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Diabetes, the Silent Enemy

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Overview

I have always been fascinated with the body function and structure. I remember when I was young, my older sister and I would help shear sheep and goats every year during the spring. We used huge scissor shears to shear the wool and mohair and after we completed shearing a sheep we would toss the wool into the huge gunny sack that hung between tripod poles. As the wool piled up in the sack my sister or I would climb into the sack and jump-up and down in the sack to compact the wool inside so there was room to pack more. Sometimes we got stuck in the sack and had to pull one another out. As we completed shearing, three huge sacks of wool and mohair hung on the tripod poles until the trading post opened for business. While the sacks hung, the lambs would lay below the sacks for shade.

One year, on the day following the shearing, my sister and I saw that one of the sacks had fallen. We lifted the big heavy sack and leaned it against the other tripod pole. When we lifted the huge sack we found three dead lambs under the sack. My mom was not happy because sheep was our source of food and income. We dragged the dead lambs by the corral to let the mothers know they lost their babies. Then the next day my mother told my sister and me to butcher the lambs. She said, "Its time you learn." That was the first time when we learned to butcher by ourselves. I had to analyze and critically examine the parts of the lamb. I had to pay attention to how cut the neck, making sure to severe the spinal cord then begin to cut a straight slit from the chest down to the reproductive and excretory area. As we skinned a lamb, I kept telling my sister be careful with the stomach area because it's bloated. I knew one of us had to puncture a small slit into the diaphragm to slowly release the air within the stomach area. Of course, my sister is older and I'm younger, so she made me do the dirty job. Well, I punctured the diaphragm and the stomach (mistake) and the poop sprayed all over my face and clothes. YUCK!!!!! EEEEOOOWWW! If I had been experienced, I would have known that the trick was to just cut a slit on the diaphragm only. My sister and my mom laughed so hard because my face and clothes were green and I smelled like poop! Although I smelled and looked silly, I still had to learn how to butcher. I have butchered a lot of sheep since that incident.

Of all the multiples times I have butchered, I had viewed many parts of the sheep's internal system holding, feeling and cleaning the organs like the stomach, large and small intestines. While cleaning the internal body parts I thought about the various function of the organs, brain, skeleton, and major arteries. I was amazed of how all parts within the body need each other to function and how major organs fit within the abdomen like

overlapping puzzle pieces. As a teacher, I have demonstrated and modeled this experience to the students: what I have seen and learned during the process of butchering a sheep. I tell them that it is important not to just hurry and butcher because of the heat, but to think about the structure, functions, and purpose of the internal organs. NOT THE POOP EXPERIENCE, but to analyze, apply, evaluate and create, which are the critical skills students need while investigating the scientific process. We have actual models of arteries, bones, brain, muscles, organs, and tendons grazing within our backyard.

I had the honor in attending Mr. Mark Saltzman's "Organs and Artificial Organs" seminar sessions. I was impressed with his knowledge of current researches of artificial organs, especially with the organs that interest me like the pancreas and the fascinating kidney functions and the current technological improvements on the hemodialysis systems. His lecture and sketches of organs, cells, and formulas were very comprehensible. I will use the visuals he presented and sketches he diagramed in my curriculum unit.

Introduction

Kayenta Intermediate School educates about 450-500 students, grades 3-5. Kayenta School District serves three schools with an estimate of 2,000 students. The rural town is located on northeast section of the Dine Nation in Arizona about a hundred miles east of 4 Corners (a place where the four states, Arizona, Utah, Colorado and New Mexico meet at one vertex). The student population is 98.1% American Indian (Dine), .01% African American, .09% Caucasian. Twenty-five % of the students are in English Language Learning classrooms. Eighty-five% of the students receive free or reduced lunch so the school is eligible for Title I funds. The district also serves 10-12 high profile students with special needs like physical, mental and behavioral. Our school made Annual Yearly Progress for two consecutive school years in 2008-2009 and 2009-2010 and was recognized as an A plus performing school. The past school year our school did not make Annual Yearly Progress. Additionally, there about 250 other special need students who are able to function in the general education classroom with assistance from technical aides in the school and about 30-35 at the primary and middle school and 50-55 at the intermediate and middle school. Whereas, the high school has about 100-120 special need students. Some of the students reside within a mile or two from their school and other live within the outlying areas ranging from 20 to 50 miles away. Students living out of town are bused in daily. The students who come in from Forest Lake area, which is fifty miles from home to school (that is a lot of miles), have to board the bus during the school week at five a.m. and return home by five or six p.m.

