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Using Out of This World Knowledge to Build Literacy Skills! Space Writer on Board!

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"We are earth people on a spiritual journey to the stars. Our quest, our earth walk is to look within, to know who we are, to see that we are connected to all things, that there is no separation, only in the mind." Lakota Seer

Introduction

A little speck of dust in the air is what our solar system is in comparison to what is beyond earth in space. The thought of this is scary but at the same time very fascinating! What is out there is not fully known of course, except we know of chemical-like reactions or star formation happening among the stars and planets. In addition, the process of a planet formation takes over millions of years. [1] Our planet has a "life" on it. "Every step we humans took was a step into the unknown. There is nothing to guide us, no histories we could look to and know what might be expected. Science has been arguing about the existence of life on other worlds, or the cosmic space and time." [2] Our Earth has been formed over 4 billion years ago through the same process according to western science. Humans have constantly had question about what is out there. The little speckle in a huge space that we live on, makes one more curious, more fascinated, and more imaginative to know what is out there! There are some who rely on indigenous science to answer some of these questions. As we learn through the western science or modern science and the indigenous science that is sometimes referred to as native science, we learn about our universe. Western science is textual, researched and categorized, while indigenous science is contextual is often based on belief or tradition mostly from oral tradition.

In the Dine perspective, the space beyond earth entails stories of the earth, from the birth of the universe to the existence of humans that were told generation to generation. The Native Americans believe that human lives are connected to the stars and the existence of what is out there. As for now, the composition of the stars and planets remains of interest to Native American astronomers. The study of stars, and planets, are known to our astronomers as they study them each day. Not only are the astronomers interested in what is out there, but in other people living on earth as well. It is fascinating to wonder what you may see or encounter daily. The only thing we could do was try to seek answers to the questions with the findings.

Imagination has been one way we deal with what is out there today. We are eager to hear who is out there, and what is out there? The imagery of many speculations is told even by writers of science fiction. I for one can share a story of my experience with seeing lights about me and the possibility that it was a spaceship which zoomed off into darkness. This only makes me wonder and begin to look for more encounters. Images, the imagination of spaceships buzzing by, the interaction between humans and other aliens with big heads as they greet one another. Or using lasers to shoot each other in a futurist way of life that does not exist on earth but is based on the reported findings. The character in the movie, "Superman" has these superhuman abilities on earth due to where the he comes from. Superman has powers and the ability to do things that humans cannot do. Children today are interested about learning of space through stories. This unit will allow children to use their imagination at the same learn about the existence of stars, planets and life.

Demographics

School

Zooming onto earth, to a very small town in Arizona, where 3rd grade students are eager to study "life or existence" of other being, we see students who find fascination with the Marvel heroes, or characters of some sort as they are topics of their discussions or conversations. This unit is intended for the third-grade students of Tsaile Public School, but can be modified for other grade levels below or higher. Tsaile Public School is operated under Chinle Unified School District (CUSD). CUSD has a total of 7 other K-8 schools within the perimeter of Chinle, Arizona. Although, Tsaile is the only school that is isolated from the other schools by at least 30 miles out to the east. The school district has an enrollment of 3,300 students which makes it the largest school district in the Navajo Nation. The district encompasses the communities of Chinle, Many Farms, Tsaile, Luckachukai, Wheatfields, Nazline, Cottonwood, and Tselani. Tsaile is located on the Navajo Reservation in the upper four corners. The median income of a household average about $28,000 (2020 American Community Survey). Currently, one hundred percent of the students are Native American, distinctively enrolled with the Navajo tribe. All students, K-12, are on free lunch program. A grant allows all students to receive free meals based on qualifications.

Tsaile is based against the Chuska Mountain off of Route 12 and Highway 64. Tsaile Public School is nestled among the ponderosa trees stemming off the Chuska Mountain. It is a beautiful quiet area, with a population of 1,409 people.[3] Tsaile Public School is also located near a Community College operated by Navajo Nation. Dine College is an accredited college that promotes college students to sustain their Navajo Language and culture alongside their required courses or follow the program of study to obtain an AA, AS, or BA degree. Its enrollment also declined due to the pandemic. The walk from Tsaile Public School to Dine College is about 15 minutes. Some of the Dine College students are parents of the students attending TPS. Tsaile Public School is a K-8 school with an average enrollment of at least five hundred students since I started my employment as a teacher 13 years ago. Unfortunately, due to the pandemic, the number of students participating in in-person school has declined. For the past 14 school years, 2021-2022, our enrollment for students' online classes was about 200 students. Our district has decided to allow students to attend school online under, "Hozho Academy" for this past school year. Some of the students switched from the Hozho Academy to in-person schooling.

Lifestyle

On weekends, families often go fishing at a nearby lake or basically stay home. Most people, who are Navajo, live by the traditional values and beliefs of the Navajo culture. Some of the children are engaged in learning their own Navajo language and practicing the culture of Navajo which involves 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 generations 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 families generally are not at home ¾ young parents have to work or live off the reservation to provide for their families, and grandparents often take care of their grandchildren. Some of these young parents live in the cities or town and cannot come home as often as they want or should. But the people in Tsaile seem to know each other very well. Extended families live nearby, or cluster by each other and usually support one another. Life in Tsaile reflects the lives on the Navajo Nation, as most families have livestock, or are farmers.

