



Curriculum Units by Fellows of the National Initiative
2005 Volume II: Art and Identity in Mexico, from Olmec Times to the Present

An Approach to Biology, Population Dynamics, and Disease via the Analysis of Mexican Art, History, and Texts

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Introduction

This curriculum unit will investigate the types of disease that came to the New World from the Old World. It will illustrate how these diseases impacted the native people and directly affected their populations. It will also investigate the fragile ecosystem that existed and how it was disrupted by the flora and fauna that were introduced by the Europeans. Students will not only gain knowledge of concepts and history they will use a wide variety of reading and comprehension strategies that will give students tools and techniques to use in other classrooms and in life.

Rationale

I find that students have very few worldly experiences. They can't seem to relate what we teach them in class to things that occur and have occurred in the world. Many of my students come from diverse backgrounds and they find no continuity or connection in what we teach them. By using the history of the Mesoamerican people as a vehicle I hope to reach many students of different cultures. My students will relate to the people and their circumstances; they will not feel as if it is just another lecture about people to whom they have had no connection. As odd as it may seem, my students will relate more effectively to a people who have had terrible suffering.

Our students think they are oppressed by the society that they currently exist in. They cannot see the end result. They feel persecuted and trapped. They have to go to school, they have to learn, and they have to listen to their parents. They don't realize that there are people and cultures who've been conquered, enslaved, tortured and slaughtered. By enlightening them as to the circumstances of others we can not only teach them science but we can teach them humanity. They can feel empathy toward these people and learn compassion for others in their own lives.

The seminar on Art and Identity in Mexico has given me background information to relate the topic of

population dynamics to the early American peoples. My curriculum covers a unit on population dynamics which discusses density-dependent and density-independent factors that affect a population and the carrying capacity of the environment. The stability of an ecosystem also plays a role in determining the population and carrying capacity. By using the Mesoamerican people as an example of population dynamics the students can see how density dependent factors such as disease, competition, and food availability directly affected these people. They can see an example of a major population decline in a real civilization, not just an example in a text book. They can also learn about the climate, introduction of non-native species, habitat destruction and natural disasters that occurred and how they affected Mesoamericans. This can be related to current issues regarding non-native species introduction, climate and habitat destruction in the students' own region.

Overview

Students in Florida are assigned to schools based on geographic location. They are then randomly placed in classes, unless they are in advanced classes. All schools in Florida base their curriculum and instructional strategies on the Sunshine State Standards. The Sunshine State Standards are set details, concepts or facts that the students must learn. The comprehension of these standards is tested on the Florida Comprehensive Academic Test or FCAT. Students must pass the FCAT test in reading and math in 10th grade and in science in 11th grade.

This curriculum unit is intended for Biology students, grades 9-11. The students are varied in learning abilities, from FCAT (Florida Comprehensive Academic Test) level 1 through level 4 in reading. Level 1 students read 2 years or more below grade level, level 2 students read 1 year below grade level, level 3 students read at grade level and level 4 students read 1 year above grade level.

This curriculum unit can be taught to standard mainstream students as well as honors or advanced students. They also vary in their learning preferences. Some are kinesthetic learners, those who learn by doing and touching. Still others are aural and learn by hearing or are visual and learn by seeing. This curriculum unit can also be used for ESOL (English Speakers of Other Languages) students, by incorporating the vast amount of Mexican art and the use of graphs and charts for population statistics.

This curriculum unit incorporates a cross curricular approach to learning. The students will learn about population dynamics by investigating the history of early Americans, reading early accounts of the Spanish invasion, analyzing and discussing Mesoamerican art, and graphing population numbers. This type of approach integrates history, reading skills, art, and math with science. This type of interdisciplinary planning fosters a stronger continuity among the core subjects. They will also use numerous reading and comprehension strategies which will increase their reading abilities.

Students will begin their study of early Mesoamerica by focusing on the Aztec people and different factors affecting their population size and changes to that population size.

I will introduce the students to a brief history of the early Mexican people focusing on the Aztecs. The fall of the Aztec empire will be discussed in relation to Cortés and the diseases that were prevalent in the 1500s.