I had taught special education multi-age third through fifth grade in a pull-out classroom for two years. The coming school year, 2011-2012, I will transfer to the Middle School as a sixth grade general education teacher. When I taught special need students, I focused on teaching science during the afternoon block for ninety minutes daily. Every Friday was lab day which was using the inquiry process and scientific investigation while viewing and analyzing various cells through the microscope. Our district's mission and goal are targeted subjects of mathematics, reading and writing. Science is not as important as the three R's so our students have fewer opportunities to learn about science concepts, vocabulary, and the inquiry process.

This year as a new sixth grade teacher, I will continue teaching science daily. I will invite native Dine orators to my classroom or to the cultural center. The speakers will present science topics about the current content our classroom is learning like earth, space, or living organisms. We will plan field trips to participate and attend science fairs locally and state level. We will visit science museums, and the Lowell Observatory in Flagstaff,

Arizona. The teacher and students will use as supplemental resources for science and math like the online resources like PBS teacher online, and Siemens Science Technology Engineering Mathematics Academy and the Asset online from Arizona State University which is online video streaming, webinars, and illustrations. I will create a monthly Science Newsletter so parents are informed of what concepts their children are learning and information of Dine cultural sensitivity. The newsletter will cover current science topics we are studying with vocabulary, projects, guest speakers, experiments and additional school and district information involving science. I will include a simple science experiment that parents and students can do together as school to home activity. My goal is to turn on the light bulb and create excitement for science so students enjoy learning and growing. I would like to parents to be involved in their child's education.

I teach science using the Arizona state standards strands, concept and performance objectives and the Dine philosophy of life relating to native science concepts. I will use research-based teaching methods with various resources and strategies correlating science experiences for enduring understanding so my students will remember as they move up to the upper grades. Many students have insufficient technology experience and computers within the lower grades are not compatible with the latest technology. I will make every effort to obtain current computers for my students so they can perform and share their discoveries. There are online educational media I have subscribed and applied for our use. I will take advantage of useful teaching tools available and assessments my students in the science realm, to differentiate instruction and to have student advocate their learning through choices of projects, experiments, and assignments.

Rationale

Diabetes is a silent enemy that sneaks into Dine families and will slowly maim and kill the young and elderly. Some individuals today have learned to manage and control the disease while others give in to the enemy and slowly die, because the disease can progress causing severe complications like amputation of the foot, vision or kidney failure, nerve damage, and heart disease or circulation problems. Others would say they are tired of the medication or the daily shots of insulin and will cease the procedure. This is especially true in the elderly, because their focus is the livestock. So the silent enemy eventually wins and will move on to attack another individual and family.

Most students know someone within their family who has the disease, but they do not have a complete understanding of what and how the disease makes a person with diabetes very sick. The child is basically aware that their family member has to take daily medications and has to eat during specific time. Students need to know the biological functions and structures of the organ that is causing the sickness so they will be able to thoroughly explain and understand the information when presenting it to the community. Diabetes is known as the 'sugar disease' within the Dine nation, because explaining the disease requires detailed explanation to a traditional speaker and some students have to explain what, how, and why of diabetes to their grandparents, *(cheii or nalii).* Students need to know the body *(at'iis)* system, down to the various cell structures, functions, and relationships to other cells.

Some students come from varied home life situations, and they have different beliefs because some attend the Christianity religions, whereas others still believe and live the tradition using the Dine Foundation of Life. During the course of my unit I will explain the foundations of Dine philosophy because the majority of the students I will be teaching are American Indian-Dine. The visual pictorials of the body, cells, and organs,

circulatory, nervous and skeletal system will include the Dine language (preservation of indigenous languages) as well as English. Students will learn the body organization, then the individual parts and their functions, and how the individual parts contribute to function as a whole body. While using both languages, students will conduct their own discoveries through observation and inquiries.