Environment and Cultural Perspective

Almost one hundred percent of the students at Tsaile Public are Navajos. However, students' cultural background knowledge depends on the exposure of their home life in regards to traditional views of Earth and the life beyond Earth. Students come from a range of cultures and traditions although they are of the Navajo tribal member. Since the time of colonized era, the Navajo people had been introduced or adapted to other ways of life. Some of the practices for families on the reservation are traditional and rich in cultural knowledge of the Dine way of life. Christianity is another. Those who follow Christianity are families that have been exposed to church or Christian religion led by different groups, such as Mormons, Christians (Jesus of Nazareth), Jehovah's Witnesses, and so forth. The other type of religious practice for some of the family members of the Tsaile school is the Native America Church. This church is somewhat aligned with the traditional perspective but has practices that are different from the actual Navajo traditional practices. This type of religious belief involves the use of teepee and peyote. This religion was formed in the 19th century. So, through these religions, students hear the belief and views of their Mother Earth, Father Sky, and the values of "life" itself as taught by their parents or grandparents.

Content

History

Universe and the Solar System

Earth is the only home and life that was known to mankind for hundreds of years. Since the beginning of human existence on earth, humans were almost greedy to say that the earth was the center of the universe. As the years went on, with curiosity many astronomers questioned just what was beyond earth? Through much star gazing, it was discovered that earth is not the center of the universe after all. Although this could have been true for western science a long time ago, but it was not for Native Americans. The existence of stars and earth was shared through stories, songs and prayers. If one would look back into some of the artifacts, such a petroglyphs and songs, it entails the origination of the Universe, stars, sun, moon and earth. It even entails petroglyphs of visitors from outer space. The western science explains the Universe started

with a “big bang theory”. This theory explains that the universe began from a signal point of high density and temperature that exploded and expanded the evolution of space as it stretched out into a vast universe consisting of billions of galaxies. The galaxies are born of gas and dust that formed stars in a form by gravitation, dark matter and mergers. Within our solar system, the sun is older than the planets.

As we know today, there are many planetary systems in our Galaxy. We called our planetary system, the solar system (see Fig.1). Solar meaning the of the sun, which is a star, is working together with a group of celestial bodies (planets) and held together because of the gravity of the sun. The planets that are in our solar systems are; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto was once considered as one of the planets, but was later reclassified to be a dwarf planet. Along with the planets, there is the moon, asteroids, comets and meteoroids can be found in our solar system. Our solar system is located in the outer spiral arm of the Milky way. Our solar system is traveling and spiraling around the Galactic center. The planets around other stars are also rotating and center of our Galaxy. The planets are held in their orbits by the gravitational force of their star. Gravitation is what holds everything together and what holds us

down to our planet. Without gravity, everything will float away or bounce around, even us here on earth.

