



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2007 Volume IV: The Science of Natural Disasters

Myths and Legends on Natural Disasters: Making Sense of Our World

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It is useful to be assured that the heavings of the Earth are not the work of angry deities. These phenomena have causes all their own.

- Lucius Annaeus Seneca, c. 63 C.E., *Natural Quaestiones*, from p.151 in Abbott, 2004

It seems that nowadays more than ever we continue to read about natural disasters affecting diverse cultures all over the globe. It is difficult to go for a day without reading about some natural disaster affecting one or another part of the world. From flash floods, to earthquakes, to severe weather and droughts, natural disasters affect all nations directly or indirectly. These natural disasters are said to be the direct consequences of human's effects on the environment. Factors such as human sprawl, the over-exploitation of natural resources, pollution, overpopulation, etc.; are considered to be explanations as to why these natural disasters occur and why they have such dire consequences. But, is this accurate and how have these disasters been explained throughout the ages?

Objectives

This unit explores content concepts related to the scientific and non-scientific reasons as to why and how natural disasters originate. Additionally, it looks at the way that throughout the ages, different cultures have attempted to explain why these disasters take place. Furthermore, this unit is written with the second language learner in mind. Although, I often will refer to the students as English Language Learners (ELLs), unless otherwise mentioned, this term will be inclusive of all language learners and thus will refer to all second language learners. Thus, the English speaker learning Spanish in a dual language, a structured immersion program, or in a bilingual program, is at the heart of the lessons and strategies here presented. In addition, the unit is an exercise in integrating the national TESOL (Teaching of English to Speakers of Other Languages) standards and the different content standards in social studies, and science.

The goal of this unit is to provide the classroom teacher with some model activities that integrate the TESOL and content standards in the four language domains of listening, speaking, reading and writing, as the

students explore the theme of natural disasters and related myths. Students then are asked to explore some first hand and second hand accounts of major natural disasters affecting the New England states such as the hurricane of 1938, the blizzard of 1888, or the year without a summer (1816).

In order to accomplish this, students will participate in a series of activities allowing them to:

- 1 Differentiate between scientific and non-scientific rationales to natural disasters
- 2 Study and compare the scientific and legend or myth of a natural disaster
- 3 Observe how natural disasters affect life cycles, habitats, and ecosystems
- 4 Recognize relationships between events and people of the past and present circumstances, concerns, and developments
- 5 Locate the events, peoples, and places they have studied in time and place (e.g., on a timeline and a map) relative to their own location
- 6 Gather information from multiple sources, including archives or electronic databases, to have experience with historical sources and to appreciate the need for multiple perspectives

Key Concepts

The following is a list of the key concepts that are targeted throughout the unit and in the lesson activities.

- 1 Earth is an active planet fueled by various energy sources
- 2 Energy is derived from Earth's interior, the Sun, and impacts with comets and asteroids
- 3 The study and movement and interactions of the lithosphere plates (plate tectonics) helps us understand the origins of mountains, volcanoes, and earth movements
- 4 Natural disasters are fatal when humans get in the way of Earth's processes
- 5 Natural laws are uniform through time and space: the present is the key to the past
- 6 Humans throughout the ages search for explanations to life's events
- 7 Humans have direct and indirect effects on our environment and habitat that affect some naturally occurring events
- 8 Humans interact with life's events in time and space, shaping our past, present and future

Introduction

What is the definition of a natural disaster? What is the relationship between Earth's workings and natural disasters? What are the direct and indirect environmental, economic, and human impacts of these severe weather and dynamic patterns on habitats and ecosystems? How have we explained through the ages the effects that natural disasters have on communities and society? How did these events affect the lives of people and how have they shaped our present? These are some of the central questions that frame this curricular unit.

Since the dawn of mankind, humans have looked for explanations of natural phenomena that they are unable to understand. There are many one myths related to the creation of the world. Otherwise called cosmic architecture that will be studied and will represent a stepping-stone to the study of the scientific understanding on how natural disasters originate. The Greek philosopher Aristotle (354-322) defined the material world as composed of four elements: earth, water, fire, and air and four properties of matter: heat, cold, humidity, and dryness. At the same time, myths and legends explained how these elements are created and how they affect our lives.

I explore the following natural disasters and myths and legends related to:

- 1 Hurricanes and Nor'easters
- 2 Tornadoes, thunderstorms, and floods
- 3 Earthquakes and tsunami
- 4 Volcanoes

Earthquakes, volcanoes, and tsunami

In order to understand the origins of earthquakes, volcanoes, and tsunami, one needs to understand the role that the tectonic cycle plays in Earth's recycling of the outer layers. The Earth is composed of different density layers; a solid metallic inner core surrounded by a liquid outer core, and mantle core composed of heavy rock. This mantle core is composed of the asthenosphere layer (a weak solid), the lithosphere (a strong solid), oceanic crust (low-density rock), and a hydrosphere (liquid) layer. Above the crust, we have the atmosphere composed of gases. In order to visualize the way that plate tectonics works, and the different layers that make up the Earth, the metaphor of a hard-boiled egg is a useful one. The Earth's core is the yolk, the rest of the egg is the mantle, composed of the shell (lithosphere), the slippery inner lining (asthenosphere), and the egg white (Abbott, 2004).

In the tectonic cycle, melted asthenosphere flows upward as magma, and solidifies to make up the ocean floor

or lithosphere. The tectonic cycle can be described as the recycling of the upper layers of the Earth (asthenosphere, lithosphere, and the oceanic or continental crust). Through seafloor spreading, this new lithosphere moves sideways from the oceanic crust on top of the asthenosphere. When two separate slabs of oceanic lithosphere collide (depending on the age, temperature, and density of the slabs), can either turn downward into the asthenosphere (subduction) where it is reabsorbed into the mantle, or if the layer is less dense the slab can override it.

Most everyone is familiar with the concept of plate tectonics, the study and movement and interactions of the lithosphere plates. But what is the role that these plates play in the formation of mountains, volcanoes, and earth movements (earthquakes)? Because of the seafloor spreading, these lithosphere plates can either pull apart at divergent zones, slide past each other at transform faults, or collide with each other at convergent zones, Each of these processes account for the different types of earthquakes, mountain formations, and volcanoes.

Most of the earthquakes and volcanoes can be explained in terms of plate tectonics. The lithosphere is broken down into different plates that depending on whether they collide, move away, or go past each other, generate different types of earthquakes. When the plates pull-apart, they cause the rock to fail and smaller earthquakes take place. These earthquakes do not tend to pose great threat to humans. When the plates move past each other in horizontal movements, also called transform faults, larger earthquakes are a consequence of the irregularity in the plate boundaries. It is where two plates converge that the most serious earthquakes originate. These usually occur at subduction zones where one of the plates is pushed back into the mantle releasing incredible amounts of energy that can produce catastrophic earthquakes.