The students will be introduced to terminology relative to population dynamics and demography. They will relate these terms to the situations that occurred before, during and after the fall of the Aztecs during the

Spanish conquests. The students will construct population graphs illustrating the population decline over a hundred year period. They will discuss the factors influencing this population decline and discuss how humans have affected other populations and environments world wide. All of these concepts will be addressed through cooperative learning strategies and modeling activities.

In 1492 Columbus Sailed the Ocean Blue, and With Him He Brought Disease and Pestilence.

History of the Mesoamerican People

The area known as Mesoamerica refers to the geographic area and cultural traditions of the pre-Columbian civilizations of North America. This area included Mexico and parts of Central America (Mckay, Hill and Buckler, 1992). Areas in lowland districts tended to have heavy rainfall and warm temperatures which tended to foster disease (Cook, 1998).

Early Mexican peoples lived simply. They began as hunter gathers and converted to agriculture and cultivation around 8000 B.C. One of the earliest crops that was domesticated is believed to be the bottle gourd. It was useful for holding water and other liquids. Their main crops included maize, beans and squashes (Mckay, Hill and Buckler, 1992). They ate cacao beans, maize, manioc (also known as cassava), avocado, beans, pumpkins, chili peppers, and tomatoes. Beans were especially rich in protein as well as oils and carbohydrates (Crosby, 1972). There was very little animal protein in their diets. They ate rabbits, turkeys, lizards, fish and other small mammals they could hunt. They were poor domesticators of animals. They only had small dogs, turkeys, guinea pigs, Moscovy ducks. Although there were many important ancient Mexican civilizations, the Aztecs are not only the best known, but also the last.

North of the Basin of Mexico lived nomadic hunters. They were called Chichimec, or dog people. At the start of the 13th century some Chichimec came to settle around Lake Texcoco. This group of Chichimec was called Mexica. They claimed to be from Aztlan, the place of seven caves (Schwartz, 1997). In 1325 the Mexica, now know as the Aztec, formed their capital, Tenochtitlan, which is the location of present day Mexico City (Mckay, Hill and Buckler, 1992). Their city grew from a small town to a large city with stone temples and adobe houses. They began to extract tributes from surrounding provinces under their control and participate in long distance trade (Schwartz, 1997). Despite their achievements, at the heart the Aztecs were an agricultural society that was greatly influenced by the forces of nature.

The Conquest of the Aztecs

During the Spanish Conquest of the New World there were several stages of Spanish expansion. The Aztec invasion by the Spanish represented the second stage, the first having taken place a generation before in the Dominican Republic and Cuba (Mckay, Hill and Buckler, 1992). Hernan Cortés, Spanish conquistador, set sail in February of 1519 with about 600 men, cannons and horses.

On his way, he picked up Jerónimo de Aguilar, a long-shipwrecked priest who had learned to speak Mayan, who would be a translator. They landed near Vera Cruz on the Gulf Coast. Cortés marched inland battling native peoples on his way to the Aztec capital. Many of the natives fled in fear for they had never seen horses before. During their journey they encountered the Tlaxcalan people; they initiated battles with the Spanish invaders but after weeks of heavy fighting the Tlaxcalans surrendered. They became allies of the Spanish and would help conquer the Aztecs.

On November 8, 1519, Cortés met Montezuma, the Aztec ruler, outside the city. Montezuma received the

Spanish graciously. Montezuma initially believed that Cortés might be Quetzalcoatl, an ancient god (Mckay, Hill and Buckler, 1992). Cortés still believed the Aztecs would drive them out so he captured Montezuma to be his hostage. A young woman who had been given to the Spanish, Marina, spoke Mayan and Nahuatl, the Aztec language. Although cumbersome, Cortés could speak to Aguilar, Aguilar to Marina, and Marina to Montezuma. This allowed many opportunities for mistranslations.

Six months later, while Cortés was away, Alvarado, one of Cortés's men, slaughtered hundreds of Aztecs out of fear, initiating an Aztec uprising. When Cortés returned he was allowed into the city, but he was attacked. Montezuma tried to persuade his people to surrender; they in turn stoned him to death.

