Seminar Title: Food and Health

Curriculum Unit Title: Getting Healthy by Eating Healthy

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## Synopsis

Effective meaningful lesson plans for Native American students are rare in K8 schools. When a comprehensive curriculum is available that is aligned to the standards, it is mostly generalized to the point where it is difficult to connect the resource materials directly to Native American students. Nutritional education and instructing students on healthy lifelong choices form the primary basis of the curriculum unit. The instruction and lessons should focus on family, home and community as it relates to plant-based diets and nutritional science as integrated with the personal interests of the students. Today, changes away from the more traditional diets of the middle of the 19th century and cheap low nutrition high-profit margin food has created many physical health problems for Native American communities. In "Getting Healthy by Eating Healthy", the curriculum unit will simultaneously address standards and instruct meaningful topics including the possible alleviation of the diabetes epidemic within the community, learning the nutritional contents of foods, and making determinations of what are more healthy and less healthy foods. This unit will cover the relationship between diet, health, physical activity, and diseases in our molecular biology and in relation to nutritional science. Students will build nutritional knowledge and develop plant-based food 'habits' based on researched concepts within the fields of social science and psychology.

## Introduction

Growing up on the Navajo Nation reservation, I remember only a diet of traditionally-prepared food from traditional blue corn, wild onions, corn mush, wild berries, mutton stew, tortillas, squash, watermelons, cantaloupes, and an array of other foods grown locally. When trying to think of a rational topic for this project, I was astonished about how the Navajo people changed their diets from home grown to highly processed foods in less than one generation. From a world where I grew up eating naturally grown plants from the garden, fruits from the orchards, meat from sheep and other livestock that grazed the land without injected hormones, to habits through which I felt like a foreigner in my own homeland, partially because of the disconnect from traditional foods. I've pondered the fact that my grandparents and their peers had no mention of diet-related diseases or illnesses in their time. Nonetheless, I experienced a nurturing household in the absence of the English language and no electricity or running water in the home. The introduction of commodity food into our community by the federal government in my early years of age was accepted, but the cans sat on shelves and we continued to eat a diet of blue corn mush, sumac berry mush, corn, assorted vegetables, mutton, poultry, and occasionally beef. The milk came from the goats grazing the land. The changes brought on by marketing of food and the requirements that all children be placed into the public-school system forced many changes on the Navajo people including a new diet. In our families and communities, the change in diet appeared to have contributed to negative health conditions, as Navajo people with diagnosed diabetes became common within a few years. To address these changes in diet and its effects on the Navajo people, the school systems can become part of the health crisis response by disseminating informational solutions to children about the human body and the effects of foods. In coming up with a solution for better health, teachers can develop standards-based curriculum and assessment designed with culturally relevant concepts to hopefully begin the reversal of food related health problems on the Native American homelands.

## Demographics

Kaibeto Boarding School is in a remote rural area on the Navajo Reservation in Coconino County, Arizona. The nearest town is 40 miles west of the school. The population is about 1,600 with a small market combined with a gas station one-fourth of a mile off the highway. The elevation is 5,610 feet surrounded by multiple shades of red-colored mesas on a stretching plateau, creating a sweeping, beautiful landscape. The enrollment of the school is 200 with all students of Navajo descent. Most are bused in and there is also a dormitory that houses at least 30 students. The teacher-student ratio is 1:18 with students from grades Kindergarten through eighth grade. The five-year-old school building is considered new and attractive. The school remains the single resource for many social activities. Families and students come to play at the school sports fields, use the outdoor courts, or run the two-mile long campus perimeter. There are no other locations in the community with recreational facilities. There is only one organized entity providing health learning resources on healthy lifestyles and eating heathy diets for preventative care. Each year there are increasing numbers of families expressing concerns of achieving optimal health and we also have experienced increased numbers of attendance to organized 'health-related' activities. This presents an opportunity for our school to answer the currently fragmented plea for positive community changes. I envision a curriculum about the human body and good nutrition; lessons disseminating information that gives the families and my students a diversified learning experience that may inspire multiple examples of student-driven research to develop a lifestyle for health that is easily sustainable and leads to a productive long life.

## Rationale

In the Native American and Alaskan Native population, the rate of diabetes is at its highest now, with over 16% of the members of the population being diagnosed as having this chronic disease compared to to 8.7% of non-Hispanic whites (CDC, 2014.). Each year, the U.S. Indian Health Service from Tuba City comes to Kaibeto K-8 school to record and monitor students' BMI (body mass index). This health-inspired service is a data collecting program that measures body fat based on predetermined ideal BMI as correlated to weight and height. In the continuing data collection, there is an indication the students monitored are at a higher risk of potentially developing health problems such as high blood pressure, known as hypertension, and diabetes. In researching ways to counter balance these alarming indicators, studies have shown that a higher percentage intake of plant-based eating can lower the propensity of obesity, can lower BMI, and help individuals achieve ideal waist sizes (Harland & Garton, 2016). The intent to develop meaningful instructions rooted in real health challenges is rational; instructions for a positive change is critical for students in our school systems at this time. These students can become a voice for change throughout their communities as well.