Earthquakes

Most earthquakes originate along fault lines. A fault is referred to a fracture or a crack in the Earth's layers. There are three different types of faults: dip-slip, strike-slip, and transform. There are two separate kinds of dip-slip faults depending on whether the fracture in a vertical direction by the plates pulling apart (extensional or normal faults); or whether the fracture is in a vertical direction but the rock layers are pushed together (reverse fault). If instead the movement along the fault is horizontal, where the motion of the two plates is in opposite directions, these faults are referred as strike-slip faults. The most famous of these faults is in San Andreas, California. Finally, transform faults are a special type of horizontal fault movement that occurs along the sides of two plates. A fault can be described as strike-slip and as a transform fault.

In order to understand the earthquake history of a region, it is necessary to know what the plate-tectonic history of the regions is. Most often, when describing earthquakes as natural disasters, it is the conjunction of multiple factors such as the type of tectonic-fault, the resonance between seismic waves, the intensity, the sediment foundation, population density, and building design, that influence the intensity and damage they can produce.

Some of the most known earthquakes that have occurred throughout history include Santorini, 1628 B.C.E.; Vesuvius, 79 C.E.; Tambora, 1815; Krakatau, 1883; Mount St. Helens, 1980; and Pinatubo, 1991. Each of them have the same commonality in the destruction and devastation they left behind, reminding us that the forces of nature are in constant motion, and that have direct and indirect effects both in those locations and across the different regions of the Earth.

Volcanoes

The process by which a volcano is formed can simply be described as melted rock that erupts to the surface of the earth. The relation between plate tectonics and volcanoes is a direct one, in that 80 percent of volcanism takes place at the centers of two plates separating. These eruptions tend to be peaceful as compared to those volcanoes originating in subductions zones, which involve magma rich in crustal rock and gas-rich magma producing some of the most explosive and devastating volcanoes. There is little or no volcanism associated with transform faults.

The process by which rock melts and becomes magma due to increase temperature, decreased pressure and water content affect the way that a volcano will erupt. The most important volcanic materials include lava, pyroclastic debris, and glass. In order to understand the different eruption styles, as well as the volcanic landforms, one needs to take into account the three V's (viscosity, volatility, and volume). Depending on the levels of viscosity, volatiles, and volume (from low to high) the different volcanic landforms originating are shield volcanoes, flood basalts, scoria cones, stratovolcanoes, lava domes, and calderas. The size of a volcanic eruption is measured by the volcanic explosivity index (VEI) ranging on a scale from 0 to 8.

Although New England is not a prone area to earthquakes or volcanoes, students might be curious to find out that earthquakes do indeed occur in our area. Some of them significant in the intensity and damaged produced. The most severe earthquake in Connecticut took place in East Hadam on May 16, 1791. A great resource to find out the date, location, and intensity of the most recent earthquakes worldwide, including New England, can be located in the U.S. Geological Survey web page (see Teacher Resources).

Tsunami

Another type of natural disaster that is associated with plate tectonics is "tidal waves" or tsunami. In Japanese, the literal definition of "tsunami" is "harbor crossing wave". "Tsu" means either "ferry crossing" or "harbor crossing" and "nami" means wave. The origin of the meaning of the word tsunami is related to the fact that fishermen thought that these types of waves only occurred in the harbors. The rationale is that a tsunami at deep sea may cause little or not visible effect but when the fisherman arrived back to their harbors they would encounter the devastation of their villages and harbors.

A tsunami is a series of waves generated by the sudden rapid displacement of a body of water due to earthquakes, landslides, volcanic eruptions, or meteorite impacts. Like volcanoes and earthquakes, the most devastating tsunami originate in the subduction zones where one of the plates is pushed back into the mantle releasing incredible amounts of energy. The most common cause is an undersea earthquake. The most devastating tsunami to date has its origin in the December 26, 2004 Indian Ocean Earthquake. At a 9.15 magnitude, this earthquake started a series of tsunami that killed over 230,000 people ranging in distance from the proximity of the earthquake in Indonesia, Thailand, and the northwestern Malaysia, to as far as Somalia, Kenya, and Tanzania in eastern Africa.

Severe weather: hurricanes, tornadoes, nor'easters, thunderstorms and floods

Unlike volcanoes, earthquakes, or tsunamis, that originates from the movement of plates or as a consequence of fault movement, severe weather produce natural disasters originating from giant storms, thunder storms, flashfloods, tornadoes, or lighting. The number of casualties from natural disasters that are accounted for by severe weather is 75 percent of the yearly deaths and damages (Abbott, 2004). The most severe weather is located in the mid-latitudes, given they are the transfer zones between the equatorial and polar air masses.

In order to understand natural disasters that relate to severe weather, one needs to understand the way that mid-latitude cyclones (low pressure), anticyclones (high pressure) and the effects that the jet stream has on these, depending of the season of the year, including factors such as Earth's rotation, atmospheric heating, global wind pattern, Coriolis effect, air masses, fronts, and rotating air bodies.

Due to the Earth's rotation, air and water masses deflect to the right in the northern hemisphere and to the left in the southern hemisphere. This is called the Coriolis effect. The jet stream deflects around this low and high pressures enhancing cyclonic and anticyclonic flow. An anticyclone is a clockwise rotating air mass associated with a dry air mass that descends down its core evaporating moisture from below.

Most severe weather occurs along fronts; boundaries where areas of different air masses collide varying in temperature and water vapor content. These rotating air masses produce severe weather in the form of thunderstorms, tornadoes, and hurricanes. A counterclockwise rotating air mass is referred as a cyclone. Because of its low-pressure core, winds flow inward, creating an updraft of raising air, which in cooling forms clouds and sometimes rain. A hurricane is a large tropical cyclone that can generate winds of over 150 mph by feeding moisture and heat to the eye that with the help of air updrafts, rise rapidly, condensing the water vapor, and thus increasing in intensity due to the release of heat in the process of convection.

Hurricanes begin as tropical disturbances, or low pressures poorly organized with weak surface winds. As this surface winds strengthen, they send warm moist air to the center of the cyclone, becoming more organized and change into a tropical depression. When surface winds are sustained at or exceeds 39 mph, it is a tropical storm. As the moist warm air raises and cools down when reaching its dew point, the water vapor condenses releasing latent heat causing stronger updrafts and increasing the amount of upward flow of more warm, moist air. If the sustained surface winds exceed 74 mph, the tropical storm is then characterized as a hurricane.