The silent enemy needs to be eradicated. It is essential to kill the enemy that sneaks quietly and suddenly attacks an individual within different families. Prevalence of the enemy, the disease increased during the 80's. More and more diabetic diagnoses were documented at various Indian Health Service clinics and hospitals on the Dine Nation. Diabetes attacked young and old, educated and uneducated, contemporary and traditional believers who live sedentary and imbalanced lives. Diabetes, the silent enemy is here and is on the rise on the Dine' Nation drastically changing families within the past twenty years. The Indian Health Services stated that American Indians have the highest percentage rate of diabetes of any other population group; within the Dine people, the diabetes rate is even four percent higher. When diabetes was identified, the focus was treatment and as time progressed there was a need for prevention and education for families and the patient. Although prevention within a family was taught, the enemy continued to flourish, attacking more individuals within Dine families. The enemy became a Dine Nation crisis: how can we overcome the disease? The government had to get involved with Indian Health Service and American Indian tribes around the nation had to devise a plan. Eventually, information about diabetes became part of the schools' curriculum.

Now general and special teachers need to integrate life science, Dine philosophy, health/diet and fitness into their curriculum and lessons. The state standards and Dine curriculum units need to merge to meet the needs of our students and inform them of the disease. The life science portion of the Arizona state standards contains student's expectation of learning, understanding and applying the concept of organism, cells, tissue, organs, respiration, circulation, digestion, excretory, muscle, and skeletal systems. The function of a normal pancreas will be targeted, because diabetes is affecting more students who know an individual in their family with diabetes or know of someone having the disease.

The unit, Diabetes, the Silent Enemy, will be a sixth grade health/life science integrated unit with other standards like math, reading/writing, listening/speaking, social studies, and foreign language (Dine). It will be taught as an integrated unit during the course of three weeks for approximately fifty minutes a day and lab days every Friday. The health/science unit will cover the function of the body from the cell structure and its interrelations and interactions within the environment. One component will focus on the pancreas and how diabetes affects the body and its biological understanding of life with adaptation and genetics. The unit will also cover the Dine' philosophy of learning in Life as a Dine', Foundation of Dine's image, and the Foundation and Roots of Our Body to bridge the Western medicine and Dine' healing of traditional medicine.

Strategies

"The components of the planning pages consist of the following: 1) Focus and motivation, 2) Input, 3) Guided oral practice, 4) Reading/writing activities, 5) Extended activities for integration, and 6) Closure/evaluation" (Brechtel, 2001).

1) Focus and motivation is the initial part of teaching. The goal is to get students to begin thinking about their thinking (meta-cognition) and to focus on using their knowledge of personal and cultural background. The

strategies used during the initial phase of teaching are using visual charts like the T-graph chart, Cognitive Content chart, and observation charts. Creating a teacher-made big book about the body system will help students focus on what they will be learning. The plastic parts of the body like the brain, heart, lungs, liver, stomach, pancreas, large and small intestine, and the kidneys are manipulative that will get students to activate prior knowledge. These strategies will involve whole class participation and will light up student's interest and sets the purpose for learning similar to anticipatory set.

T-graph chart

The T-graph chart will have two questions written on two columns. The questions will be written in Dine, "What do I know about the function and structure of the body?" written on one column and "What *more* do I want to know about the function and structure of the body?" on the other. The teacher will write exactly what each student says in each column. The T-graph chart will inform me of what the students and the whole class knows about the topic like a quick check list assessment. The chart will be reviewed weekly to answer and validate their answers base on their findings on wall charts or classroom interactions.

Cognitive Content Dictionary

The Cognitive Content Dictionary chart will have daily key signal words students need to know like diabetes, pancreas, dialysis, and structure. The chart will be divided into three columns. The first column will include the signal word with a word study like part of speech, other word forms, antonyms, synonyms, and word of origin. The second column is the meta-cognitive because students will need to think about the meaning of the word: where, why, and how did they come up with their prediction? The third column is the meaning and sketch of the word. Then students will create their own vocabulary dictionary and will write and use the words daily.