What instructions are needed to develop knowledge about a good daily diet for normal functioning of the human body? My students in grade four are very enthusiastic about learning many issues that relate to them. Tapping into this natural enthusiasm, this unit is appropriate because at least five out of seven students in my class have stated that they have a family

member with the diabetes disease. We will study the nutritional values of nutrients in a plant-based diet, and how the body uses these nutrients.

In my experience, there is belief among many Native American communities that the introduction of reduced priced, processed, commodity, and refined foods can contribute to catastrophic changes to traditional "well-being" in the Native American communities. Additionally, changes in lifestyle include a shift towards varying conveniences and entertainment, including electronic technology such as television and videos that rarely require any physical activity. Established education institutions must re-examine their missions and design curriculum include realistic nutritional challenges as a core for learning. Using strong multipurpose curriculum rooted in required educational standards is not irreconcilable. Education must be different from traditional rote learning and the way of the hierarchical delivery systems that believe they have all the answers. The way nutritional education is conducted up to now must change to "present holistically rather than maintained in the microcosm of bio-physiology and disease orientation" (Tom-Orme,1985). It is never too late for the community to start learning about health, with children leading the change of eating well to reverse the many health problems. Learning about the functions of the human body and how food is used by the human body for better health, I believe that my students will realize their destiny to assume leadership for their family developing a long term balanced diet for good health and well-being. Students will see the nutritional value of proper eating for good mental and physical health. They will begin to understand they need a variety of different healthy foods to maintain proper weight and learn about the risk of chronic diseases associated to unhealthy lifestyles.

Nutrition requires learning different areas of science and mathematics beyond the functions of consuming or utilizing foods. The study of botany, measurements, chemistry and public marketing of foods healthy vs. processed or high-sugar foods offer many areas for learning. The different topics within the unit will be presented as 'you are what you eat,' and include learning about antioxidants and phytonutrients, plant-based nutrition, and healthy versus unhealthy diets. Topics of discussion could include the nutritional values of various cruciferous vegetables, legumes, roots, grains, etc. There are many ingrained eating habits we must change. We must change our food choices in order to attain good health. Our poor eating habits are exacerbated during social events where we both overeat and eat the wrong kind of foods. Nonetheless, there are ways to structure school and community support systems through body function education, making better food choices, and organization of physical activities to reduce the harmful effects of diabetes on the human body or help prevent health conditions that are factors in developing diabetes. Information on gardening and organization process may include the benefits of planning and growing an organic garden at home or school, this would include information on the benefits of plant-based diets. In beginning the seeding process the students will also receive lessons on physical and psychological benefits of lifelong activity, including basic functional fitness and gaining ways to monitor for self-success. I will facilitate the learning of the units through use of effective teaching strategies and a variety of methods such as writing activities. We will learn how our traditional diet of plant-based eating is a much better choice for the Native American metabolism.

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Understanding Nutritional Value of Good Foods

The goal is to explain concepts and to facilitate interest by introducing terminology to help students comprehend bridging words such as micronutrients, phytonutrients, ranges of amino acids, anti-inflammatory foods, and antioxidants. The units are designed to give the teacher the latitude to inject how some foods are classified as anti-cancer, and how essential micronutrients are critical in biochemical processes for good health. In sparking interest on good food choices, the teacher will engage students with nutritional values in food and the various effects of the food on our health. The overall subtle aggregate goal is to relate the lessons to the students in an engaging manner to motivate learning. In my experience, the students in my grade four class have strong curiosity about many things and are always excited about the discovery of learning when their interests are "sparked."

When students' interests are peaked, they make a connection between processes of the body and foods, and how certain foods can benefit their bodies. They will also remember the content longer. Evidence based teaching strategies along with questioning, show and tell, use of manipulatives, summarizing, and clear lesson plans will keep the students motivated and engaged in their learning. Their interests can have deeper meaning thus--learning is taking place and it gives them a voice in what food choices they make-specifically if they are advised of healthy or unhealthy choices.