In the Indian Ocean, hurricanes are referred to as cyclones, while in the western Pacific Ocean they are typhoons. Regardless of the names of these low-pressure weather systems they all share the same characteristics in their formation. These cyclonic storms are dependent of warm seawater and can only originate in 5° to 20° latitude; which due to the Coriolis effect, allows for the air mass rotation to take place.

Among the most known hurricanes that have impacted the United States we of course must make mention of Katrina in August 29, 2005 as one of the most devastating and tragic events in recent U.S. history. Other notorious deadly hurricanes in order of the number of death include Galveston, Texas on September 8, 1900; South Florida-Lake Okechobee, Florida, on mid-September, 1928; Florida Keys/ Corpus Christi, Texas, on mid-September 1919, in New England on September 21, 1938 (Abbott, 2004). For first hand accounts of severe weather affecting the New England states, including hurricanes, Nor'easters, blizzards, and floods see Watson

(1990) and Caplovich (1987).

In the northeastern United States during the winter months, these mid-latitude cyclones can turn into nor'easters. As these cyclone storms move up the northeastern coastline, the counterclockwise circulation draws, in the west of the storm, the cold air from the north; while in the east draws the moisture from the Atlantic ocean feeding the moisture into the cyclone. As a consequence we have severe weather and what has been labeled as "white hurricanes", "blizzards", and "ice storms". A blizzard is defined as cyclonic storm system with sustained winds 35 miles per hour, accompanied by temperatures below 25° F, and visibility of less than a quarter mile. Among the most notorious winter storms we must include the blizzard of 1888, the "White Hurricane " between March 12 to 15, 1993; the January 6-8, 1996; and the Canadian ice storm of January 5-8, 1998.

Myths, Legends, and Folk Tales

In the process of making sense of the events that occur in our environment, different civilizations have looked for answers in religion and folklore. These are interpretations based on beliefs and not based on rigorous observations and descriptions of naturally occurring events.

One of the major goals of a science curriculum is that of encouraging children's natural curiosity to make observations of their environment so they can begin to make predictions as to why changes take place. In a sense, when we talk about myths, we talk about non-scientific interpretations as to why certain events occur. As such, they can be viewed as hypotheses, which need to be studied in order to ascertain if they pass the rigor of the scientific method.

A myth is a sacred story from the past, which is concerned with the powers that control the human world and the relationship between those powers and human beings (Rosenberg, 1997). Bierlein (1994) describes myth as the earliest form of science. A folk tale is a story which is pure fiction and which does not have a particular time or space. It is usually a symbolic way of presenting the way human beings cope with the world where they live. A legend is a story from the past about a historical individual. These stories are concerned with people, places, and events in history. Yet, the term myth has and is also used to mean "not true". For example, some of the myths about tsunami are that: a tsunami is a single wave, or that you can surf a tsunami. Although these

There are many myths and legends that explain natural phenomena related to natural disasters. These myths fall under the themes of cosmic disasters (the end of the world), the Great Flood, cyclical disasters, punishment of humanity, the doom of the gods, or cosmic fires. Of all the many myths relating to disasters, those related to the creation of the world, and of floods and storms are the most numerous ones. This is in part due to the fact that the theme of the flood is one of the most widespread myths, what Bierlein (1994) calls parallel myths because they occur across cultures and times. Thus, from stories like *Noah and the ark* , to the *Magic mould* (Verniero, 2001), these stories all explore the theme of destruction, and then the recreation of the Earth in one way or another (Please see Beirlein, (1994) for an extensive collection of creation, the earliest times, and flood myths from many different cultures).

Of all the cultures regarding cosmic disasters, the Aztec tradition is the most representative one. According to

the Aztec myth of the five suns, the world was destroyed four separate times in the struggle between gods. The first world was destroyed by jaguars, the second by a great hurricane, the third by fire, and the fourth by a flood. We are presently in the fifth world; predestined to be devastated by earthquakes (Willis, 1993). In the Hopi mythology, we are in the fourth world; the previous destroyed by fire, by ice (when Earth toppled on its axis), and by a flood, in that order (for an extensive discussion of these myths see Willis, 1993 and Bierlein, 1994).

In the Japanese tradition, the two youngest gods, Izanagi and Izanami create the first island, Onokoro, by trusting, on the mud floating everywhere, a spear given to them by August lord of Heaven. Once the island was formed, the spear began to rain water and the oceans were formed. After consummating their marriage, the myth explains how it is that Izanami gave birth to the rest of the islands that make up Japan. They continued the creation of the world after she gave birth to the gods of wind, rain, mountains, mist, streams, rivers and the seas (Verniero, 2001).

According to Tibetan folklore, the Earth is being sustained on its back by a giant frog. When it moves, or jumps in the water, it causes an earthquake. According to Bali tradition, it is a tortoise that carries Earth upon its shoulder, and that when it moves produces earthquakes. In the Polynesian tradition, it is Ruau-Moko, the youngest child of Papa, the Earth goddess, moving in the womb that causes earthquakes. The Chinchas of Peru have Mama Pacha as the Earth mother, often not only overseeing the planting and harvesting, but depicting her as dragon that is the originator of earthquakes (Lindemans, 1995). The Mayan god of earthquakes and mountains is Cabulkan.

There are also many myths and legends related to how mountain ranges were formed. In Chinese mythology, Pangu's body became the Earth, as we know it. Thus, from his head the mountains of the East were formed; from his stomach, grew the mountain of the Center; his left arm originated the mountain of the South, and the mountain of the North grew from his right arm; and it was from Pangu's feet that the mountain of the West originated. Even the constellations, stars, and the planets originated from his beard and his eyebrows respectively. The sun originated from his left eye, while the Earth grew out of his right eye. His voice emerged into thunder and lightning. The seas and rivers have their origin in Pangu's blood (Verniero, 2001).

Among the Native American tradition, the integration of myths related to mountain formation and volcanoes, it is of no surprise. Especially, when taking into account that in the history of many of the Northwest tribes still endures the memory of early accounts of eruptions of what is now called Mount St. Helen. For the Puyallup tribes, St. Helen with a symmetrical cone covered in perpetual snow is the body of Loowitlatkla ("Lady of fire"), is surrounded by Mount Hood (Wyeast mountain) and Mount Adams, who represent two brothers who admired so much the beauty of Loowit that after a long fight for her admiration caused the great chief Tyee Sahale to turn his two children into the respective mountains (VolcanoWorld, 2007).