On June 30, 1520, called Noche Triste, or sad night, the Spanish fled, still being pursued by Aztec warriors who killed many of their men. Cortés regrouped over the summer of 1520 and in May 1521 he surrounded the Aztec capital. He cut off their supplies and after three months the city fell, ravaged by disease and dysentery (Mckay, Hill and Buckler, 1992).

The Spanish were able to conquer a civilization that was known to be fiercely militaristic and had a population of millions. They appeared to have few advantages when they arrived: 600 men, and a few cannons and horses. But what they lacked in numbers and supplies they made up for with viral and bacterial immunities. The epidemic that swept through the Aztec empire decimated the population, leaving the survivors dispirited. They were plagued by an illness that mysteriously killed Indians and spared the Spanish, making the Spanish appear invincible (Diamond, 1997). As a result the Aztec's were ready for invasion.

Before and after the conquest of the Aztec, the Spanish favored a policy of settlement, or congregaciones, where the natives were forced together in a sort of town. This increased the density of the population causing future epidemics to have higher mortality (Cook, 1998). These types of settlements were favorable to the Spanish political, economic and religious control (McCaa, 1997).

Disease in the New World

The New World was not disease free. Its people were affected by syphilis and other infections (Cook, 1998). Because of the great isolation of the Mesoamerican people their immunity to certain world disease had been reduced. When the New World met the Old, the Spanish conquistadors and explorers brought with them fatal diseases that killed more effectively in the New World (Crosby, 1972). The highest mortality was during the first hundred years of contact. The diseases spread quickly, killing large numbers of natives. Estimates vary considerably, with one estimate suggesting a drop from 25 million in 1519 to 1 million in 1620 (Mckay, Hill and Buckler, 1992). After several generations, some resistance was built up among survivors, and interbreeding among them (Crosby, 1972). There were two main diseases that caused so much damage: smallpox and measles.

Smallpox began to ravage the Aztec population around 1520, about the time of Noche Triste. Smallpox is transmitted through the air in droplets or dust particles and enters a person through the respiratory system. It is extremely communicable. It incubates in a host for up to twelve days. The host begins to have a high fever with vomiting. Four days later pustules on the skin begin to form. For those who survive, within a week the pustules scab up and leave scars. Within a month or less the patient is either dead or has developed immunities (Crosby, 1978).

Measles arrived around 1531. The disease was described as a small skin rash that affected all sectors of the populations (Cook, 1998). The mortality experienced by this disease was less than small pox but still

devastating. The mortality rates were around 25-30%. Measles has a shorter lifespan than smallpox and survivors develop immunities.

Malaria may have been introduced during Columbus's 4th expedition. Some of the explorers carried *Vivax malaria*, endemic in Mediterranean Spain, in their blood (Cook, 1998). The explorers reached Jamaica in 1503, after coasting along Mesoamerica. Mosquitoes were very abundant and several varieties of the *Anopheles* mosquito could carry malaria; they only needed the introduction of the parasite from an infected sailor (Cook, 1998). Malaria exhibited a different pattern of transmission compared to measles and smallpox. New cases of malaria may appear during any time of year in any area whereas epidemic diseases like smallpox and measles have a lot of cases for a time then no cases for a while (Diamond, 1997). Taken together, the various epidemics caused a massive loss of life which made it easier to conquer most of the hemisphere (Cook, 1998). Disease was not the only cause for death in the New World; non-native species also had a major impact.

Non-native Species Introduction

The Europeans also disrupted the ecological balance of the ecosystem that existed in the New World. They brought with them a variety of plants and animals. They introduced horses, large dogs, pigs, cattle, chickens, sheep and goats to the New World. These animals had no natural predators in their new environment and no New World diseases affected them. This allowed the population of these introduced species to soar. The pig, especially, adapted remarkably (Crosby, 1972). Due to their remarkable growth they caused the extinction of native species of plant, animal and even the natives themselves by eating their crops.

The introduction of grazing animals also caused mass deforestation and habitat destruction. The Spanish also set aside large areas for grazing, usually where the Indians land where they had been cultivating their largely vegetarian diet. Indians went hungry and had a lower disease resistance. Many left or died.