Nutritional Science

As the facilitator, the lessons should help the students to understand how they can enhance physical, mental, emotional, and physiological health. The lectures should connect to help them ponder and acquire knowledge and skills to make healthy food choices, understand how to participate in physical activity, to help them to visualize how they can attain lifelong knowledge, and to instill further independent studies. The teacher will engage students in research to find out about how foods travel through the intestines and to create charts for thorough understanding. Another activity is how our intake of specific food assists our brains. They will learn that food provides energy which is a complex blend of nutrients either in the form of macronutrients and micronutrients. The three main types of macronutrients are carbohydrates, protein and fat. The carbohydrates break down into simple sugars in the body as either complex carbohydrates or as simple carbohydrates. It is important that students know that the nourishment nutrients in the food maintains, grows, or repairs cells. This is fuel they need to go about daily tasks and it also keeps the body in top notch shape (Oz,2012). Students should be able to see a direct link between foods they eat in their everyday life.

Plant-based foods

Plant-based foods have been associated with "lowering ischemic heart-disease mortality, sustainable weight management, reducing medication needs, lowering risk of chronic diseases, decreasing incidence and severity of high-risk conditions like obesity, hypertension, hyperlipidemia, hyperglycemia, and reversing advanced coronary artery diseases and type 2

diabetes" (Hever & Cronise, 2018). Plant-based eating should be promoted to follow specifically based on benefits related to healthcare. Segments of the food industry, healthcare organizations, organic farming, supermarkets, even restaurants have begun to provide viable options for plant-based eating. Plant-based foods are foods that are grown of plant origin. Whole food, plant-based diets are naturally grown foods that preferably have no additives, no modification, or have not been stripped of their original packing. Food choices need to be a balanced diet of vegetables, fruits, whole grains, nuts, seeds, spices, legumes, and not processed with salt, sugar or syrups. Food provides structural components which interact with various receptors and transmit messages to different parts of the body; therefore, all whole unprocessed food is a rich blend of nutrients. Readers should recall that the two major classifications are micronutrients and macronutrients. The study plan consists of all the vitamins, minerals and an emphasis on water consumption.

## Sugar and Less Healthy Foods

Some of the foods we eat can affect or contribute to controlling our behavior. These foods can prove impossible for some people to resist and people sometimes overeat even though they feel full, or they crave foods they really should not be eating. We know sugar and sweeteners are not good for our bodies; Aspartame (found in sugar substitutes such as Equal) is 200-300 times sweeter than sugar. Splenda is 600 times sweeter than sugar, and Saccharin is 700 times sweeter than table sugar. Sweeteners provide the taste of sweetness and rewarding sensations. Your hormones may play a role. Research says that your tongue and taste buds are a bordering for leptin resistance, and then your brain no longer knows leptin's messages, therefore this leads to enhanced behavior revolving around satisfying your cravings (Hever & Cronise, 2018). Overconsumption of sugar leads straight to high sugar levels and if too often it can promote a dependence on carbohydrates further contributing to leptin resistance. This can lead to fat not being burned properly for fuel, and overconsumption would cause fat to accumulate inside cells leading to insulin resistance. Elevated cortisol would promote stress-related craving and the need for added sugar in the behavior (Hartwig & Hartwig, 2012).

## Physiological Benefits of Exercise

Combining your balanced diet with regular exercise can give your body a good boost. Exercise trains your body to move food more efficiently, it promotes a healthy immune system, and it also increases energy levels. Studies show that exercising 5 times a week helps in losing 3 times as much fat as for those who exercise once, 2, or 3 times weekly, thus 5 times a week at 30 minutes is more than enough. A well-balanced body enhances nutrient intake and skeletal strength. It will decrease any cardiovascular diseases and the onset of diabetes. Learning about exercise is important at any age. For children, the benefits can promote emotional health and continued academic progress in school.

## Glycemic Index

Studies show if eating low glycemic index foods, there is a lower risk of diabetes and

coronary heart disease. Students in the elementary level need to become aware of what types of food have too many carbohydrates (LDL-bad cholesterol) and which plants have needed fibers. (Gallop, 2002) Students will learn about vitamins and minerals, including calculation of Glycemic Index (GI). The glycemic index is simply a measurement of carbohydrates, basically, a scale that will assist or indicate foods that will raise blood glucose level. Foods high on the GI impact blood sugar. For example, food that has carbohydrates that break down quickly during digestion will have a higher GI value. The glucose response is fast and the glucose or sugar in the bloodstream increases rapidly. Whereas, food with carbohydrates that have slow break-down in the human system will release glucose gradually into the bloodstream and have low GI values. For example, the slow and steady tortoise has smooth glucose and the hare has a rapid high GI. At one seminar session, the group learned that one of the Navajo food staples had a low glycemic index value. Prior perspectives held that mutton was a cause for high glucose count, but through our calculation of the GI, we found that mutton had a GI value of less than 50.