The origin of the word hurricane is based in Taino mythology (Uracan) referring to the evil god who was the originator of sea storms. In the Mayan mythology, Hurakan (meaning one-legged) is the creator god of wind and storms. He lived in the mists over the primeval flood. Hurakan was believed to be the creator of the ancestors of the Mayan people, after he destroyed the previous inhabitants of Earth by sending floods to destroy them.

Strategies: Differentiated instruction and English Language Learners

As the United States population shifts from the increasing numbers of emigrants reaching our shores, so does the population we serve in the classroom. Like many other waves of emigrants, these new members to our communities bring a wide array of resources, specifically culture, language and lifetime experiences. However, they also represent multiple challenges for the school communities where they settle down. Among the unique challenges to classroom teachers is the need to make the age appropriate curriculum accessible because of the lack of language. In order to do so, teachers need to pay specific attention to their linguistic and academic needs. As part of this challenge it is important for the teacher to understand that in order for ELLs to attain age-appropriate English literacy, they must develop within the four language domains: listening, speaking, reading, and writing. It is through the development in each of these domains that ELLs are able to build-up the necessary literacy skills needed to achieve academically and reach on par with their monolingual English peers. For this to happen, these second language learners must make more than a year's progress for each school year in attendance.

As an instructional coach working with classroom practitioners and students, I am always looking for ways of integrating the four language domains into challenging age appropriate classroom activities that differentiate the linguistic and academic needs of the students.

These multiple challenges, in meeting the linguistic and academic needs of the ELLs are significantly different than those challenges exhibited by monolingual students. Although, many of the strategies that differentiate the linguistic needs of ELLs are good effective practices for all students, they are necessary and essential in working with linguistic minority students.

Research-based Instructional Strategies

Marzano, Pickering, and Pollock (2001) conducted an extensive review of the literature and explored nine categories of research-based instructional strategies that show significant student achievement outcomes. Under the category of identifying similarities and differences, are included the strategies of comparing, classifying, metaphors, and analogies. Hill & Flynn (2006) expand on these strategies and explore how these strategies can be better implemented in working with ELLs.

In dealing with such abstracts concepts as the Earth's history, as well as high-level scientific concepts, it is important to use familiar contexts that students can relate to. It is through metaphors and analogies that students can be able to better understand the concepts of time. In order to contextualize and make more comprehensible the abstract concept of Earth's history, Calder in Abbott (2004) uses the analogy of Earth as a forty-six year old woman. In this metaphor, millions of years of evolution and of the Earth's history are narrowed down to something concrete and more tangible. In this metaphor, each 100 million years of Earth's history is equivalent to a year in the woman's age. Thus, most of we know about Earth would have taken place in the past six years of her life. It was not until she turned 42 that the continents had little life and plants did not appear on the Earth until she become 45 years old. Dinosaurs become extinct eight months ago; and it was only in the middle of last week that some ape ancestors evolved into human ancestors. Twenty-four hours ago Homo sapiens begun to hunt other animals, and in the last hour humans settled down and discovered agriculture. Fifteen minutes ago Moses leads his people to safety, five minutes later Christ was preaching, and in the last minute the Industrial Revolution begun.

The analogy of an egg previously examined, is another clear example on how we can facilitate comprehension of abstract concepts to explain the different Earth's layers and plate tectonics concepts.

Furthermore, another clear example of this effective strategy is the analogy of the rate at which human fingernails grow in trying to understand the rate at which the tectonic plate movements take place and the concept that repeated small changes (e.g., from earthquake related movements) occurring for great lengths of time will create Earth's features such as mountains.

Another category of research-based strategies is that of non-linguistic representations. We store knowledge in two different ways: linguistically, and non-linguistically. We can think of linguistic knowledge as actual sentences stored in long-term memory. Nonlinguistic knowledge is presented in terms of mental pictures or physical sensations. The use of both linguistic and nonlinguistic representations of concepts, allows the students to recall and think about information. Although this is important for all the students, it is necessary for ELLs in that they are still developing their second language and therefore presenting information linguistically will not make the knowledge easily accessible. The use of charts, graphs, and diagrams complement the narrative and present the basic key concepts both linguistically and non-linguistically. Thus, many of the electronic, teacher, and student's resources, listed in the reference section, offer many figures and diagrams to visualize these concepts, which in combination with the metaphors and analogies, will make the content more comprehensible.

As part of the strategies in scaffolding knowledge, the use of before and after pictures, will act as a 'hook' at the same time that will make tangible for our students the forces of nature in our physical environment. It has been said that a picture is a worth thousand words. In attempting to describe the devastation following a natural disaster, words cannot do justice to the chaos and horror of lost communities. Often, all that is left is an altered and often unrecognizable desolated community. However, a picture can hardly describe the human feelings of loss or pain caused as a consequence of the natural disaster. It is for this reason that first-hand accounts are so important to give us a more complete sense of the long lasting consequences of natural disasters. Special attention is needed when presenting the material so that neither the accounts nor the pictures are so disturbing that will cause unnecessary anxiety or stress to our students.

However, it is through before and after pictures that the students can observe what are the consequences to the physical environment at the same time they catch their attention. It is through first-hand accounts that we begin to feel what it means to be engulfed by the direct and indirect consequences of a natural disaster.

Sample Lessons

The following sample lessons include the key elements in the design of a standards-based performance task with second language learners as the targeted population. These lessons take into account the language acquisition stages across the four language modalities of writing, speaking, listening, and reading. Thus, these lessons ensure that in order to perform the tasks they need to use the four modalities, Through the use of differentiating instruction strategies and materials the complete range of language stages can be targeted.

The key elements in the design follow the SQUARE acronym: Standards, Questions, Unwrapped, Application, Resources, and Evidence (Ainsworth, 2003). In other words, when we are designing a standards-based

performance task we need to ask: what are the standards and indicators the tasks will target?; what are the essential questions that the tasks address?; what is the unwrapped content and skill that the tasks will develop?; what application of learning does the task will require?; what instruction, information , and resources do the students need first to perform the task?, and what is the individual evidence of learning that the task will provide?