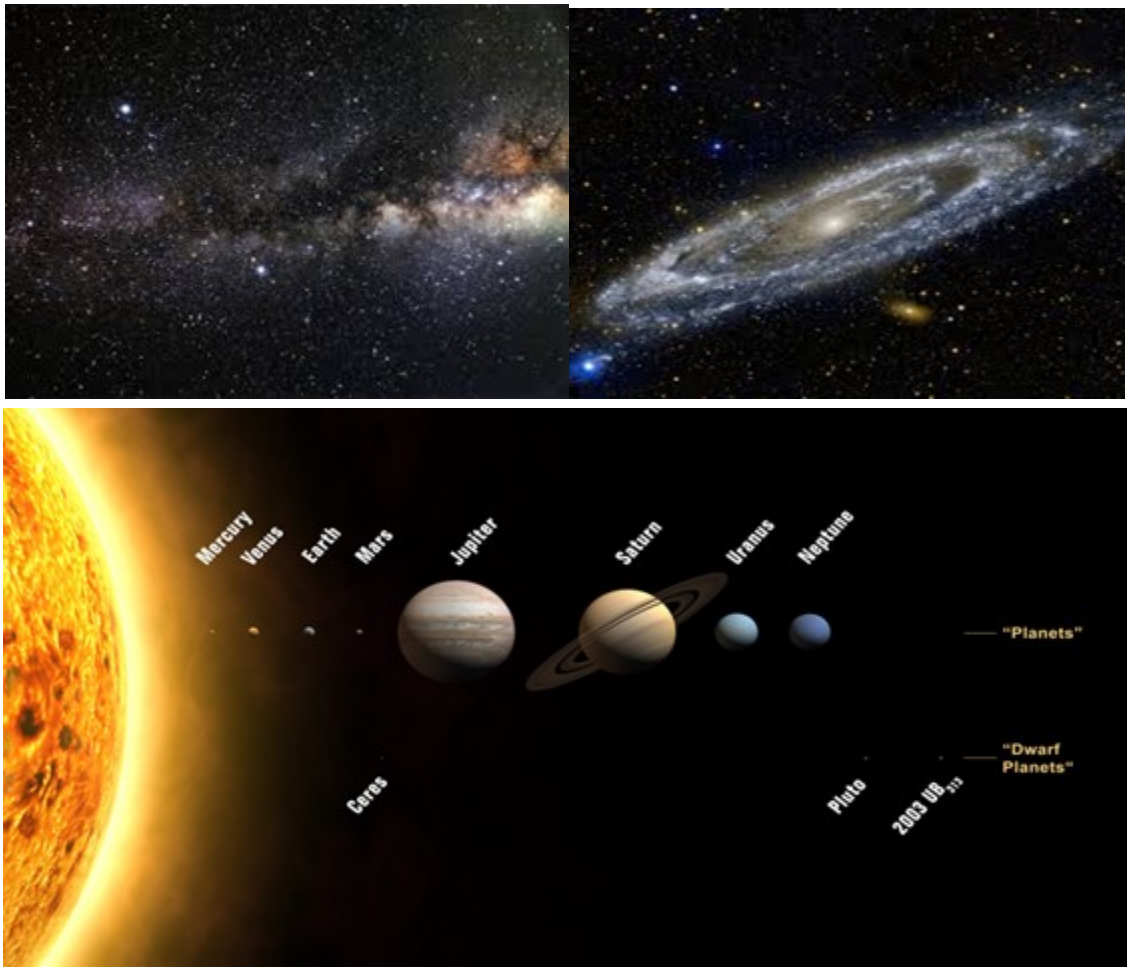

Fig. 1. Space, Galaxy and Solar System

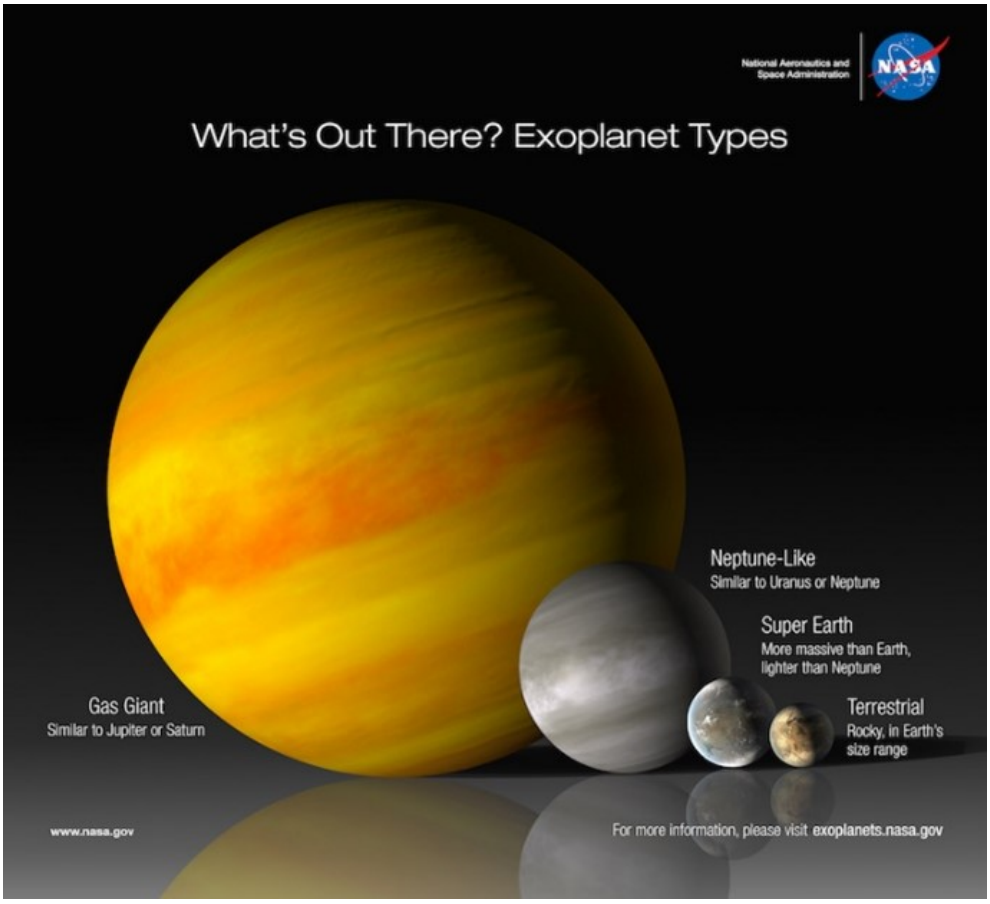

fig.2 The size of a terrestrial planet seen here. (NASA)

Terrestrial Planets and Gas Giants

There are four terrestrial planets. Mercury, Venus, Earth and Mars are considered to be terrestrial planets because they resemble earth in that they have a rocky surface and metals. Figure 2 shows an image by NASA, comparing the size of a terrestrial planets to that of other planets. In our solar system, the terrestrial planets are the closest to the sun. The terrestrial planets are relatively small worlds, composed primarily of rock and metal. All of them have solid surfaces that bear the records of their geological history in the forms of craters, mountains, and volcanoes.[4] They all have a core and an outer shell, just like the earth.

The next four planets (Jupiter through Neptune) are not considered terrestrial planets because they are composed mostly of gas and are known as gas giants. The outer part of the solar system has many ice planets which are dwarf planet. Pluto is considered a dwarf planet. The reclassification of Pluto was motivated by a number of factors, such that its orbits inclined with respect to the orbits of planets, also because it is an ice dwarf in the part of the solar system that has gas giants, and because the more we examine the solar system, the more Pluto-like objects we find. Of the 8 planets in our solar system, this unit will focus primarily on life that terrestrial planets exoplanets may have.[5] Terrestrial planets are where life may most likely be found. There is a possibility of water on these planets depending on the years of the planet.