Observation charts

Five observation poster charts with pictures about the body, pancreas, diabetes, health, and the Dine' philosophy of life will be used as carousel activity. Students will be grouped into teams and will discuss each poster. The writer will write a sentence, a question or a statement about each poster; then the teams will rotate to the next chart when the teacher says the signal word. The teams are allowed one to two minutes to jot down the information. When the team has completed their rotation another student will orally summarize the first poster they initiated.

Teacher made book

A teacher made book about *Atsiis* (The Body) will have similar topics as the observation posters with written passages and more pictures. The book will be used for read aloud, team task oral reading, and independent reading. Teacher made big books will contain vocabulary and embedded concepts that will help build background knowledge.

Realia

Examples of realia items will be a plastic model of a body with removable brain, organs, intestines, and kidneys. A plastic model of the skeletal system and an animal cell are other samples. Actual sheep organs will be used to show actual examples.

2) The purpose of Input is the direct teaching of skills and information. It activates active participation using graphics organizers. Within the graphic organizers color coding, chunking information and academic concept,

topics, and vocabulary are implemented. Two pictorial input and one comparative input charts, a graphic organizer of the food pyramid and super scientist rewards. Input is direct teaching of the content using a chart with pre-drawn pencil picture sketch with bullet information about the components. Pictures and academic word strips will be added to the charts and graphic organizer. The teacher will use color markers to outline and sketch different portions of the chart. The colors are traced in front of the students to imprint information for the brain, and color coding and chunking information helps students see the patterns. While the teacher explains the information for ten minutes students are engaged and attentive. After ten minutes the teacher stops talking and allows students to negotiate meaning and to give comprehensible output. Then the teacher continues with the chart again and repeats the process until the chart is completed.

Pictorial Input and Comparative Input charts

There will be pictorial sketches of the body with the organs (heart, liver, lungs, stomach, large and small intestine, pancreas and kidney) and the brain. The Dine' philosophy and the four sacred mountains will be sketched on another pictorial chart. The comparative pictorial will have a sketch of a normal pancreas and a diabetic pancreas structure and function combined with information about American Indians (Dine) and diabetes. The super scientist awards are small bright color papers with a picture of a vocabulary word on a sheet. Each award will have different information connecting to the unit and will be given to students who are showing respect, make good decisions, and solving a problem while direct teaching is conducted.

3) The purpose of Guided Oral practice is to teach and guide the students with the academic discourse of the topic while students negotiate meaning, interact with text information, and process information using meta-cognition. It builds self-esteem because the affective filter is low when students are supported using their primary language. The poetry/chants, the sentence pattern chart, expert groups, process grid, and home school connections allow students to negotiate for meaning, learning vocabulary word, and specific topics. Poetry and chants are used when students are learning patterning, poetry formats, and use new academic vocabulary. The sentence patterning chart assist students with vocabulary, sentence structure and the part of speech are incorporated. The process grid will include topics learned from expert groups then are shared with their team. The topics will be diet, fitness, *hozho,* native food, and native herbs. The process grid is effective ways to have students write expository paragraphs. Home school connections will be part of the student's responsibility to complete homework with family involvement.

4) The purpose of reading and writing activity component is for teachers to model to students how to use a print rich language functional environment, use variety of texts, media, and model teach text patterns. Students will be interactive with oral activities, learn in cooperative groups. They will use various literatures, reading skills, mind maps, oral discussion, and social skills. Then, independent practice of reading and writing of all genres using student's native and English language. It is a balance of teamwork and individual practice. The key is when it has been modeled by the teacher the students are able to independently select free choice reading and writing activities.

5) The purpose of extended activities is to integrate multiple knowledge of what students learned as enduring understanding. The activities will include native chants and music, poetry, art map making of the sacred mountains and sketches of the Dine' philosophy, and local field trips to the cultural center, Dine' nation museum, the science museums, and guest speakers like the culture center director, a *hataalii* (medicine man), individual with careers in the medical field. Students will create a book about topics they learned or a traditional food cook book, learning folders, creating a food pyramid of traditional and modern food. Students will use technology of power point slide or the new program like the Prezi.