Health and Nutrition

I can attest to extreme diet changes in the students of today when compared to 15 years ago. Most students participate in sports passionately yet partake of soda drinks, chips or candies, and junk foods sold at concession stands. This change in diet increases the importance of student awareness of concepts such as free radicals. “Free radicals are molecules created in the body by reactions that occur to produce energy” (Smith, 2008). These molecules steal electrons from healthy cells modifying the cell called oxidation which causes oxidative stress, thus contributing to tissue damage and diseases. To facilitate the teaching of the units are descriptions of ideas with activities, worksheets, charts and tables, and guides. We will learn how our traditional diet of plant-based eating is a good choice for the Native American metabolism and some major complications of diabetes mellitus. Activities will be designed for research, reading, writing, learning centers, collaboration, and possible guest speakers, as well. Information that indicate why the Health-care cost has skyrocketed into the billions of dollars could be explored; the costs include therapy, pharmaceutical products, treatment procedures, and processes conducted in hospitals.

Through studies, the students will learn what are dietary allowances, daily food guide, food composition tables, energy intake, and caloric expenditures. The students will learn how people develop eating habits that “lead to over nourishing and becoming chronically ill from all the eating” (Hever & Cronise, 2018). In this curriculum unit, we will discuss disabilities caused by diabetes and other related complications such as heart disease, renal disease, blindness, and limb amputation.

The curriculum unit will further provide presentation of lessons on health-promoting lifestyles with organized charts or tables to accompany the lessons and partake in making Native food that was used by our grandparents as healthy food options. Students will journal daily on specific writing topics as reflection and deliver several written assigned activities demonstrating thorough understanding of the “getting healthy by eating healthy.” The students will also receive lessons on the physical and psychological benefits of lifelong activity including basic functional fitness and gaining steps in monitoring for self-success. Researchers have reported childhood obesity

epidemics on the Navajo, “according to the Center for Disease Control (CDC, 2017), 29 million people have diabetes, that's nearly 1 out of 11, and 86 million are estimated to be prediabetic. As a population, American Indians and Alaska Natives have the highest rates of diabetes. In the Navajo area, 1 in 5 have diabetes and it is estimated that 75,000 have prediabetes. The CDC claims that 9 out of 10 people who have prediabetes do not know they have it” (Noble, 2009). This alarming report should prompt educators at high Native American population schools to act on integrating health into the curriculum objectives that uses standards objectives to teach health in multiple aspects including foods and exercise in the home or at school to support healthier children. It is necessary for all youth to become more familiar with the internal structure of the body and its’ susceptibility to disease. The educational system should be engaging in educational services that alleviate problems alongside the health care system to provide and to design meaningful effective, culturally relevant education on diabetes for all ages and population (Garcia-Smith, 2012).

Realistically, we need to acquire knowledge of the science of food, the course it takes in our body, and how it ends up in our liver and how not being able to process it properly leads to diabetes. We need to have knowledge of the nutrients along with access to the details of how studies show the development of diabetes and other chronic diseases associated with the overconsumption of unhealthy foods (Hever & Cronise, 2018).

Other issues of discussion would include how medical schools and or health care needs to provide training to better meet the needs of Native families having healthy lifestyles, and possibly changing mindset, so success can begin to take place (Garcia-Smith, 2012). The health care system in many Navajo communities now tends to lend lip service and doesn’t seem to take the rapid diabetic disease problem as detriment and extreme. Presently, the idea of eating healthy, whole, plant-based foods is not acknowledged as a preventive concept even within the school cafeterias across the Native nations. The idea of nutritional knowledge-based education might have an impact to fight diabetes prevalent in many Native communities. If we, as educators, partner up with the health care systems and declare war against diabetes and become kinder towards ourselves, we can make progress toward healthy productive communities. Many professional clinicians have potential desires to assist but it is only the topping and seen as a job and true motivation is nonexistent (Personal Observation, 2018). Participation at school levels in the studies of nutrition and discussion of how research has shown that whole, plant-based foods are all easy to control. We can eat our way to lifelong health. We, as Native communities, can grow and sustain healthy productive cultures; we need to make nutrition the main point of our health goal.

Learning to take control of personal eating habits is difficult but changing the eating habits of the entire family may prove to be impossible without the proper information to begin discussions. Therefore, schools along with health care programs need to step up and begin lessons and trainings on numerous health related topics as a start. Meal planning can be topic of teaching, physical activity and behavior modification can be provided at community levels (Bilderback, 2009). With practice and persistence, we can adopt good habits and good behaviors that seemed impossible to achieve. We would be on the journey to continue reaching goals of longevity.