Special attention needs to be placed on vocabulary introduction. For example, when students are asked to read the definition of what a disaster is, the students need to be familiar with the vocabulary associated to the definition. There are many effective ways of presenting students with new vocabulary but having students look at the definition in the dictionary is not one of them. It is much more effective to provide the students with a simple definition of the word, followed by the word in context, proceeded with samples of what it is and what is not. Finally, the students can create one or multiple nonlinguistic representations of the definition in order to either connect it to some prior term or to a personal experience. Appendix A includes and organizer that can be used to introduce new vocabulary or expand in the depth and breath of its meaning. For example, the definition of disaster according to the Merriam Webster is:

An event that causes serious loss, destruction, hardship, unhappiness or death

As simple as definition might appear to the native English speaker, special attention needs to be taken in the way that the vocabulary is introduced. The teacher needs to consider polysemous or multiple-meaning words and introduce them accordingly (depth of vocabulary). Students might have a meaning of the word disaster (You are such a disaster!), but not the depth of its meaning. By providing the students with a definition in "kid's language" such as something (an event) that happens that results in loss, damage, suffering, sadness, or death, they will be able to grasp its meaning.

It is important to know that the use of the second language is highly encouraged given the time it can take to introduce and present new vocabulary. Thus, sometimes, simply translating the word to their first language allows the students to only have to acquire the label in their second language (if they already understand the concept), while other times both the concept and label will have to be directly taught. It is in teaching these words that the teacher must explicitly follow the process above mentioned. I list at least one electronic reference resource that students and teachers can access to check and hear the word's pronunciation. Other electronic resources include WeatherEye, a glossary if content related to winter weather terms (KGAN, 2005).

The big idea

Our Earth is in an active planet that is in continuous motion. As such, the Earth's natural ongoing processes release incredible amounts of energy that affect its interior as well as exterior. It is when humans get in the way of these processes that natural disasters are fatal, and produce numerous financial and tragic consequences.

Throughout the history of mankind, humans have attempted to make sense of their environment and Earth's processes. Therefore, different cultures have attempted to explain natural forces by means close to their understanding. Thus, the origin of myths and legends was based in those interpretations. Continuous scientific progress has brought us closer to the understanding of how natural forces are part of Earth's and the

Universe's ongoing processes.

In order to understand the role that these natural processes affect Earth and our environment, we need to study how the universe was formed and how, as if were a living organism, the Earth is changing and in constant evolution causing natural disasters that are part of a normal process.

Essential investigative questions

What are the similarities and differences between manmade and natural disasters?

How have different cultures explained the onset of natural disasters throughout history?

In what direct and indirect ways do natural disasters affect our society?

Can we control nature?

Materials and resources

Computer, pencil, dictionary, writing paper, list of websites (see Electronic Resources), flip chart, different myths and legends, vocabulary worksheet

Performance Task I - Manmade disasters versus natural disasters

Standards- See Appendix A

Essential question

What are the similarities and differences between manmade and natural disasters?

Application

Students will create a list of manmade and natural disasters.

Students will classify disasters according to whether they are natural or manmade.

Students will compare and contrast similarities and differences between natural and manmade disasters.

Students will write a paragraph and share it orally with a partner.

Instruction, information and Resources

Instruction- Definition of what a disaster is. How to create and use a comparison matrix

Information- Students will need to know the definition of what a disaster is and the difference between a manmade and a natural one.

Resources- The student will be provided with sentence starters to complete a paragraph comparing manmade

and natural disasters, a vocabulary log, and a rubric.

Evidence- Students will create their own paragraph using the class comparison matrix, the groups list, and the sentence starters to compare and contrast similarities and differences between manmade and natural disasters, They will present orally their paragraph, create a vocabulary log with the word 'disaster' and self assess their work.

Procedure

In order to activate prior knowledge regarding disasters, students, in cooperative groups, students read the definition of disaster written on the blackboard and brainstorm all the types of disasters that they can think of and that meet this definition. Some of these events could be: lots of homework, cleaning the house, a tree falls on the house, war, etc.

After the five-minute brainstorm, each group shares with the class. The teacher, or a student, writes down the group responses on chart paper in order to create a class list. Then the groups are given three minutes to include any other disaster they did not have as part of their group list. The teacher then introduces the modifier of 'manmade' and "natural" disasters asking for one example of each in the class list. Next, the students, in groups, are asked to classify their list according to whether they are manmade or natural disasters. After, as a class, a comparison matrix is created with the following headings:

Disaster | Manmade | Natural | Both | Neither

In the next step, the essential investigative question is read aloud and individually students are asked to complete the following sentence starters using the class comparison matrix in order to write a paragraph:

Manmade disasters versus natural disasters

. . . is an example of a manmade disaster. . . . is a manmade disaster because. . .

. . . is an example of a natural disaster. . . . is a natural disaster because. . .

One of the similarities between a manmade and a natural disaster is. . . because. . .

One of the differences between a manmade and a natural disaster is. . . because. . .

The following could be an example of a paragraph using the sentence starters:

A car crash is an example of a manmade disaster. A car crash is an example of a manmade disaster because nature is not a cause of the accident. An earthquake is an example of a natural disaster. An earthquake is an example of a natural disaster because its origin is due to the movement of tectonic plates. One of the similarities between a manmade disaster (a car crash) and a natural disaster (an earthquake) is that both can cause destruction. One of the differences between a manmade disaster (a car crash) and a natural disaster (an earthquake) is that the number of people affected is fewer.

Students are then paired and are asked to share their writing with their partner.

Finally, the students self assess their performance through the use of the rubric on Appendix C.

Performance Task II - Interpretations of natural disasters

Standards: See Appendix A.

Essential question: How have different cultures explained the onset of natural disasters throughout history?

Application

Students will offer their point of view on five different statements related to disasters.

Students will listen to some interpretations of natural disasters from various cultures and different periods.

Students will search at least two websites looking for the scientific explanation for natural disasters associated with earthquakes, volcanoes, tsunamis, or severe weather.

Students will write their own myth or legend regarding the natural disaster of their choice.

Instruction, information and Resources

Instruction- The teacher will define what a myth and a legend are. Then, he/she will relate some of the myths associated with some of the natural disasters from Task I. The teacher will follow up with a brief overview of the scientific model of enquiry and explain how scientists have and continue to search for evidence and explanations of natural phenomena.

Information- Students will need to know how to locate the websites.

Resources- The student will be provided with a list of different model myths and legends, access to a computer, a list of websites, and a rubric to follow as a guideline and assessment tool (please see teacher, student, and electronic resources at the end of this unit).

Evidence- Students will write their own myths or legends of a natural disaster. Then, they will include a list of at least two separate websites visited detailing the scientific explanation regarding the natural disaster of their choice. Students will present orally their myth to the rest of the class, and will include a list of the resources used, and a copy of their self-assessment.

Procedure

The teacher begins by going over the class comparison matrix from Task I, reviewing the differences and similarities of manmade and natural disasters. Followed by an overview of this lesson on how they are going to hear some myths and legends (non-scientific explanations of natural phenomena), create their own myth, and then look for the scientific explanation of the natural disaster by searching a couple of websites.