Fig 3. Earth from space (NASA).

Earth

The planet earth, is where we exist. Figure 3 shows a picture of earth. It is the third planet from the sun. Earth is located at the exact right location and has the right atmosphere to support life. It is not too close from the sun, if any closer it would melt or burn us. It is also not too far away, otherwise we'd freeze.

Earth is composed of an inner and outer core. The inner core is solid, while the outer core is liquid. The outer core is made of many elements such as rocks and different metals. The planet earth has active surface with a rusty crust that are mountains, plains, canyons, valleys, lakes, and other living things we see today. So far, earth is only planet that is that is known to be inhabited is our solar system.[6] The earth's atmosphere has gases that block UV which is so important to humans because it helps keep us from harmful radiation from the sun. The Earth also has a magnetic field that shields us from electrons and protons emitted by the Sun. Without the magnetic field, we will die from radiation.

Gravity is also important. The earth's gravitation also keeps us on earth. While the sun is drawing in the earth and other planets in our solar systems, all things are held onto earth by the gravity of the earth. Gravity keeps us on the ground rather than floating off into space. In addition, anything that has a lot mass (and therefore a lot of weight) will have a high. Gravity is what holds our world together because of the air we breathe, the atmosphere, is held together by Earth's gravity.

Earth has several different cycles that makes the earth active. There is the water cycle, carbon cycle, rock cycle and the life cycle of different organisms.

Western Science Background of Life

What is life?

We ponder on the question, "What is life?" How do we determine if there is life beyond earth? Life here on earth as we know it is a living organism that can use energy to reproduce, grow and respond to changes. Before our species, other animals, the dinosaurs, roamed the earth. They relished on the resources available from the earth before they were wiped when a comet struck the earth. Humans are a relatively new species inhabiting earth.[7] Humans' basic needs are food, water, air and shelter. All these needs are met by our planet. We will not survive if one of the needs are not met. The planet that species are able to inhabit, contains

resources that are needed by those species. The sun provides the most important source of energy for life on earth; plants use solar energy to make food, which is consumed by other species on earth.

What is Habitable (Goldilocks) Zone?

What other planets may be habitable or is already inhabited? We know the type of species or organism that live on earth, but what of other planets? What makes a planet habitable? Habitable meaning an environment that supports one known organism in activity to reproduce, survive, growth, and maintenance which is referred to as metabolic activity. Earth is the only known planet that is habitable as we know it. Other planets are not known to harbor life. But, astronomers are seeking for answers if there is life out there and possible finding of a planet that is habitable that would be similar of the earth. If not, what other exoplanets are condition to offer a better life than of earth. Researchers believe that if a planet roughly the size of earth and has a rocky surface will sustain life. So, the mass and the size of the planet matters. In addition, if the planet is between 4 to 8 billion years old will most suitable to habitat if every found since that gives ample time for life to evolve. A habitable zone around a star is the region where liquid water could exist on a planet there.

What is an Exoplanet?

Our galaxy consists of 8 planets. The planets revolved around the sun. Any planets outside of our solar system that revolves around a star is called an exoplanet. Exoplanets are so far away that they are hard to detect. But astronomers are able to detect exoplanets. The planets are very dim, like a fire fly that they rarely seen with light because of the distance. A spacecraft called Kepler was launched back in 2009 by NASA to look for other planets that maybe habitable. One method that helped astronomers discover many exoplanets was the "wobble" or "wiggle" method. If the lights from the star looked like it is wobbly, then a planet was around the star. Another method is the transit method ¾ as a planet comes in front of its star, starlight dims; this is the method that the Kepler spacecraft used. The wobble method could detect big planets that are Jupiter sized, smaller planets are more difficult to detect. Some of the planets that were discovered had rocky surface. The rocky surface shows that if the planet is located at the right distance from the sun, it may have habitable zone where life could be possible.[8]

Cultural Background

Cultural Perspective- Universe

Navajo astronomy is complex and offer many stories of the people. The stories and constellation are not similar to the Greek astronomy, but carry the same value. Learning about the universe has been in the Navajo custom and belief since the beginning of mankind. Navajo astronomy is based on a philosophy of birth and life. The animals, the plants, and the people have been created all together in what is known as "origins of life through five worlds". The worlds are explained like layers of world upon one another. The first world was inhabited by insect like beings. Birds, animals and human beings inhabited the second, third and fourth world. In the fifth world, which is where we are today, they emerged together in this world. These sacred stories were transmitted from generation to generation by the grandparents. These stories were only shared during the winter times, from October through February when the snow first appears. Many activities, such as string games, were ways to connect with the stars. The string game was for family to tell stories, provide healing and show respect to the universe. With the strings, a replica of the stars was made by the children and their parents. Within these stories, the creation of stars of how they were place tells of the constellation that is connected to the culture.[9]

The Navajo people who lived a traditional life where they knew that there were many stars in the universe. As for our galaxy, they believed that the sun was the center of our galaxy. To pay respect to the sun and the stars, the Navajo homes were constructed in alignment with the cosmic direction and principals of the way of life. The universe is considered sacred and interrelated, creating a network of relationship and processes in constant motion. “The entire Universe is considered to be a living organism, a scared organism, existing in a non-static and constantly regenerating process.” The hogans, which are the cultural homes of the Navajo people, were structured to be round and the entrance always facing the east. The doors of each hogan would be opened on a daily basis to allow sunlight into the homes for blessing and provide offerings. Along with alignment of the cultural way of life, the activities such as walking into a scared home or sacred activities, is based on the sun and the earth’s shape, round. By doing so, allowed the people to be connected to the universe.