Research shows that eating right is the best means of treatment in fighting or even reversing the onset of diabetes and many other diseases such as high blood pressure or heart disease (Hever & Cronise, 2018; Oz, 2018). Native foods such as blue corn mush or sumac berry mush was a staple meal for our grandparents, therefore, preparation of this dish will be presented by a community member. Discussion of organic foods along with planning a family home garden or school garden will be presented on excel as a student activity integrating decision making on which vegetable plants to grow. This would be a beginning point of organic eating within the families or communities. The last part of the curriculum unit will include information on diabetes and other diseases that may be components of unhealthy eating. PowerPoints on the essential needs of nutrition will still accompany the diabetes information and the consumption of health-promoting nutrients and how to possibly avoid disease-advancing foods. Teams can work on creating ideal diets, menu planning, healthy recipes, or investigate prices of vegetables as a shopping list cost.

**Content Objectives**

In this unit, the goal is to organize and connect lessons about nutrition and healthy eating so the students can begin to explore the relationship between their diet, exercise, and well-being individually, in families, and in the community at large. The overarching goal is to have each student complete interactive lessons that will incorporate components from reviewing standards, objectives, and direct instructions where the teacher will model concepts “I do,” then whole group work “we do,” independent work “you do,” assessment to determine what students learned from lesson and closure. By breaking up the lesson into various components, students will remain engaged and be able to understand purpose of lesson, and learning standards. The curriculum will consist of six units in lecture forms on nutrition and basic information on vitamins and minerals; plant-based nutrition; organic eating; and taking a closer look at whole plant-based eating. Tools include Power Point presentations and charts identifying essential information on glycemic index, food groups, vegetables, legumes, and root crops, etc., and on healthy foods versus what is unhealthy diets. Essential research components include introduction of “My Plate”, the “Pyramid Plan” and lecture will also cover the history of traditional Native people diets, the transition and effects of the over-processed food we eat today.

It is important to note that this unit will give students the knowledge and tools to make it their own, make a positive impact in their family unit, communicate better ways to eat healthy food and to show their family what happens to their bodies from both healthy and unhealthy food. Effective learning promotes changing behavior, and only positive reinforcement will have positive impact on behavior. Negative consequences do not change behavior. To make positive, long-lasting pattern changes; only positive examples and experiences will change behaviors to promote health life style changes.

The unit is intended to give important information based on scientific facts. I want students to be able to explain that eating healthy will improve their ability to fight off illnesses or recover from an injury or to tell their grandmothers that they can possibly reduce osteoporosis effects or will be able to sleep better if they eat plant-based as opposed to diets heavy with meat or hamburgers.

As a classroom teacher for 30 years, I can attest to the diet changes taking place in the young students of today. Most participate in sports passionately yet consume the wrong kinds of foods. Today, partnership is critical between tribal governmental agencies, universities, and tribal educational institutions to make long lasting changes in learning for students. Research today shows that appropriate education promotes decrease in the chronic disease diagnosis or positive increases in other ways for progress (CDC, 2017). The Indian Health Service is making aggressive improvements in prevention based on the applied, coordinated efforts of clinical care alongside education at the community level. Special Diabetes Program for Indians report that team-based diabetes care has made a dramatic increase in healthier well-being based on data from 1997 to 2013, going from 8% -30% and to an increase in the 74% to 98% in different related areas of intervention (CDC, Vital Signs, 2014. 2017). We will need to begin education in the school systems alongside the efforts of the healthcare systems as well as improvement in the food prepared for the students at the school level.

**Teaching Strategies**

Direct-Instruction: during the direct instruction component, the teacher will use lecture format, power-points, video demonstration, or technology to engage students in learning concepts to gain information. Teaching strategies will vary depending on purpose of the activity in the lesson. For example, in the anticipatory set at the beginning of the lesson after reviewing the objectives, teacher may use K/W/L (What do you know, what do you want to know, what did you learn) graphic organizer to determine interests and current understanding of the topic, and questioning or storytelling to gain interest of the student that connects to health and nutrition.

This teaching strategy works for my students based on an information-centered method, so students are taking notes and writing out the information, involving two modes of learning. PowerPoint presentations will accompany the lecture, making it a more engaging interaction as students take notes and listen. Students will do a Partner-Talk to summarize what they learned or use re-voice with the teacher for thorough understanding.