The Spanish also brought over their own domesticated dog. Their dogs were much larger and more ferocious than the dogs that existed in the New World. They brought Mastiffs and greyhounds that were trained for war and killing people, especially Indians (Schwartz, 1997). The dogs were used for many tasks: food tasters, hunting game, guarding, tracking natives, and in war, killing large numbers of people (Schwartz, 1997). Some of them returned to the wild and lived as predators. They were treated like wolves by the natives. These introduced animals also brought their own diseases with them. In South America, the native alpaca and llama population suffered greatly.

They also brought a variety of plant life. They brought wheat, chickpeas, olives, melons, onions, radishes, salad greens, grape vines, sugar cane, and fruit (Crosby, 1972). But not all of these imports would grow in the New World Climate. Often the Native population was forced to grow European crops when the Spanish could not grow enough of their own. But rarely did the Natives add these to their own diets (Crosby, 1972).

Some of these imported animals were not brought over intentionally. The black rat hitched a ride over and spread out all over the continent. They ate whatever they could find. They were also carriers of diseases, the bubonic plague and typhus (Crosby, 1972). Many of the plants that came to the New World that were not food plants or floral were also unintentionally brought over. They came hidden in cloth, mud, dung, and other ways. With the overgrazing done by the imported livestock, heartier foreign grasses and weeds were able to take over. Kentucky Bluegrass, dandelions, and daisies were some of the plants that originated from the old world (Crosby, 1972).

Population Dynamics

Population growth is the change in population size over time (Glencoe, 1998). But this growth is affected by limiting factors, that is, factors that determine whether an organism can live in an environment (Glencoe, 1998). These limiting factors help define the carrying capacity of the environment.

The carrying capacity is the number of organisms the environment can support over time. Populations generally increase exponentially, at an ever-increasing rate, until acted on by outside forces. The population then levels off and is maintained just below the carrying capacity of the environment. Density dependent and density independent factors both regulate the size of a population.

Density dependent factors have a greater effect on more dense populations. They have an increasing effect as the population increases. These factors include such things as disease, competition, parasites, food availability. Density independent factors affect the entire population regardless of size or density. These are usually things such as natural disasters, floods, volcanic eruption, drought, and habitat destruction. No matter how many individuals are living in the valley, if it floods they all will die. Conquest may even be considered density-independent as many settlements and cultures were affected.

Age Structure

The age structure of a population refers to the proportion of individuals in their pre-reproductive, reproductive, or post-reproductive years. Depending on the number of individuals within each structure you can determine whether a population is growing or not. The age structure of Mesoamerica was young, with 40% of the population under 15 years and 90% under 50. Though the average life expectancy was 16 to 26, the population could sustain a growth rate of 0.5% a year if there was a high fertility rate (McCaa, 1997).

Species Interactions

The interaction of different species also affects the population size. If a new species of animal is introduced into a population, such as a pig, then this species grows exponentially until it reaches its limit or the carrying capacity of the environment. This pig will compete for food with the native creatures and with the native Indians. They may also cause the extinction of native plants and animals due to this competition. Introduced species may also hunt native species, such as the large dogs that the Spanish brought. Due to competition, the native species that was food for a native predator may die out, causing the extinction of the native predator.

Stress

Stress is also a major factor that affects population size. Though the mechanisms and factors that cause stress are not well understood, it has been shown that populations under severe stress will exhibit a variety of symptoms. Decreased parental care, decreased fertility, and a decreased resistance to disease have all been shown.

The Mesoamericans were under tremendous stress with their foreign invaders all around them who introduced new animals, plants, religion and practices. Women were known to interrupt pregnancies or abandon babies so that they would not experience the same fate as the parents (Cook, 1998). After being infected with smallpox and surviving, the victim is left scarred for life. The psychological affects of this disfiguring disease were dramatic. The smell of the deceased was so great in some areas their houses were pulled down on them

or they were cast into the water (Crosby, 1978). All of these things left the people distraught, terrified and depressed. The extreme physical exertion, anemia from nutritional deficiencies, and parasitic infection combined with disease and conquest made for an extremely stressful existence in Mesoamerica (McCaa, 1997).