Science Fiction

Science fiction is one way the world connects with the unknown. It is booming business everywhere in movies, games, books, novel or series, and special characters. In the beginning of this unit, I inserted a quote I find to make sense in the world of Native American and the connection to science. The question of “what’s out there? Are we alone?’ can only be answered by the mind. Our imagination begins to wonder. One can only imagine life outside earth with the ideas of earlier stories.

Some believe that science fiction writing began in the 1920’s however, it may have started much earlier, and the “*wooden cow*” in Greek mythology is such an example. Stories of creatures, such as half human and half animal in the mythical stories were put into writing. Science fiction stories began as authors create imaginable creatures in their stories. In the 1930’s, comics characters of superheroes with powers appeared in Newspaper then onto magazines. Superman was the first hero written by DC Comics in 1939. Some science fiction was based on magic or specifically in space or other planets such as *Star Wars* were written and thriving. Movies of science fiction became entertaining as well in the later 1800’s. Such as *Frankenstein,* a character that didn’t look realistic. Science fiction began with the characters or creatures on earth then onto space. In addition, some of the characters were villains or heroes as of the genre of folktales in mythical stories.

Science fiction was born as a unique genre. It is related to science, but the characters or being in the stories or in the parts are not realistic in terms of what we considered to be normal. Most of the stories are futuristic or out of ordinary. Science fiction allows the exploration of the imaginary world.[10] Paul Davis believes that the best science fiction is not written for entertainment, but allowing for the learner to get a deep understanding of the universe. It also broadens and tackles the concept of the philosophical and ethical view of science.[11]

Native Superheroes-Myth

I grew up in an era where many Navajo families were assimilated into the western civilization culture. My parents were one of those people who were taken away from home by the government and placed them in schools away from home. They were forced to go to school and were stripped of their culture and identity. I was expected to basically to go to school and learn the English language. I lived with my grandparents, who carried and lived their traditional way of life. I listened to stories told by my grandparents of many heroes within of our culture. They had some connection with the creation and the universe. These stories told were somewhat similar to the Greek mythology. Other Native American also have similar stories that tell of the life and universe as well.

Some of the heroes mentioned are told in legends or mythological stories. The characters of these being had

power and were unlike humans. The heroes are known to save the planet earth and restore harmony on earth and the people. One of the Navajo super heroes is that of the Twins. The twins' father is the sun. Both boys, saved the people from the giants that roam the world and was going to kill the people. Throughout the reservation, according to the stories, there are signs or marks on rocks that signifies the hero twin's existence and the death of the giant. Although the twins look more humans, they had power above to help them fight. These Navajo stories were told to understand life and make the connection with the universe. Some of the other heroes are coyote, who places the stars. Many of the animals are connected to the creation of the world, such as the turkey, the black bird, humming bird, horned toad to name a few. The characters of the animals signify the strength, wisdom and possess special qualities to help survive in our world.

Character Traits

When fictional stories are written, an author would have to think and create characters based on a story. The character traits are important because it what makes the story. The character can be a negative person or a positive person. Character traits are based on the adjective words that will describe a person. The words, the action and the behavior of a character will bring out the traits of character. When writing about a character, it is important to think about what will the traits of the character. For this unit, students will be writing about a trait, the characteristic, the behavior, and the actions of their character as they develop a story. In addition, the environment of the character will also be important because of adaptation of survival. Humans as a character on earth depend and react to their environment based on the resources.

Teaching Strategies

Correct teaching strategies are very important in making sure that the students are comprehending what is taught. There are many strategies that can be used, which can be modified for this unit when needed. For this unit, students will be required to be Teacher will use teaching strategies that will guide students 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.

Questioning and Experimenting (Higher Order Thinking Skills)

Bloom taxonomy is a concept of education reform that guides students to higher level thinking. Students vary a different level in the classrooms, teachers lean on these taxonomies to level students' academic performance. According to Bloom's Taxonomy, students learn best by taking them step-by-step from lower to higher level thinking and doing. The first step of the taxonomy is basically to understand and identify concepts. For example, naming objects such as flower parts, but not go into depth. The goal is to get to the level to where students can apply and create to problem solve. Teachers use questioning skills to be able to adjust to the level of the students. 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 too will begin use questioning skills in their assignments.

Visual aids or Nonlinguistic representation

Providing visual aids and using visual aids when teaching helps support learning for the students. This strategy enables students to conceptualized through metal images, physical models, and pictorial

representation. Students that are ELL (English Language Learners) benefit the most and is very helpful in comprehension. If students cannot grasp the concept through auditory, the visual aids support them to make connection. Research supports that using visual aids provides interest, motivation, provides and establishes learning through thinking and ensures long term memory or knowledge through experiences. Students will remember the concept of what is being taught and make the connection. In this unit, students will be looking at some pictures from NASA, and or watch video to learn about space. Students may create an exoplanet to explain their character's home and make a model of a hogan to understand the cultural perception of the universe.