Students will gain information in the form of direct instruction, and to include strategies in graphic organizer format to further demonstrate knowledge-based concepts. An example would include having students complete a research project based on students' choice interest area such as foods diabetics should be eating or what a healthy kidney looks like. After learning that people with diabetes are not able to turn the sugar from their food into energy, students could research choice topics of interest to demonstrate knowledge to peers in a presentation mode; using technology, an illustrated learning poster, and or visual representation as a project. For example, students placed in teams could demonstrate how the body of a diabetic cannot make the best use of a hormone called insulin, and; the insulin is made in a gland of a pancreas. The insulin is needed to use the sugar in the blood as energy and it also controls the level of sugar in the blood. When the insulin is made, it happens in cells called islet of Langerhans. Individuals with Type 1 diabetes cannot get energy from the food they eat, the sugar stays in their blood, and they feel fatigued and thus begin to develop many other health problems. The issue of kidney disease comes from diabetic symptoms. Today, dialysis or kidney transplants are used for survival and at a great cost. In the presentation, the goal would be to have students discuss care

and education about kidney disease and treatment. Student presentations could be shared among different grade levels and community members.

Graphic Organizers: Within presentations, the use of graphic organizers would be an effective tool to provide visual and learning concrete modes of learning. Furthermore, use of graphic organizers have always been effective for the Native American population as it helps students organize their thoughts and ideas in a visual format, thus improving vocabulary and comprehension skills. Students may work in teams to brainstorm, plan, problem-solve, question, write or make decisions on the topic presented. The graphic organizers will include Venn Diagram, T-Chart, concept map, etc., as they form pictures and thus allowing for the brain to see patterns and relationships.

Technology Usage: Technology standards could also be incorporated in the group projects since our standards requires 4$^{th}$ graders to develop the skills of technological use. Teams of students could research to create diagrams of how the food travels through the intestines, how the kidney works, or create cholesterol deposit drawings to present as a project. As they work in teams, emphasis on conceptual understanding over the use of technology, the students will familiarize themselves to integrating strategies that will continue to impact their life skill learning. Inquiry-based instruction. As we involve students in the learning process through several avenues, students will develop a deeper understanding of what they are learning. Young students are always asking questions about many things, so this is an appropriate time to work on inquiries; investigating, generalizing, exploring, and reporting on what they see in their surroundings specifically to science. To become successful in the future, it is best to teach and assist students now in inquiry-based processes as students learn. Inquiries on the impact of skipped meals, effects on attention span without breakfast, or 'does the cafeteria provide good nutrition?' could be inquiry-based questions of discussion. We need to encourage questioning, letting them know they can ask for clarification when they need to understand something and to keep in mind that this could create true reflection to open ended questions that may have multiple explanations. Students may make predictions and create real world applications by keeping track of meals for a week, graphing data, determine and share trends and patterns individually and within their families to make comparisons on food choices, exercise patterns, or area of health interest. Individual projects may include creating a Family Menu Plan within a given cost amount in the form of assessment. In each lesson, components mentioned will help the teacher assess students' understanding using formative and summative assessments. Many forms of differentiation could be used based on the individual strengths and instructional performance level of students.

Cooperative learning: cooperation is important to any student population, this is based on opportunities working with others to see different perspectives. If provided authentic problems as planning a family menu where the students are given responsibilities for making the shopping list, students will be motivated to apply what they are learning to real-world home problems to increase their interest and understanding. Students gain more when working together, so many of the discussions in the lessons work to demonstrate and build confidence.

Projects: As a concluding project, schools could apply for grants or obtain community donations to design and build a school or home garden. The unit could have information on organic food and how to develop and read blueprints on creating a garden to help them in following through with their healthy eating plans. A project could include analysis of the school cafeteria food using math skills for graphing, surveying students, completing a narrow study, and writing a persuasive essay on their food options. In the cafeteria, although students are provided nutritional options such as what flavor of milk; little choice is provided for students daily where students could design a meal plan for the school as a service project. Additional lessons that demonstrate that there are also other factors that affect our well-being such as genetics or lifestyle choices could impact outcomes. Daily reflection and closure is critical in the unit for students to summarize findings and apply lessons learned to real world situations. For example, students can continue to make good dietary choices as they become habits. "Once you make that switch, your insides -the biological level kicks in quite quickly like in two weeks and you begin to feel the differences" (Dr. Oz, 2009).

**Classroom Activities**

Knowledge-Based Nutrition:

The curriculum unit will serve as an introduction to nutritional basics including proteins, carbohydrates, fats, vitamins, minerals, and water in cell function. I will present the nutritional unit in sequence following state standards to include whole group direct instruction and small group differentiated learning activities that align with students' interests and abilities. The complete curriculum will encompass nutritional content and practical applications. The unit is organized using levels such as "Basic Nutrition" for students who have no background and with added challenges or further studies. The learning goals include many materials to spark students' interests in the topic of the basic nutritional content, causes and prevention strategies for diabetes, symptoms of advancing diseases, and statistical analysis on the Native American population that is most affected by unhealthy choices. We will learn how our traditional diet of plant-based eating could have been a good choice for the Native American metabolism. Student activities will be designed for research, reading, writing, learning centers, collaboration, and possible guest speakers.