Ecological Impact

All organisms are interdependent upon one another. Changes in any ecosystem can have unpredictable and detrimental effects on the entire system. Humans, past and present, are the main reason that our environmental support system is at risk. Humans themselves make up one part of the earth's biodiversity. This relates us to every other organism of the earth, either directly or indirectly (Leonard and Penick, 1995). Humans destroy the biodiversity of the planet that is a product of millions of years of evolution, essentially irreplaceable losses. Many species in the Mesoamerican region went extinct with our knowing they ever existed.

The habitat destruction, introduction of non-native species into the Mesoamerican ecosystems and overexploitation of species in Mesoamerica resulted in a tragic loss of biodiversity including the extinction of some native cultures. With the introduction of non-native species an ecological imbalance occurred. These new species compete with the current species and are often associated with their extinction. The ecological disruption that occurred in Mesoamerica caused many Aztec and other Mesoamerican people to die due to starvation and disease. Introduced species ate their food crops, pushed out their native animal resources.

As humans, we need to know about diversity and past mistakes so that we may coexist with other species and make changes that may one day be essential to our own survival.

Objectives

This curriculum unit is important because I can teach my students to see the relationship between different disciplines of education. Currently, the education that our students receive is very disconnected — disconnected from real situation in the world, disconnected from the students and each discipline is disconnected from one another. The students go to math class to calculate numbers and they go to science to learn about chemical processes. They can not and have not learned to bring things together for overall comprehension.

The personality of the students will develop by learning about the circumstances of another culture. They will gain empathy, compassion and humanity. By exposing them to this type of tragedy I hope students will be more interested community outreach and disease research.

The students' academic knowledge will be increased greatly due to the integration of other subject areas. They will be exposed to more reading, history, art, and math than they normally would be. Their study will allow them to build a stronger foundation of basic knowledge while delving deeper into area they may never have been exposed to.

The students will directly develop several academic skills from this unit. They will learn graphing techniques, reading strategies, and cooperative learning skills. They will also develop metacognitive skills. They will be

able to analyze and question their own methods of learning and thinking. They will be able to choose reading and learning strategies that best suit their style of learning.

This curriculum unit will address the Sunshine State Standards that are used by Duval County Public Schools. After completing the unit the students will be able to evaluate how populations of organisms can influence other populations of organisms. The students will examine the effects of limiting factors such as food and disease. They will explain the relationship between organisms and their habitats on both a local and global scale. Students will also analyze activities of humans and other organisms that lower productivity, reduce fertility, alter the flow of energy, and reduce the carrying capacity of an ecosystem.

Students will select and use pre-reading strategies that are appropriate to the text. They will select and use strategies to understand words and texts, and to make and confirm inferences from what is read, including interpreting diagrams, graphs, and statistical illustrations. They will apply a variety of response strategies, including rereading, not taking, summarizing, outlining, writing a formal report, and relating what is read to his or her own experiences and feelings.

The students will locate, gather, analyze, and evaluate written information for a variety of purposes, including research projects, real-world tasks, and self-improvement. They will select and use appropriate study and research skills and tools according to the type of information being gathered or organized, including almanacs, government publications, microfiche, news source, and information services. They will synthesize information from multiple sources to draw conclusions.

The students will understand how cultural and technological characteristics can link or divide regions. They will understand how social, cultural, economic, and environmental factors contribute to the dynamic nature of regions. They will understand past and present trends in human migration and cultural interaction and their impact on physical and human systems. They will understand the relationship between resources and the exploration, colonization, and settlement of different regions of the world.

The student will describe, analyze, and generalize relationships, patterns, and functions using words, symbols, variables, tables, and graphs. They will represent real-world problem situations using finite graphs, matrices, sequences, series, and recursive relationships.

Strategies

This curriculum unit will be taught using reading and comprehension strategies, discussion, and lecture formats. The students will use K.W.L. (What I know, What I want to know, What I have learned) chart and an anticipation guide initially to assess prior knowledge and curiosity. They will be asked about populations and Early Mexican Peoples.

The students will be given a reading assignment about the early Mesoamericans. They will use various reading strategies in order to increase comprehension of the reading. As a class the reading will be discussed and cooperative learning activities will be a focus. A timeline of events will be constructed, including population estimates to illustrate population losses.