6) The purpose of closure and evaluation is for students to show what they have learned using meta-cognition as personal exploration, to family and to their community. It will be their alternative means of assessment like processing all charts and learning's, on-going assessment and alternative assessment strategies

Students will create posters, student made booklets, pamphlets, website, power-point slides, a play or a skit, a song or chant and other ideas. The poster, pamphlets, and learning folders will be posted and presented at various community sites like at the Indian Health Service, Recreation Center, Shopping center, Senior Citizen Center and at the fast food restaurants like McDonalds, Burger King and Sonics. Rubrics will be created to evaluate students' learning as one of their self-assessment. Processing all charts learned, a jeopardy game, and a summative assessment will be students' end product, which will lead to enduring knowledge.

Instructional Content Background

Organism

Organisms are living things that react tostimulation,reproduction,growth andhomeostasis. The cells in the body have different functions, some working independently, while others may form into clusters to form a shape like organs, tissues, bones, vessels and other important parts in and on the body. The whole body is a system within a system beginning with the macroscopic systems to the microscopic systems.

Organs

Organs are groups of cells clustered together to carry out a function. These specialized organs have specific designed tissues that conduct demanding tasks to keep the body working together to stay alive and healthy. They are known as "major organs."

The first major organ is the brain; it is the control center for the body because the brain operates the central nervous system and involuntary or voluntary functions. The brain contains three main parts; the cerebrum which is divided into two hemispheres, the cerebellum which beneath the back of the cerebrum and controls the sensory of balance using the muscles and joints, and the medulla which is the part of the brain that connects to the spinal cord and control involuntary processes and receives and sends sensory impulses.

Other major organs are located in the chest cavity. The heart is an organ mainly made of cardiac muscle tissue and is about the size of a fist with upper chambers known as the right and left atrium and lower chambers known as the right and left ventricle. Between the chambers are valves that control blood flow of oxygen rich blood (throughout the body) and oxygen poor blood (to the lungs). The "lub-dub, lub-dub" is the sound of the valves closing and blood flowing in and out of the heart.

Next, there are the two lungs, one on the left and one on the right side in the chest. The left side is slightly smaller because it is making room for the heart. The lungs contain bronchial tubes that have small air sacs call alveoli attached at the end of the tubes. It has over three million alveoli which are covered with tiny capillaries that carry carbon dioxide blood and oxygen rich blood. The carbon dioxide, waste gas moves out of the blood into the air and is exhaled through the trachea which oxygen rich blood travels to the heart and is pumped throughout the body.

The liver is the largest reddish brown organ in the body. It is located below the right lung and under the heart and above the stomach. Its function is to break down and distribute glycogen, remove toxins, and regulate amino acids. The liver is an important organ because it removes poison from other organs and help organs maintains the body's functions.

Moving further down into the chest cavity is the digestive system which includes the stomach, the small and large intestines. The stomach is an expandable sac-like organ between the esophagus and the duodenum. The stomach has four parts, the first part is the cardia which obtains food from the esophagus, the second part is the fundus which is the loop arc chamber of the stomach, third is the corpus and pylorus which the central portion of the stomach, and fourth the antrum which is the bottom portion which empties the content to the duodenum. The stomach lining contains various layers for producing acids, mixing and moving food (chyme) to the small intestine in small increments. The main function is to assist in digestion of food and mixing it with digestive acids and enzymes.

The small intestine is an organ that process and absorbs digested nutrients like carbohydrates, protein, fats, vitamins, and minerals. It is over six meters long and classified into three sections beginning with the duodemun which mixes chyme with fluids from the liver and pancreas, the jejunum contains long villi, and the ilium contains short villi. The structure contains millions of microscopic folds with many finger-like ridges known as villi. Within each villi there are many more folds with minute microvilli which contains small blood vessels that transport and absorb nutrients to the outer surface cells. The inner lining of the small intestine carry special molecules that absorb certain chemicals and nutrients through the small intestine walls and diffuses nutrients into the blood vessels.