Connect to Reading and Connect to real word situation

Through three strategies of making connections, students have to make meaning of what they are learning about. In addition, making real world connections will be more meaningful when learning a concept. Teachers need to make the connection of what skills or objectives they are teaching and give the "why?" to make it relevant and meaningful. The three strategies of making connections are: making Text-to-Self Connection, Text-to-Text Connection, and Text-to-World Connection.

As students are reading or listening to text read aloud during the lesson, the teacher will pause and have students make connection with the text. Through the lesson, the text or the information shared with students will be evaluated by students so they understand the purpose for the lesson. The students will be reading several children books to make a connection with from text to real world about space. Furthermore, lessons tied to the student's background knowledge or familiar ideas or topics makes it more meaningful. For this unit, using the cultural perspective will make it more meaningful for the students.

Quick Talk; Quick Writes and Reciprocal Teaching

Through this lesson, students will make connections as they go along through the lesson. The teacher using the reciprocal strategy to help students think through questioning. The questions asked by the teacher or students allows the learner to comprehend what is talk. As students learned new concept, students can talk with partners or groups and write what they have learned. The students can be in the teacher role and share his or her knowledge to the rest of the group. For this unit, students can have conversation with parents, grandparents, or gain information from a text or video, they will be allowed to share their knowledge. For students, it also build confidence and build pride in their reading. Sometimes, they can't wait to share because they love to talk.

Graphic Organizers

Use of cues and graphic organizers is a teaching strategy that is very helpful for students. It ensures the learner to focus and maintained important information or data. Using graphic organizers provides steps to recall and even mentally picture what concept was taught. It also helps compare different scenarios, topic identification, creating a mental picture, organizes the thinking process. Graphic organizers also provide experience similar to hand-on project. For this lesson, students will use KWL chart, Venn diagram to compare and contrast exoplanets to earth, and concept map. In addition, when sharing students can always refer back to their notes or organizers.

Grouping and Cooperative Learning

Using grouping allows students to be engaged and feel safe. Teachers can organize students into groups and

creates roles so all students can participate. At times, teachers see students who shut down because they feel infuriated by teachers, they do not want to say anything so they lose a lot of learning time. Schools believe in-all students can learn and so leaving out students because they feel intimated will only make the student worse. To feel more comfortable, they relying on their own peers when they want to share and talk. Teachers also need to be aware on how to group students, hence, they have to preplan on how to group strategies such as pairs, tri, or whole group. Establishing grouping by creating variation of ways to group is fun for the students. Such as, name them by superhero names, by size, by gender, etc.

Differentiated Instruction

Students learning ability level varies. Some students need a different approach such as hands on or 1-1 approach. So teachers need to differentiate instruction on a lesson based on the student's need. Students who are English Language Learners or Exceptional students are better instructed by modifying lesson in different ways. Differentiating instruction will meet the needs of all students. Students will comprehend and get to the required level of comprehension as they receive instruction from different perspectives. In this unit, especially if they are learning a lot of science information, some of the instruction maybe repeated if students are lost or confused by your quick assessment in checking for understanding. This may mean making lessons easier or adjusting at different level of language, worksheets, or presentation.

Technology

Technology use includes laptops, smartboards, tablets or even document camera. In addition, watching videos is a part of technology integration. Teachers use technology to connect to learning objectives. If students are unable to take a field trip outside of earth, the next best way is to do a virtual field trip. For this unit, the use of photos, videos and interactive games will be through NASA website. In addition, researching and creation of characters can be done through technology.

Gradual Release of Responsibility

Gradual release is a great method to use for teachers when students start of on ground zero. If new information is release to students and having student start applying can be difficult and confusing. You may get the result you didn't expect after an hour of lesson. Gradual release model is just that, teacher gradually releases students to independency after teacher models and guides the students through the lesson. It involves teacher to first model, then work with students together by helping them or guiding them, and to finally releasing students to work on their own based on the demonstration that is modeled by the teacher. This model also referred as "I Do, We Do, and You do". This is a joint responsibility between the teachers and the students.

In addition, the model can be shifted in reverse and start out with the students. That strategy begins with the students questioning by teacher presenting a simple statement. It opens up conversation of what the students know, i.e., prior knowledge. For example, for the lesson, I will begin with the statement, how did we get here on this planet? Where do we live and how do we live? Or We live on a planet that supports life. Students then in groups or pairs engage in a conversation that leads to many curious questions. Then students choose to learn, rather than teacher starting out all the time. It sounds sort of like a hook, but this allows students to engage more in conversation and take ownership of their own learning.

Activity

This unit will be implemented 15- 20 days with an ongoing writing activity as students develop their writing skills. The students will be introduced to space and the possibility of what kind of life can exist outside our solar system. The students will be engaged in writing a story about their exoplanet and life on it. The focus is to have students discuss in a collaborative setting in order to create an exoplanet, and be able to tell what kind of resources could make their work habitable. Students will be engaged in activities where they will do reading of literature books (science fiction books), watch videos, and use information from the NASA website to engage in activities. Furthermore, students will be learning about the Dine mythological view of the earth, sun, and stars. As for the Dine perspective of the world beyond us, there are many stories and beliefs of what is out there. Students will be involved with their family members to collect resources from a cultural perspective.

