https://www.youtube.com/watch?v=vu97CRuXI9c>

What we get from the plants: <https://www.youtube.com/watch?v=sDNk3rgilHQ>

Things We Get From Trees: <https://www.youtube.com/watch?v=kjkhO4ijY4>

A Record of Change: Science and Elder Observations on the Navajo Nation:
https://www.youtube.com/watch?v=47ufP_a9hPE&t=950s

Climate Change: Navajo Power | Joe Biden for President 2020:
<https://www.youtube.com/watch?v=sEIEUF3A4Gw>

U.S. Department of Energy, Energy Information Administration (EIA) Energy Explained website(@<http://www.eia.gov/energyexplained/>)

Navajo Cultural Uses of Native Plants in the Four Corners Region:
<https://www.youtube.com/watch?v=6sve04NRSp4>

Basu, S, Seminar Presentation- Climate Change, July 2021.

Booth, A. L. (2003). We are the land: *Native American views of nature*. In *Nature Across Cultures* (pp. 329-349). Springer, Dordrecht.

Falvelle, C. and Goodluck, K, New York Times. *Dispossessed, Again: Climate Changes Hits Native Americans Especially Hard*, June 27, 2021.

Garrett, M. T. (1999). Understanding the “Medicine” of Native American traditional values: An integrative review. *Counseling and Values, 43*(2), 84-98.

Harkin, M. E., & Lewis, D. R. (Eds.). (2007). *Native Americans and the environment: Perspectives on the ecological Indian*. U of Nebraska Press.

Isaac, B. Conference Interview-Solar Power. July 2021.

Lindsey, R. (2020). *Climate Change: Atmospheric Carbon Dioxide*. Accessed August 14, 2020.

U.S. EPA. 2016. *Climate change indicators in the United States, 2016*.