The large intestine begins with the cecum, joins with the ascending right colon where the small intestine connects to the larger colon. Moving up the ascending colon the large intestine begins to lie horizontally through the abdominal cavity between the stomach and small intestine. The horizontal portion of the large intestine is known as the transverse colon, and then the colon descends down the left side of the cavity as the descending colon. The descending colon ends into the sigmoid colon and rectum. The function of the large intestine is to absorb salt and water from fecal matter making it more solid. It also absorbs certain vitamins and stores the fecal matter until it is time to excrete the matter from the body.

The kidneys are two reddish bean shaped organs located behind the stomach and intestines in the lower back. The function of the kidneys is to filter the blood. The renal artery brings unfiltered blood to the kidneys and the renal vein takes filtered blood from the kidneys back into circulation. Inside each kidney there are more than a million nephrons. Each nephron contains two parts; the renal corpuscle and the renal tubule. Within the renal corpuscle there are two more parts, which are the glomerulus and the Bowman's capsule (or glomerular capsule). The glomerulus contains a network of capillaries that drive the blood to increase pressure and help push out waste, excess water and other unwanted materials out of the blood and into the Bowman's capsule. Then the Bowman's capsule filters waste and other materials through its double walled sac membranes while keeping blood and proteins out. After the filtration of the Bowman's capsule, the waste and other materials enter the renal tubule which reabsorbs useful molecules back into the blood. The remaining materials are urine products which are sent to the collection duct. Then numerous nephrons pool the materials into collection ducts, which drain the remaining materials into the ureter. From the ureter the urine is collected in the bladder until it is full then can be excreted from the body.

Pancreas

A functioning pancreas is about the size of the index and middle finger together of an average person's hand

to the wrist, with an oblong flat shape. Its job is to produce the right amount of insulin that is distributed to various organs and to different parts of the body. The cells in the body are designed so that they function best when the fluid sugar glucose surrounds them. Too much glucose in the body will turn the fluid that surrounds the cells into saturated sugar that obstructs many normal functions of these cells. The pancreas is located deep in the abdomen in between the stomach and the spine. It is made up of glandular tissue and a system of ducts with many bifurcation branches on the sides. Although the pancreas is one whole gland, it is described in sections because medical staff will explain to the patient's the portion that is not functioning properly. The uncinate process is the wide section which bends backwards containing important blood vessels called the superior mesenteri artery and vein that cross. The head of the pancreas is the widest part of the gland and connected to the duodenum, which is the beginning part of the small intestine, extending from the stomach. The neck is a thin section between the head and the body. The body is in the middle between the neck and tail. The tail is at the thin tip of the gland and close of the spleen.

The pancreatic duct (digestive enzymes) secretes juice from the Acinar cells to the duodenum to balance the acid in the gastric juice and aid in digestion of food. The bile works with the pancreatic juice to digest triglycerides and other fats. The pancreas is an organ with glands; it supplies digestive enzymes to the juice. The digestive enzymes are microscopic cutters that chop larger molecules like meat (protein) into smaller particles. The pancreas produces numerous enzymes that digest protein in various places like the sides or in the center and helps the body use energy. The Islets of Langerhans are located in the cells of the pancreas which secrete insulin and glucagon. The two hormones work together to regulate the proper sugar level in the blood that travels into the blood stream and to the cells and inform them that food is on the way.

Diabetes

Glucose is the body's basis of energy, but glucose must get inside cells to generate the energy that the cells need to function. Cells have a membrane covering around the outside that will not let glucose in. This is where insulin becomes important, because insulin opens up the cell membrane to let glucose enter the cell. Sustaining a steady level of glucose and the production of insulin is a fragile process that is controlled by the pancreas. During normal conditions, glucose levels in the blood guide the pancreas to release just the right amount of insulin to keep the amount of glucose in the blood stream and surrounding the cells at a constant level. The insulin attaches to a place on the cell like the way akey would fit into a lock. The door opens for glucose to enter the cell like a muscle cell. For example, the insulin will open up the muscle cells to allow glucose to enter and eventually create the energy needed for the muscle to contract.