Population dynamics will be discussed in relation to the Aztec in identifying the limiting factors of their

environment. Students will be asked to inquire about the types of disease that they may not have immunity to and which ones might decimate our current North American population. Students will discuss the invasive species of Mesoamerica and suggest invasive species currently in our country.

Students will be required to keep a journal. They will respond daily to various questions that direct them to metacognitive thinking. This will allow them better comprehension of the concepts involved. A final formal assessment will be given at the end of the unit.

Lesson Plans

Day One

The objective of this activity is to introduce the students to the history of Mesoamerica and the Aztec people. First the student will complete a K.W.L. chart (What I know, What I want to know, What I have learned). After discussing the K.W.L. an initial anticipation guide will be used as a pre-reading strategy. The anticipation guide is a brief set of questions that activates a student's prior knowledge and allows them to make predictions. Students will be asked several questions with agree or disagree answer. The following list of questions can be used to start the activity.

1. It is okay to take property or belongings from other people. Agree/Disagree
2. The Indian population that existed in Mexico when Columbus arrived was small. Agree/Disagree
3. The Indian population that existed in Mexico when Columbus arrived was uncivilized and undeveloped. Agree/Disagree
4. The Aztecs disappeared due to war and Spanish conquest. Agree/Disagree
5. The Aztecs were affected by European diseases. Agree/Disagree

After completing the anticipation guide the student will begin reading sections of *The Broken Spears* by Miguel Leon-Portilla. While reading these passages the students will complete double-entry journals. Students will take notes on the reading in two columns with a line drawn down the middle of the page. In the left column they will summarize important ideas from the reading. In the right column they will write their own thoughts and responses. These may be questions, personal feelings or reactions, or reflection on what the information means.

First read aloud through the initial section of reading. On the overhead, model for the students how to distinguish between major and minor details and restating them in your own words in the left column. Then, while thinking aloud, discuss why you chose that particular item and write it down in the right column along with other responses and questions.

On the next passage, allow the students to practice this type of thinking and note taking on their own. Once they are finished, discuss their results and any questions they may have. The final reading will be done at home. The students will complete some double-entry note taking as they read on their own.

Day Two

Begin the lesson by reviewing the double-entry note taking assignment from the previous night. Answer any

questions and discuss any comments the students may have. After the review direct the students to complete a sketching my way through the text activity.

In this activity the students will draw simple pictures or diagrams to conceptualize the ideas from the previous day and nights readings. Set the students in groups of three for cooperative learning. Each group should be given a large sheet of chart paper and colored pencils, crayons or markers. They will work together to sketch out their representations of the text. Allow the student's time to finish their sketches. Once they have finished, each group will present their drawings and discuss their thoughts and reasoning behind the pictures they drew and their comprehension of the readings.

Day Three

This lesson will begin to introduce the concepts of population dynamics and limiting factors. Two column notes will be used to furnish the students with new vocabulary and concepts.

Two column notes are set up similar to double entry notes. Students will take notes on the concepts and vocabulary in two columns with a line drawn down the middle of the page. In the left column they will write the major concept or vocabulary word. In the right column the students will write details about the concept or vocabulary word. A class discussion will be facilitated as the students are recording their information and questions and comments will be discussed. After the students finish with their note taking split them up into groups of three for cooperative learning.

The students will use the vocabulary words from their two-column notes to create a vocabulary tree. Give each group a large sheet of chart paper and colored pencils, crayons or markers. The vocabulary tree is a graphic tool that allows students to visually link words or ideas to illustrate their relationship. Ask each group to choose several words from their two column notes. They will then explore these words even deeper to pick up additional vocabulary and information. They will then draw a tree trunk on their chart paper for each word they chose. They will write their word near the bottom of the trunk. As they read through their text for additional information, they will add this information to their trunk by adding branches to the trunk. The branches they add may also have branches of their own. Once they have finished, each group will present their trees to the class. They will discuss their main words and the information they have added to their trunk along with the reasoning behind the addition.