Each lesson will include interactive components such as short 5-10 minutes of video, film, Power Point visual presentation on the history of market-based foods, history of traditional Native American foods, cellular functions and benefits of vitamins, minerals, and water along with impacts on the body.

A traditional speaker in the community will demonstrate traditional food, how it was grown, and prepared with blue corn mush meal and use of ashes from cedar-Juniper Monospermous trees, and a lesson titled, "Grandma Knows PH." The speaker may complete activities cooking blue corn demonstrating PH and the effects on human body. Ashes will lower or raise PH in blue corn mush and the objective is to neutralize PH for improved health and make corn mush taste delectable. For each lesson, there will be an application component to create meaningful connection to the standards. For example, on the third lesson plan, we will discuss the minerals

arranged and termed alphabetically, learn its functions, what type of food has that specific vitamin, the recommended dosage, and its impacts of deficiencies. Students will learn and be able to verbalize the symptoms that occur in the human body and this will allow students to plan their intake of minerals and vitamins to assist in ways to achieve optimal health. They will learn that minerals, unlike vitamins are not produced by the body, but are critical for many bodily functions to work correctly. There are two categories of minerals-- macro minerals and micro minerals and each will be presented in PowerPoint form. The lessons presented on nutrition as plant-based eating can begin with students exploring ways they can be healthy based on plant-based eating and physical activity to prepare them for design school menu challenge. The student group that scores the highest will have a menu meal named after their group in the school cafeteria.

Each lesson will have a Quick Write or reflection for students to apply justification demonstrating their knowledge; questions will include: What is a nutrient? Why is a Recommended Dietary Allowance important in planning your daily intake of food? Why is it important to eat breakfast? Identify some key nutrients in food? Why do we need to look at the Nutritional Facts on processed food item? The reflective question will align to the standards as students respond in their journal entry as a formative assessment. These questions will be designed to access prior knowledge on concepts learned and to practice critical thinking skills and to link information to the practical applications.

Student Application Activities

At the end of each lesson, students will have a choice from follow-up activity lists that include projects aligned to the lesson. For example: diagram of how carbohydrates rapidly or slowly digest accompanied by a chart or how food travels in our intestines, etc. As they begin to understand and discuss the basics of nutrition, students will learn the importance of physical and emotional health in connection to eating healthy.

Applications of lesson objectives help reinforce concepts to promote healthy lifestyle changes. In lesson five, students may create posters advertising good eating habits to post in hallways and cafeteria: Posters will entail food safety rules, do not skip meals, specifically breakfast, drinking plenty of water, eating meals as a family, guiding family choices instead of dictating foods, and respecting cultural distinct eating differences. The students will brainstorm ideas and design sketches or create posters to promote healthy attitudes about food to advertise a specific food item and its benefit, for example, “an apple is a healthy fast food.” Ideas could include: always wash hands before touching food; keep everything in the kitchen clean; don’t cough or sneeze on food, and keep pets and flies away from food. Some ideas for advertising good eating habits can include: making happy faces when eating vegetables at dinner around your little sibling, eat your vegetables, eat only the right portion size, exercise regularly, etc.

Learning center: Fat Corner (science)-in some foods invisible fats are not easy to spot, there are lots of foods with invisible fats such as ice cream, cookies, milk, nuts, salad dressing and many processed foods. This activity will include testing to identify foods with invisible fat. Students will need 2 sheets of paper towels and two food items to test (i.e. a slice of tomato and a slice of

cheese). First, they will lay out paper towels and gently rub each item on the paper towel; setting aside to dry. When dry, the food that had fat will have left a grease stain, while the one without fat will leave no grease stain. This activity will show that the cheese was a fatty food and that the tomato had no fat. Students will conduct three sets of food activities to see what foods have invisible fats. Students will see that some foods with hidden or invisible fats are butter, nuts and seeds. (Students will be advised to not eat any of the food without permission)

Food and Diabetes – first look for pictures of food, cut out and paste onto paper plate. Next, think about what is in each dish. Which food do you think has a lot of sugar? Which of these foods do you think should not be eaten by a diabetic person? Now list some reasons why a diabetic person could eat specific food and write reasons why, like "smaller portions", and write reasons or healthful suggestions, for example: suggest baked or mashed potatoes in place of french fries. By helping students in fourth grade make healthy food choices a part of our school programming, we can help our students and communities make eating well a happy habit that comes naturally as tying our shoes. As a real-world application activity, students may create T-chart to take along to the grocery store when families go shopping to label healthy vs. unhealthy choices. Each lesson can bridge learning into family connection to engage the whole community in educational activities.