One cause of abnormal pancreas function in diabetics is insulin resistance. Insulin resistance is when the cells stop responding to insulin, so the key does not unlock the door and the cells are not allowing glucose to enter. Eventually the amount of glucose in the blood will increase and increase. The pancreas will continue to produce insulin until the glucose level goes down. When the cells in the body have become insulin resistant, the amount of glucose in blood will never go down. Then, the pancreas will go on to try to lower glucose levels by producing more and more insulin, but eventually it will wear out and cannot keep up with the body's demand for insulin. Glucose began to accumulate in the tissues of the kidneys, eyes, heart and around nerves. The build-up can cause serious complications. This is the first cause of diabetes which becomes lifelong chronic disease. Not enough energy within cells makes people sick.

There is no cure for diabetes but, monitoring and controlling the sugar level, medication, diet and exercise will prolong life and prevent symptoms of sickness.

There are three types of diabetes: type 1and type 2 diabetes, and gestational diabetes:

Type 1 diabetes is usually seen in children and young adults. In this disease, the pancreas produces little or no insulin and daily injections of insulin are needed. Researchers do not know the cause but have found there are many contributing factors like genetic, viruses, or immune complications.

Type 2 diabetes is more common because there are more cases than type 1. It is usually found in adults, but more young people are being diagnosed with type 2 in recent years. Many people with type 2 are unaware they have the condition and do not find out until they end up in the hospital. Type 2 is becoming more common because of obesity and insufficient exercise.

Gestational diabetes happens during the pregnancy of a woman that does not have diabetes. High blood glucose develops anytime during pregnancy and the mothers are at risk of getting type 2 and cardiovascular disease during their late stages in life.

Treatment

Type 1 diabetes can start suddenly and have severe effects. People who are recently diagnosed end up in the hospital. The goals of treatment are to prolong life, reduce the symptoms and prevent further complications like blindness, heart disease, kidney failure, and amputation of limbs. Monitoring and control of blood pressure, cholesterol and blood glucose levels are important. Regular exercise and foot care are important educational benefits for diabetes. Regulating meals and weight control are important factors, too. Medications like pills or insulin needs to be utilized properly. The management skills for diabetes will prevent the need for emergency care. Medical science is constantly discovering new developments so keep up with current information on new research about treating diabetes.

Dine' Philosophy of Education

Today most Dine view their culture and tradition as inferior to Western society and prefer the modern conveniences of the dominant society. Exposure to Anglo ideology and livelihood is desired, like the easy life of fast food and vehicles, and advanced technology. They lack the education, practice and application of fitness (physical), diet, spiritual, and balance (*hozho)* which should have been taught from their parents, grandparents and great-grandparents. The fast and easy life practices are among the causes of diabetes and other sicknesses. Diabetes is commonly known as the sugar disease on the Dine' Nation, because explaining the pancreas and its function is difficult in the Dine' language. It is a modern killer and enemy the contemporary families lack understanding and are vague on what diabetes really means. On the other hand, the *hataaliis* know and consult about diabetes. The *hataaliis* are our Dine's encyclopedia and they know all about enemy and why it is here. They are very knowledgeable about the origins of everything in the universe, life, plants, animals, and Mother Earth. Even educating our children about healthier living practices through traditions and modern medical science will help our students use diet, fitness, balance, and *hozho* beginning at the bottom of your feet teaching holistic information ascending to the top of your head to the feather. And to teach *hozho* is to begin with all parts of being. It is to begin with the reason behind why hozho is important.