Week 1

Day 1 and Day 2: Students will have a discussion and use a KWL graphic organizer to explain what they know about space. the Universe and the solar system. For the first couple of days, student will focus on the K (know) and W (what they want know) as a group or individually. Then the book, *Once Upon a Star* by James Carter will be read to the students. Some of the students may be familiar with the Solar System already and that is okay. They can be of assistance to the class. But it is also important to build onto their knowledge as well.

Day 3 and Day 4: Students will be introduced to the solar system and the Universe. My plan is to excite the students by dressing up in an astronaut suit. These can be purchased from costume stores.. Having student motivated is the key to getting start, and basically, get their attention! For the first week, students will be involved in viewing a video about space, the solar system, and universe itself. For this class, students will watch a video, *Exploring Our Solar System: Planets and Space for Kids – FreeSchool,* and a short video about space, *The Milky Way for Children, Galaxies and Space: Astronomy for Kids – FreeSchool.*

Day 5: Students will complete their graphic organizer by writing what they have learned in the L column of the chart (What I learned). This activity will lead into learning what is beyond our solar-system planets. Students need to be familiar with the solar system, and understand our life on the planet earth. Teacher discussion should include which planet is able to sustain life as we know currently. In addition, what makes life, why earth is the only planet know that is habitability? What does habitat mean, and what sources on earth make it possible for life?

Week 2

Day 1: This part of the activity will require creative thinking skills in addition to more information about space. For this week, teacher will focus on the planets outside our solar system. Teacher will be introducing the exoplanets, and the terrestrial planets. Students will view photos of terrestrial planets provided from NASA photos. Student will use notes, Cornell notes that they have on terrestrial planets. Students and the teacher will be analyzing the planets and be able to tell the characteristic of the terrestrial planets. The teacher and students will then have a discussion on what an exoplanet means, what a terrestrial planet looks like. Basically, introduce the outer layers of these planets. This part of the activity is to involve student's ideas and give the components of what a planet such as Water life, mountains, valleys, rocks, metal, and iron.

Day 2-5: For the next several days, using the students' findings and learning the attributes of an exoplanets and terrestrial planets, they will now apply it to create a 3-demensional project that they should enjoy. Students will create a terrestrial planet first using paper Mache. They will add all the attributes of terrestrial planet by painting it or give it some texture. Some attributes should include, valleys, rocky surface, metal with a foil are some examples. There are a few videos available through YouTube that one could use depending on the materials available within a classroom. For this unit project, we will be using simple filled round balloons, stripped newspapers, glue and water, and paint of gray to brown to indicate rocks and land. When the project is completed, students will write next about their individual terrestrial planet. They will give important information about their terrestrial planet and a brief description.

Since this may be a simple project for 3rd grade and given how they love to do hands on activity, the next part of creating an exoplanet is important. This part will involve having the students think about an alien lifeform. The exoplanet they create will be for their super being that will be from that planet. Teacher will talk about how some of the planets are terrestrial and how some maybe of gas planets. Teacher needs to ensure that the students will understand gas planets, such as Jupitar. They can refer back to the introduction of the solar system. This planet can be of choice whether it is a terrestrial planet or any exoplanet in form of a gas, or what imagination they can create for their planet.

Week 3

Day 1 Students will be introduced to the Native American perspective of the solar system. Teacher will read a book to the students, *The Hero Twins; A Navajo – English Story of The Monster Slayer* by Jim Kristofic. The Native American perspective point of view shows how the Universe, the stars, and the solar system originated and how it is connected to the people on earth. In addition to the cultural perspective, the life on earth of the Navajo people talks about the beings that lived outside or earth, according the Navajo mythology. In addition, a video will be use to show the story of coyote placing of the stars. The book, *Coyote Places the Stars* by Harriet Taylor and *How the Stars Fell into the Sky: A Navajo Legend* by Jerrie Oughton, will be shared to educate the students the legends and myths of Navajo and other similar culture. This will help students learn to respect, understand and make connections with their culture.

Day 2- 3: Students will learn about the Navajo myth of the heroic twins who saved the lives of people on earth. Students can also be assigned home-work such as interviewing parents or grandparents about the creation stories. While at school, students can share with other students through oral sharing, drawing or groups. Students can use the graphic organize- concept map, about how the cultural perspective of the people and the universe. They can also do a comparison between the science's perspective vs. the traditional perspective. As student are learning about the heroic tale of how the twins save the lives by killing the giants, they will also be talking about the characteristics of the heroes. Through these heroic characters, students can learn the traits and begin to think about a character that they will develop. The list of traits of characters in the story will provide as an example to their character who will live on an exoplanet. In addition to learning about the solar system and the creation, the sun has its importance to the earth. The students will be involved in making a hogan to represent the respect to the sun and to the stars above earth. Teacher will share information on how the hogan is structured base on the life outside earth.