In order to begin the activity, the teacher will give each student a copy of the Points of View activity in Appendix B. The teacher reads the statements and clarifies any questions regarding the statements. Students individually will be asked to rate each statement from strongly-disagree (1) to strongly-agree (10). After the students have rated each statement, students will be given a list of sentence starters to help them express an opinion regarding each statement, to agree or disagree, rephrase someone else's point of view, or ask a clarification question (In my opinion, I .,.; I think that. . .; Do you really agree that. . .?; As far as I'm concerned.

. .; Why do you disagree with. . .?). Next, students are asked to find a partner, and discuss their point of view in regards to one of the statements using the sentence starters, Once each individual has had an opportunity to express their point of view, they look for a different partner and repeat the activity three different times.

While the students are conversing, the teacher is listening for the most common mistakes made and write these on the board. The teacher will create different sentence starters or give examples of grammatically correct sentences based on the most common conversation mistakes. Then, as a class, go through each point and have students explain points of view.

The teacher, proceeds telling the students that they are going to listen to a couple of myths and legends from past and present cultures that try to make sense of how or why some natural disasters take place and how they might agree or disagree with them. The teacher will emphasize that these are non-scientific interpretations of natural occurring events and that it is their task to search for the scientific explanations and interpretation to a disaster of their own choosing.

In the next step, the essential investigative question is read aloud and individually students are asked to select a natural disaster to create a myth and then research. Students are then paired and are asked to help each other in creating their own myth. Finally, the students self assess their performance.

Performance Task III - Consequences of natural disasters

Standards- See Appendix A

Essential question

In what direct and indirect ways do natural disasters affect our society?

Application

Students will create a list of direct and indirect ways that the natural disaster of their choosing affects society.

Students will select a role and write to a specified audience on the topic and format specified (RAFT activity).

Students will share their work with a partner and then present to a small group.

Instruction, information and Resources

Instruction- Show models how to write a persuasive essay in the format of an advice column, a note, a formal request, letter, or a plea.

Information- Identify a role, the audience, the format, and topic of the presentation based on the natural disaster researched on Task II.

Resources- Model samples of an advice column, a note, a formal request, letters and pleas.

Evidence- Students will produce a written sample following the specified format in the assigned topic.

Procedure

The teacher reviews the work done in tasks I and II and asks for voluntary students to read their myth and research paper regarding the natural disaster of their choice. Next, the teacher explains that in today's class they are going to role play and use what they have learned so far to create a writing piece. The teacher presents different samples of the format outcomes and explains how they need to choose a role and its corresponding audience.

In the next step, the essential investigative question is read aloud and individually students are asked to complete the RAFT activity in Appendix B. Students are then paired and are asked to share their role with a partner and brainstorm. Next, small groups are formed and each individual explains the role they are playing, who their audience is, and what is their topic. In turn, students proceed to read their work to the small group until everyone has had time to share. Students will be able to ask questions once the student sharing has completed reading their work. Finally, the students self assess their performance.

Performance Task IV - Web Quest

There are all types of strange weather around our Earth. Here you have a Web Quest that will bring you closer to finding about different unusual weather related phenomena. The purpose of this activity is for you to find out what each of these weather phenomena is and for you to categorize the terms according to weather they relate to severe weather, tornadoes, hurricanes, volcanoes, manmade versus natural, etc.

- 1 You are already familiar with snow, sleet, and frozen rain, but what is "rime ice"?
- 2 Can you name at least five different symptoms of "weather sensitivity"?
- 3 What is cromnyomancy? Can you design and experiment?
- 4 What is an orcan? How does or does not relate to a hurricane?
- 5 What does the term "pahoehoe" refer to?
- 6 What are "lahars"?
- 7 You already know what a thunderstorm is, but what is thundersnow? What does it consist of?
- 8 What does "graupel" mean?
- 9 What is a "train" in relation to a tsunami?

Extensions

Integrate some of the concepts and content through a geography lesson by teaching students how to locate the most significant disaster (earthquakes, volcanoes, nor'easters, tsunami). Here the five geography themes of location (where is it?); place (what is it like?); human/environment interaction (what do people do there?); movement (how do people interact?); and regions (how are areas the same?) will be explored.

Designing and testing weather related forecasting methods. Throughout the times, people have attempted to predict the weather by looking at the skies the night before, observing wind direction, even looking at the moon. Here you have an old saying, "Pale moon doth rain, red moon doth blow, white moon doth neither rain nor snow" (Watson, 2003). Could you prove or disprove scientifically this statement? How would you design an experiment to know if there is any truth to it? Could you forecast the weather by using onions?

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Watson, B. A. (1993). Acts of God : the Old farmer's almanac unpredictable guide to weather and natural disasters. New York, Random House.

VolcanoWorld (2007). Native American Myths, North Dakota and Oregon Space Grant Consortia. 7/15/2007, <http://volcano.und.edu/vwdocs/msh/lhc/hr/hrho/nam.html>.

Willis, R. G. (1993). World mythology. New York, H. Holt.

Electronic Resources

Bartleby (1999). Bartleby.com: Great Books Online. June 27, 2007 <http://www.bartleby.com/>.

There are many electronic reference resources in the Internet nowadays, but this one has many more resources to offer. Not only does this website include hundreds of books on line, but the reference list is impressive. One con is that the ads and banners can be distracting.

Forces of Nature, Oracle' Think Quest. May 25, 2007 <http://library.thinkquest.org/C003603/>.

In very simple terms, this team of students creates a webpage, both in English and Spanish, which includes many resources for the classroom teachers and students alike.

F.E.M.A. (2007). Julia and Robbie: The Disaster Twins. May 25, 2007 <http://www.fema.gov/kids/twins/>

This web page is part of the Federal Emergency Management Agency for Kids: Get Ready... Get Set... site. This collection of books (Spanish and English) includes colorful stories that track the adventures of two twins that encounter natural disasters. These stories are didactical on what to do during natural disasters and how to be ready. The stories can be printed as a portable document format (pdf) and includes an audio file in English so students can follow the reading as they listen.

KGAN (2005). WeatherEye. Glossary of winter terms, KGAN. 5/28/2007, weathereye.kgan.com/expert/blizzard/bliz_glossary.html.

A good glossary of winter weather and winter forecast terms. Simple and concise web site as a public service of KAGAN and sponsored by Central Iowa Cooperative (CIPCO)

Netscape (2001). Open Directory Project (d.m.o.z). May 25, 2007

http://dmoz.org/Kids_and_Teens/School_Time/Science/The_Earth/Natural_Disasters_and_Hazards/.