As the Indian Health Service taught Western preventive techniques the staff had to bring in *hataaliis* to assist with healing and the spiritual healing because both are linked. More and more Dine's were diagnosed with diabetes, the elders stated we need to change our modern life style to the traditional way of life, when our children use to rise early to address and acknowledge the dawn, run to the East and prepare and set positive thinking for the day, *nitshakaas*. Each of the Four Direction is interwoven components which encompass a Dine as a whole. With other natural elements he or she influences positive or negative thinking. The natural elements of each direction begins with self on how the individual approaches the day beginning with early

dawn (east), the day (south), evening (west), and darkness (north). The day, the season, the sacred mountains, life from birth to old age, thinking to reflecting, all beings like animals and plants, the Earth and sky elements are all interwoven cycles. Our home is here on the Earth and we are in the sacred place with Early White Dawn Spirit-East which is the thinking process, Blue Twilight Spirit-South which is planning together, Yellow Evening Yellow Twilight Spirit-West which is conducting the planning, and Folding Darkness Spirit-North which reflection. The sacred directions include the sacred mountains, Blanca Peak, *Sisnaajini* in the East representing white shell, Mount Taylor*, Tsoodzil* in the South representing turquoise, San Francisco Peak, *Dook'o'sliid* in the West representing abalone shell*,* Mount Hesperus*, Dibe' Nitsaa* in the North representing black jet. The directions, mountains, and colors have the foundation of a Hogan, a traditional home Dines conduct their daily living and ceremonies.

According to the teachings from our past generations, stories were told of the coyote and how his choices of mental, physical, and spiritual actions were based on trial and error. These stories provide lessons to be learned. These coyote stories were told during the long winter nights. Like the story of Coyote and the Horned Toad. Of how Coyote ate Horned Toad because he was very hungry and while Toad was inside the Coyote, Toad would squeeze and twist Coyote's organs. Toad even pulled and squeezed the pancreas and that is why diabetes came about. Even the story of how the Dine was created using the elements of the Earth which were the light, water-mist, and air-wind, light, and the sacred minerals, vines, plant pollen and earth mist pollen. That is why we are like a seed and plant, like the sacred white and yellow corn. Our blood veins are composed of our mother's blood-white, our father's blood red, our cheii's blood yellow, and our nalii's blood black. As Dines, we have male and female elements and that is why a man can create a daughter and a woman can create a son. Our whole body like the arteries, veins, fleshes and bones are made of sacred stones of white shell, turquoise, abalone shell, and black jet and red beads.

(Note, Dine Philosophy of Education a life giving teaching guidance, to live and uses life according to the natural elements of life, a law that is bestowed on us by our elder. We are obligated to teach our children and it is taught everyday in the home and globally. That is why our children become leaders, educators, healers, and artist.)

Activities

Students will conduct body system experiments using the science inquiry process of questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically about the relationships between evidence and explanation, and communicating the results.

Activity 1: Digestion

HYPOTHESIS: The chemical pH is a property that tells whether the liquid is an acid or a base. Acids have free hydrogen ions and a pH of 1-6. Bases have free hydroxyl ions and a pH of 8-14. Distilled water is neutral with a pH of 7. What do you think might happen to the pH if an acid and a base are mixed together?

MATERIALS NEEDED

3 bottle caps	a 8x11" sheet of paper	
1 jar with lid	3 labels	
5 1"-2" pieces of pH test paper	pH paper key	
1 antacid tablet	a bottle of distilled water	
a bottle of vinegar	glass cleaner	safety goggles

PROCEDURE

1. Label each of the three bottle caps: distilled water, vinegar, and glass cleaner.

2. Put a small amount of the appropriate liquid in each cap.

3. Test the pH of each and record it in the following table.

4. Which one is the acid? _____

5. Which one is the base? _____

6. Test your hypothesis by pouring one into the other.

7. Shake the cap gently to mix the two.

8. Test the mixture with a clean piece of pH test paper and record the results in the table.

LIQUID	pH
Distilled Water	
Vinegar	
Glass Cleaner	

9. Fill the jar about half way with vinegar. The jar will simulate your stomach and the vinegar will simulate the hydrochloric acid in your stomach.

10. Some people get stomach aches and take antacid tablets to help. Wrap an antacid tablet in a piece of paper and carefully stomp on it until it is crushed. We will see why.

11. Pour the antacid into the jar, put the lid on, and shake.

12. Use the pH strip to test the pH level: _____

13. What happened to the pH in the "stomach"?

CONCLUSION:

QUESTION: What part of the digestive process did you simulate by stomping on the antacid?

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