Day Four

This activity will introduce the students to graphing exercises. Student will be shown different graphs of populations. They will illustrate various age structures of populations, carrying capacity and population decline.

After showing the students various graphs and explaining and discussing the concepts that they illustrate, model for the students how to set up and complete different graphs. Split the students up into groups of three for cooperative learning. Give each group a large sheet of chart paper and colored pencils, crayons or markers. Each group will be given two word problems that illustrate different concepts shown in the graphs. Each group will work out the problems and graph them on their chart paper. Once they have finished, each group will present their graphs to the class. They will explain their word problems and their problem solving methods.

Day Five

The students will work to solidify the information from the past four lessons in class during this activity. Split the students up into groups of three for cooperative learning. They will be participating in a review board game, 'Epidemic'.

Students will be provided with some initial background review information such as, in 1519 Hernan Cortez lands near Vera Cruz; in 1519 through 1521 there was an outbreak of smallpox with a 33-50% mortality rate; in 1531 through 1534 there was an outbreak of measles with a 25-30% mortality rate; in 1503 malaria was brought to Jamaica; non-native species were introduced to the new world and there was general ecological degradation of the environment.

After the background information is presented explain the setup and rules of the game. Students will be in groups of three and each group will represent a subset or outlying settlement of the Aztec empire. Each person in the group will start with a population of one hundred Aztecs. The student in the group who finishes the game with the most Aztec survivors is declared the winner.

Each group will be given certain materials for play. These include a game board, pawns to act as place holders on the playing board, and a coin to flip with heads directing the student to move one place and tails directing the student to move two places. They will also be given playing cards that instruct whether or not to add or subtract member of their populations. The following list of instruction can be used for the game.

- Measles outbreak in population — subtract 1 Indian for every 4
- Hernan Cortés arrives in Aztec Tenochtitlan, he kills and enslaves Indians - subtract 1 Indian for every 7
- Aztec uprising - subtract 1 Indian for every 10
- Noche Triste — subtract 1 Indian for every 10
- Cortés surrounded the Aztec capital and cut off supplies — subtract 2 Indians for every 10
- Water supply tainted by rotting corpses — subtract 1 Indian for every 10
- Measles outbreak in population - subtract 3 Indians for every 10
- Measles outbreak in population - subtract 3 Indians for every 10
- Wild Spanish dogs ravage village — subtract 2 Indians for every 10
- Maize crops have plentiful harvest — add 2 Indian for every 10
- Spanish cows eat your crops — subtract 2 Indians for every 10
- Cassava crops plentiful — add 2 Indians for every 10
- Spanish force you to grow wheat, no harvest of your own — subtract 2 Indians for every 10
- Develop dysentery — subtract 1 Indian for every 10
- Find Spanish pigs that wandered off — add 2 Indians for every 10
- Malaria outbreak in population — subtract 2 Indians for every 10
- Find deserted Spanish melon field — add 1 Indians for every 10

As the students play they will record their population numbers in a chart provided. This chart allows them to add and subtract their population and keep track of their numbers. These numbers will be graphed to illustrate the population decline that the Aztec people suffered. Each turn will be recorded as a one year interval starting with 1492. The population numbers will be placed on the chart to calculate survivors.

The students will graph population numbers versus year. The population will be represented on the 'Y' axis and the year will be represented on the 'X' axis. The graph will be titled "Population of the Aztec people versus year".

Student Reading List

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Materials

Chart paper

Crayons

Colored pencil

Markers

Tape

Overhead Projector

Transparency paper

White board or Chalk board

White board markers or chalk

Laminated game board

Coins

Pawns

Playing cards or index cards

Graph paper

Sunshine State Standards

SC.G.1.4.1 The student knows of the great diversity and interdependence of living things

SC.D.2.4.1 The student understands the interconnectedness of the systems on Earth and the quality of life.

SC.G.2.4.4 The student knows that the world ecosystems are shaped primarily by physical factors that limit their productivity.

SC.G.2.4.5 The student understands that the amount of life any environment can support is limited and that human activities can change the flow of energy and reduce the fertility of the Earth.

SC.G.2.4.6 The student knows the ways in which humans today are placing their environmental support systems at risk.

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