Nutritional Learning Activity Centers

As part of further studies, students will learn how to determine healthy food options at the store before designing menus including how to interpret food labels and making good choices for the best value using math skills for portion sizes. In teams, students will read and justify the nutritional facts of three different brands of cereal and complete the charts and questions to make the healthiest choice, using a Cereal Nutritional Fact sheets based on the specific information of serving size, total calories, fat content, a list of nutrients, cholesterol count, and Percentage Daily Value (DV).

Before entering a menu designing contest, students will create a Pyramid Power: Students will create a Food Guide Pyramid or My Plate diagram that describes and displays the different types of food and how much of each food group they should eat each day. Lastly, they will explain why the portions are the specific sizes they are, (they should be able to use the words moderation, variety and balance.) This explanation may be used as an assessment.

Milk as a Liquid Nutrient: First students will measure each other on the Growth Chart (in feet and inches). Next, students will read the information on the chart that explains why milk is important for their growing bodies. In teams, the students will read the brochure labeled "Farm to Table- Milk's Journey to You!" Lastly, they will create a Sequence Chart of milk's journey using sequence chart provided.

**Student Assessment Plan**

Formative and summarize assessments will be used as an on-going process of the curriculum unit to determine whether the learning goals were met. The completion of project-based activities will

serve as the daily formative assessment. Students will also have an opportunity to self-assess their performance in the form of completion assignments, project-based learning activities, essay form, formative Quick Write, and summative assessments for more formalized knowledge-based assessment exams. Upon completion of the variety of assessment formats, students will have had an opportune time to reflect on their understanding and application of nutritional based standardized goals. First, students will learn terminology specific to nutritional education, take part in a writing where they give a short-written response to an open-ended prompt used as critical thinking practice or to informally assess their thinking and learning. Another assessment that will be used is a two-paragraph written essay; based on what they have learned, their BMI, their food menu, and to identify nutrition-related issues, causes, and significance impact on the human body. Each week, the students will be assessed on their thorough understanding of the week's lesson taught. An example will include a "compare and contrast two breakfasts"; an oral report on the school lunch after they have recorded school lunch foods served and evaluated it to Daily Food Guide or Nutrient Analysis, or an essay on why nutrients in food are important. As the lessons progress, short formative quizzes will assess understanding, as well as an end of curriculum unit summative assessment.

**Alignment with Standards**

The curriculum will address the Arizona State Standards, the Common Core State Standards and incorporate Navajo Standards in all components of reading, writing, math, listening and speaking, so that students will be able to achieve by the end of the unit. Some objectives would include: explain how details and examples support inferences, provide summary of the text, write from opinion, recall specific description and its visual presentation of text, identify key ideas, summarize and comprehend integration of knowledge, write informative text to examine a topic, and engage effectively in collaborative discussions. The Common Core Standards for Mathematical equations includes calculating necessary calories and food group intakes, using recipes for measurement in cooking, calculating heights and weights, analyzing BMI, tracking nutrient intake, and create budgets for family menus. The curriculum unit will cover the standards with whole group direct instruction, strategies to incorporate new vocabulary on nutrition and health, group assignments to assist in conducting research and giving presentations, choice project-based learning activities to apply standards in real world applications and essay components to demonstrate proficiency of content area knowledge.

Viewing the Arizona State Standards; many of the standards, strands, and concepts align with the idea of eating healthy, making informed decisions to reduce disease and promote well-being. A traditional view is that humans must be balanced socially/emotionally, physically, mentally, and spiritually. Using traditional teachings in connection with Standard: Strand 1: Inquiry Process, Concept 4: communication, communicating verbally, PO2, using bar graphs and Venn diagrams to compare and contrast findings, Strand 4: Life Science; characteristics of organisms, concept 3: Environment comparing land usages between plant based diet and animal; Health Standards Strand 1- Comprehension of Health Promotion and Disease Prevention, Concept 1: Relationship between healthy behaviors and health, benefit of eating healthy meals with families. Simply stated, content objectives describe goals and "I can" statements that align with standards.

The Navajo Nation Standards would encompass the Department of Dine Education that states that they are ensured that curriculum is strong in Dine language, history, culture, and values. Therefore, the curriculum unit will include Concept 1,2, and 3 from character education which includes making healthy choices in personal life where eating healthy food and developing consistent physical activities are part of the healthy productive way of life. The teacher will collaborate and advocate inclusive of traditional Native American role models and speakers to talk with students about traditional foods, how to model good character, show respect by taking care of oneself and eating healthy and keeping the body healthy. The information sources may include listening to speakers and reviewing main points of speakers. Concepts 1,2, 3, and 4 includes the Diné language Standards, the Navajo language words may include concepts and vocabulary words.

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