Day 4-5: Students will be learning about the characteristic and the attributes of a hero. Teacher will share another book or show a super hero movie, such as superman for grade 3 version and analyze the character in the text. Some other science fiction stories can be shared, such as Star Wars, Buzz Lightyear, Fantastic Four from the Marvels or DC Films. Students will list the traits and the abilities of the hero. The text is for this

activity to be shared, *PjMask series, 5-minute stories* will be share for students to understand super heroes with super powers. Once the students have learned about the characteristics, the abilities of the hero, the home from which plant the hero is from, they will be building the character. Students will draw the super hero from the exoplanet they have created. Students need to make sure the planet and the being are connected such as if they are made of iron, rock, water, etc. The exoplanet will need to be painted or build to the liking of the character in order to inhabited by the hero or character.

Week 4

Day 1-5 In continuation of learning of planets and life, students will now create a character and write a science fiction about their super being or character that they have created. Students can write in paragraphs or create a comic, but it will need to carry a story. The story will be written with the usually 5 elements; character, setting, plot, problem and solution. As students write, the writing process of revisiting the writing to add more information or give clarification. The comic or story should have the setting from the exoplanet that they created. Some features, traits, and surviving skills or motor skills should be included in the comic or the story developed. Students can have their class first set of science fiction writing to share through the year!

Appendix on Implementing District Standards

Reading Standards

3.RI.10 Student will proficiently and independently read and comprehend informational texts, including history/social studies, science, and technical texts, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 3.

3.RI.03 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.

3.R.RL.03: The Highly Proficient student can analyze characters in a story and prove why their actions, motivations, or feelings affect the sequence of events.

3.R.RI.08: The Highly Proficient student can describe complex connections within text, such as cause and effect, comparison, and sequence to help them understand expository texts.

3.R.RL.02: The Highly Proficient student can recount or paraphrase the message of fables, folktales, and myths when implicitly stated, and prove their thinking using key details from the text.

Science

3.L2U1.7: I can develop and use system models to describe the flow of energy from the Sun to and among living organisms.

3.L2U1.8: I can construct an argument from evidence that organisms are interdependent.

Language standards

Writing

3.W.03: The Highly Proficient student can develop a narrative story that includes: characters, setting, plot, sensory details, dialogue, and a logical sequence of events.

Resource for students

Once Upon a Star: A Poetic Journey through Space by James Carter

PJ Masks Series 5 minutes stories, Simon and Schuster Children's Publishing Division, 2018.

Resource for Teachers

Videos:

https://www.youtube.com/watch?v=Qd6nLM2QlWw - Exploring Our Solar System: Planets and Space for Kids. –

https://www.youtube.com/watch?v=RubnGwhcT6E -The Milky Way for Children, Galaxies and Space: Astronomy for Kids – FreeSchool

https://www.youtube.com/watch?v=GncYOf29uc4 - What Is The Big Bang Theory? | The Dr. Binocs Show - Best Learning Videos For Kids | Peekaboo Kidz

https://spaceplace.nasa.gov/loopy-legends/en/

https://spaceplace.nasa.gov/all-about-exoplanets/en/

Books and Articles

Basu, S. Summer Intensive Session Talk, 2022

Maryboy, Nancy C., and David Begay. Sharing the skies: Navajo astronomy. Rio Nuevo Pub, 2010.

Frank, Adam. *Light of the Stars: Alien Worlds and the Fate of the Earth*. WW Norton & Company, 2018.

Fraknoi, Andrew, David Morrison, and Sidney Wolff. " Astronomy OPENSTAX Textbook and Resource Hub.". Rice University, 2018

Hasteen M. Klah. Navajo Creation Myth The Story of Emergence- the Dine Bahane' Legend of the Navajo Native American Peoples

Johnson, John Asher. *How do you find an exoplanet?*. Vol. 5. Princeton University Press, 2015.

Lambourne, Robert J., M. J. Shallis, and Michael Shortland. *Close encounters?: science and science fiction*. CRC Press, 1990.

Paul G. Zolbord *Dine Bahane' The Navajo Creation Story*

Rothery, David A., Iain Gilmour, and Mark A. Sephton, eds. *An introduction to astrobiology*. Cambridge University Press, 2018.

Vick, Helen Hughes. *Walker of time*. Rowman & Littlefield, 1993.

William H. Lyon. *Americans and Other Aliens in the Navajo Historical Imagination in the Nineteenth Century.* Journal Article Vol.24. No 1 (Winter, 2000), pp. 142-161 (20 pages)

Notes

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[1] Rothery, David A., Iain Gilmour, and Mark A. Sephton, eds

[2] Frank, Adam. *Light of the Stars: Alien Worlds and the Fate of the Earth*. WW Norton & Company, 2018

[3] Decennial Census 2020 (U.S Census)

[4] Fraknoi, Andrew, David Morrison, and Sidney Wolff. " Astronomy OPENSTAX Textbook and Resource Hub.". Rice University, 2018

[5] Ibid

[6] Basu, Sarbani Intensive Session 2022

[7] Franknoi, Andrew, David Morrison, and Sidney Wolff, OPEN STAX

[8] NASA Science, Space Place, What is an Exoplanet?, 2020

[9] Maryboy, Nancy C., and David Begay. *Sharing the skies: Navajo astronomy*. Rio Nuevo Pub, 2010.

[10] Lambourne, Robert J., M. J. Shallis, and Michael Shortland. *Close encounters?: science and science fiction*. CRC Press, 1990.

[11] Ibid