A comprehensive directory of web pages geared towards people under the age of 18. The pages are ranked according to age groups and are based on themes.

United States Search and Rescue Task Force, I. (2000). Blizzard, Expert Consultants, International. 5/12/2007

<http://www.ussartf.org/blizzards.htm>.

If there is anything related to blizzards and winter weather that you want to know, this is the site for you. Easy reading with tables, graphs, and pictures.

United streaming. Every teacher in the district can have access to one of the best resources for integrating multimedia in their lessons. The multimedia collection

<http://unitedstreaming.com>

In entering the key word 'earthquake', I received 37 links to videos having to do with earthquakes. One of the advantages of these videos is that are broken down into short segments from 1' to 5', so that specific content can be presented without having to view all the videos. Another advantage is that there are no commercials. Additionally, there are supporting materials, including videos in Spanish.

VolcanoWorld (2007). Native American Myths, North Dakota and Oregon Space Grant Consortia. 7/15/2007, <http://volcano.und.edu/vwdocs/msh/lhc/hr/hrho/nam.html>.

This is a collaborative higher education, K-12, and Public Outreach project of the North Dakota and Oregon Space Grant Consortia administered by the Department of Geosciences at Oregon State University. This site includes a wealth of information. Highly recommended by the number of links and resources that it has to offer.

Teacher Resources

First Hand accounts

In working with young students we must be very conscious of the content regarding natural disaster's that explain the human devastation. I chose the following BBC Reporter's Blog on the Boxing Day Tsunami because of the brevity of the first-hand accounts without all the gory details. Additionally, this site offers some great graphics on simple explanations on why and how tsunamis originate. There are some great pictures of what it looked after the tsunami and what it looks like now.

<http://news.bbc.co.uk/2/hi/asia-pacific/4129521.stm>

Caplovich, J., W. W. Westbrook, et al. (1987). *Blizzard!: the great storm of '88*. Vernon, Conn., VeRo Pub. Co.

A fascinating and well documented resource on the blizzard of 1888 and life before and after the storm. It includes numerous first and second-hand accounts, including oral histories, newspaper reports, before and after photographs, and weather maps.

Watson, B. (1990). *New England's disastrous weather*. Camden, Me., Yankee Books.

Not only does this book contain excellent first hand accounts of natural disasters pertaining to New England, but also includes historic photographs related to these disasters that brings us closer to our distant past. This book is divided into six chapters under the themes of: hurricanes, blizzards, tornadoes, floods, summertime and the prognosticators. A fantastic resource!

Because of the importance of the visuals, I have been looking for a site that I can bring my students to look at pictures of what the environment looks before and after a natural disaster. I am still searching but I bookmarked the following site because of the oral accounts with text and some great images of the 1906 San Francisco earthquake:

<http://www.co.marin.ca.us/depts/lb/main/crm/earthquake/index.html>

Anything that you would like to know about earthquakes can be located by searching this site; from the causes to tracking systems; to first hand accounts; this is the place to go.

<http://earthquake.usgs.gov/regional/world/events/>

Myths

Bierlein, J. F. (1994). *Parallel Myths*. New York, Ballantine Books.

A great resource for the new reader to mythology. Bierlein elaborates on the universality and importance of myth in human history and culture.

Cotterell, A. (1989). The Macmillan illustrated encyclopedia of myths & legends. New York, Macmillan.

This book is divided by world's regions and includes myths and legends from across the five continents. It has many colorful pictures, tables, timelines, and alphabetical list of myths and legends. A great source to locate concise myths and legends.

Philip, N. and N. Mistry (1995). The illustrated book of myths : tales & legends of the world. London ; New York

Boston, D. Kindersley ;

Distributed by Houghton Mifflin Co.

This book includes a collection of myths from many cultures. It has three important sections with many short myths and legends related to creation myths, beginnings, and visions of the end. Highly recommended as read-aloud or independent reading for all different levels.

Verniero, J. C. (2001). One-hundred-and-one Asian read-aloud myths and legends. New York, Black Dog & Leventhal Publishers
Distributed by Workman Pub. co.

An excellent source of Asian myths and legends divided by country: China, Japan, Korea, Vietnam, Tibet and Mongolia.

Willis, R., Ed. (1993). World Mythology. New York, Henry Holt and Company.

This reference book is divided into sections by country and region offering an extensive biographical list. A must have in teaching about mythology. It also provides the reader with a great source of pictures and illustrations depicting mythological representations in the arts.

Natural disasters

Abbott, P. L. (2004). Natural disasters. Boston, McGraw-Hill Higher Education.

This is possibly one of the most important reference books relating to natural disasters. I add it here and to the students' resources list because of the wealth of information it has in graphs, maps, and tables. It also includes an extensive glossary of terms.

Fredericks, A. D. (2001). Investigating natural disasters through children's literature : an integrated approach. Englewood, Colo., Teacher Ideas Press.

If you are interested in introducing, presenting, or expanding on the content related to natural disasters through children's literature, this is the book to reference. It includes children's literature and offers ways to teach about natural disasters.

Standards

Connecticut State Department of Education (2007). SDE: Science, Connecticut State Department of Education. 7/1/2007, 2007

This is the Connecticut State Department of Education web site for Science. This page contains the necessary links to Connecticut Curriculum science frameworks, a draft of CAPT handbooks and other important links. Well organized with very valuable resources. Includes samples of embedded performance tasks.

Connecticut State Department of Education (2007). SDE: Social Studies - Social Studies Trace Maps, Connecticut State Department of Education. 7/1/2007, 2007

This is the Connecticut Stated Department of Education web site for History/Social Studies. This page contains the necessary links to Connecticut Curriculum Trace Maps for History/Social Studies. It is a concise and well-organized web page but lacks sample lessons.

TESOL (2006). PreK-12 English language proficiency standards. Alexandria, Va., Teachers of English to Speakers of Other Languages.

A must have volume in order to differentiate instruction to meet the needs of the English Language Learner. It includes the newest Teachers of English to Speakers of Other Languages standards with sample lessons.

Student Resources

Abbott, P. L. (2004). Natural disasters. Boston, McGraw-Hill Higher Education.

Although this book is geared to adults, I highly recommend it for the clear and concise tables, graphs, and diagrams explaining the major concepts related to natural disasters.

Cerveney, R. S. (2006). Freaks of the storm: from flying cows to stealing thunder, the world's strangest true weather stories. New York, NY, Thunder's Mouth Press.

This book is to fascinate any child or adult that will put his/her teeth through it because of the number of anecdotes and stories related to weather folklore, meteorology, climatology, and weather. Recommended for advance readers or read-aloud.

Groman, J. (2002). The atlas of natural disasters. [United States], Michael Friedman Pub. Group.

This is a wonderful reference book that can be used as a supplement to the classroom library.

Mark-Goldstein, B. S., A. Layton, et al. (1997). I'll know what to do: a kid's guide to natural disasters. Washington, DC, Magination Press.

This is a good resource book to help children understand about natural disasters and what to do in preparation, during, and after a natural disaster takes place.

National Geographic Society (U.S.). Book Division. (1995). Raging forces : earth in upheaval. Washington, D.C., The Society.

This book will appeal to all readers because of the colorful pictures and brief chapters. It is well-referenced and additional readings by subject, and tips on how to prepare for a major disaster.

Philip, N. and N. Mistry (1995). The illustrated book of myths : tales & legends of the world. London ; New York

Boston, D. Kindersley ;

Distributed by Houghton Mifflin Co.

This book includes a collection of myths from many cultures. It has three important sections with many short myths and legends related to creation myths, beginnings, and visions of the end. Highly recommended as read-aloud or independent reading for all different levels.

Philip, N. (1999). *Mythology*. New York, A. Knopf.

A wonderfully well illustrated book about what mythology is, and how different cultures, throughout the ages, have viewed the creation of the world, the cosmos, making humankind, evil forces, superheroes, etc. This book will appeal to all reading levels.

Watson, B. A. (1993). *Acts of God : the Old farmer's almanac unpredictable guide to weather and natural disasters*. New York, Random House.

This is a fascinating book with all types of anecdotes and stories relating to weather and natural disasters. It is simple to read and includes many captions and first-hand accounts, including newspaper clippings, old sayings, and lots of weather folklore.

Appendix A - Standards

The following are some of the curriculum content standards that this unit targets:

Teachers of English to Speakers of Other Languages (TESOL) English Language Proficiency Standards:

Standard 1: English language learners communicate in English for social, intercultural, and instructional purposes within the school setting

Standard 4: English language learners communicate information, ideas, and concepts necessary for academic success in the area of science

Standard 5: English language learners communicate information, ideas, and concepts necessary for academic success in the area of social studies

Social Studies

Standard 1: Historical Thinking

1.3-4.1 Identify ways different cultures record their histories, compare past and present situations and events, and present findings in appropriate oral, written and visual ways.

1.5-6.1 Gather information from multiple sources, including archives or electronic databases, to have experience with historical sources and to appreciate the need for multiple perspectives.

Standard 2: Local, United States and World History

2.5-6.1 Locate the events, peoples and places they have studied in time and place (e.g., on a timeline and map) relative to their own location; and

2.5-6.2 Explain the relationships among the events and trends studies in local, state, national and world history.

Standard 4: Applying History

4.3-4.5 Recognize relationships between events and people of the past and present circumstances, concerns and developments.

Standard 9: Places and Regions

9.3-4.1 Locate major physical and human features in the New England region and the United States.

Appendix B

My New Vocabulary Pronunciation

Part of speech

_ Noun

_ Adjective

_ Verb

_ Adverb

_ Other: _____

Synonyms

Antonym (opposite)

What it is

What it is NOT

Examples

Examples of what it is NOT

My own sentence

Draw a picture showing what it is or how it relates to you

Points of View

Rate your opinion from one to ten on each of the following statements

1-Strongly Disagree / 10- Strongly Agree

1. Earthquakes do not occur in New England.
2. When we are bad, God punishes us with disasters.
3. We can control natural forces.
4. It is not possible to do anything about natural disasters.
5. We have to care of nature so disasters do not occur.

_ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

1|

2|

3|

4|

5|

RAFT (Role, Audience, Format, Topic) Activity

Select any of the *roles* from the first column. Then write to the *audience* listed to the right of the role using the suggested *format* , on the listed *topic* regarding the natural disaster of your choice.

Role

Scientist

Bird

Mountain

Meteorologist

Water

Audience

Symposium

Humans

Rock mantle

6 o'clock news

Sun

Format

Speech

Letter

Plea

Newscast

Formal request

Topic

Direct effects of . . . (natural disaster)

Indirect effects of . . . (natural disaster)

Indirect effects of . . .(natural disaster)

Direct effects of . . . (natural disaster)

Direct effects of . . . (natural disaster)

Appendix C - Evaluation Rubrics

Performance Task I

Manmade disasters versus natural disasters

1. Group work

T: I have contributed to my group's work a lot.

O: I have contributed to my group's work some of the time.

W: I have contributed to my group's work a little.

2. Classify between natural and manmade disasters

T: I have helped my group classify a lot.
O: I have helped my group classify most of the time.
W: I have helped my group classify a little.

3. Write a paragraph

T: I have completed the whole paragraph using the sentence starters.
O: I have written most of the paragraph using the sentence starters.
W: I have written some of the paragraph using the sentence starters.

4. Capitalization

T: All of my sentences begin with a capital letter.
O: Most of my sentences begin with a capital letter.
W: Some of my sentences begin with a capital letter.

5. Punctuation

T: I have checked all of my sentences for punctuation marks.
O: I have checked most of my sentences for punctuation marks.
W: I have checked some of my sentences for punctuation marks.

6. Read

T: I have read the whole paragraph to my partner.
O: I have read most of the paragraph to my partner.
W: I have read some of the paragraph to my partner.

7. Vocabulary Log

T: I have completed the log.

O: I have completed most of the log.

W: I have completed some of the log.

Did I do my best work?

Terrific OK Needs Work

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Learners explore different natural and manmade disasters through a webquest. In this earth science lesson, students explain their causes.Â Educator Edition Save time lesson planning by exploring our library of educator reviews to over 550,000 open educational resources (OER). Learning Explorer An all-in-one learning object repository and curriculum management platform that combines Lesson Planetâ€™s library of educator-reviews to open educational resources with district materials and district-licensed publisher content.Â Students explore different natural and manmade disasters through a webquest. In this earth science lesson, students explain their causes. They also discuss how disasters affect society.

Natural disasters and extreme weather. Ancient legends give an early warning of modern disasters. The new science of geomorphology is being harnessed by researchers who believe folklore can save lives. "Myths can tell us a great deal about what happened in the past and were important in establishing what happened here 300 years ago," said Brian Atwater, of the US Geological Survey in Seattle. Along the Oregon and Washington coast, there are Native American stories about boulders, called a'yahos, which can shake to death anyone who stares at them. Then local legends helped again. Japanese colleagues studied their records and traced an orphan tsunami - a giant wave not linked to a local earthquake - that destroyed several villages on 27 January, 1700.