



## Natural Disasters and the Five Themes of Geography

Curriculum Unit 07.04.11  
by Matthew A. Dooley

### Introduction

---

I am a seventh and eighth grade Social Studies teacher at John S. Martinez Magnet school in New Haven. My student population consists of 13 to 14 year old children of Latino and African-American descent. The background knowledge of the majority of my students is severely limited. This creates an environment in which every objective to be taught must be accompanied by preliminary lessons to facilitate student comprehension and allow scaffolding to the larger world as a whole.

One of the central concepts of World Geography is the application of the Five Themes of Geography (location, place, region, movement and human-environment interaction) and their impact on societies. Location answers the question of where something or someone is. There are two types of locations, absolute and relative. Absolute location uses latitude and longitude lines to identify or pinpoint the exact location of something or someone. A relative location is described by a particular place, landmark, time, direction or distance from one place in relation to another. Instead of giving the latitude and longitude of Hartford, Connecticut, one can say it is a half hour north of New Haven, Connecticut.

Place answers the question of what a place is like. It describes certain features or characteristics that an area has. These features can be either man or nature made. Rivers, climate, human population, mountain ranges, and proximity to oceans are all descriptions of place via nature. The Pyramids of Egypt and the Great Wall of China are two examples of manmade features.

Region answers the question what makes an area like another one. Region can broadly be defined on the similarities derived from commonalities of a particular area. Examples of region vary and can be defined by a geographic landmass such a mountain range. It can also be something intangible, representing an aspect of culture such as language or religion. An example of a region defined through language would be Latin America where Spanish binds the area together through a common history of events and expression of words. Region can also be defined through religion such as Islam in Southwestern Asia and Northern Africa or Christianity in North and South America.

Movement describes how people, goods and ideas get from one area to another. Examples of movement would be the settlement of Europeans in the Americas. Movement also can be used to illustrate how trades

goods such as bananas or clothes can come from one area of the world and be brought to another. Movement can also show how ideas like religion or technology such as gun powder can travel from one culture to another.

Human-environment interaction describes the relationship that people have with the world. It explains how people are shaped by their environment and how people also shape their environment. These interactions could be a singular event or a series of smaller events which effect a more dramatic change over time. An example of how environment affects human society is the Inuit people of Alaska living in shelters made of ice or people living near forested areas living in shelters built out of wood. Examples of how people affect their environment are pollution and logging both of which would have a potentially negative impact on the larger world.

Attempting to teach these concepts in an abstract setting without direct student involvement has proven to have minimal effect on student comprehension. Earthquakes, volcanoes and hurricanes will facilitate a more concrete setting where major themes of geography can be explored through student initiative, rather than solely in a teacher driven lecture format. Many students with similar backgrounds share a lack of background knowledge which can hamper their desire to put the "pieces together," therefore it is important to have an approach that can pull the students in. People seem to be fascinated by the havoc, death and destruction brought by natural disasters. It would be through this venue that student interest could be peaked, therefore allowing for individual research on specific instances throughout history.

## Learning Objectives

---

- 1 Students will be able to explain the theory of plate tectonics
- 2 Students will be able to define climate patterns
- 2 Students will be able to describe the Five Themes of Geography
- 3 Students will be able to define natural disasters including earthquakes, tsunamis, volcanoes and hurricanes
- 4 Students will be able to describe the causes of the aforementioned natural disasters
- 5 Students will apply the concepts within the Five Themes of Geography to various natural disasters
- 6 Students will be able to explain and evaluate the relationship of a natural disaster to the area which it affects
- 7 Students will be able to summarize the historical events of a selected natural disaster
- 8 Students will be able to explain the relationship of a geographical area and the societies which reside near it
- 9 Students will be able to assess the likelihood of a reoccurrence and the repercussions of the natural disaster studied.

## Rational and Discussion

---

As students have multiple ways of assimilating information, it is important to include visual, tactile and auditory methods of delivery. These three modes of learning will be achieved in various ways. Through the sparing use of documentaries and clips from movies, students will be able to visualize aspects of natural disasters from their causes to their aftermath. It is important that documentaries are used in concert with question sheets which must be answered during the viewing by the students. Throughout this process the film can be paused so as to queue the students when questions must be addressed and key points emphasized. At the end of the viewing, students should be called upon to answer the questions. This will allow certain students who are having issues of comprehension a chance to answer missed questions and also the teacher to address these gaps. Student explanations should be stressed over teacher supplied responses as a way of reinforcing the new information the students have learned. This will also allow students the opportunity to express themselves in a more public format. At the conclusion of the question review, students should be required to pass in the questions and their answers to confirm whether or not they have processed the information.

Teacher-led student internet research should be used at several stages. National Geographic <http://www.nationalgeographic.com/forcesofnature/interactive/index.html> has a website which allows students to change several variables which will result in a hurricane, volcano or earthquake. The website itself is easy to navigate and can be used to give students a hands-on and visual demonstration of the factors which when combined in a certain way, lead to these natural disasters. Particular historical events accompany each natural disaster and can be used as teacher introduced examples. The second stage of research will consist of individual student research from a previously teacher created list. The students will be assigned or allowed to choose a disaster type that interests them after they have learned about natural disasters. This process, if done correctly, will maximize student interest in their research. Students will be given a handout which asks questions about their specific natural disasters which will lead them through the task of researching. At this age, it is appropriate and important to keep narrow, focused goals for the students to keep them from getting lost or overwhelmed. The medium of choice will be the internet. It is vital that students begin to use the internet as a research tool. Encyclopedia Britannica (it has articles which range from elementary to adult) will be the first resource to which the students will be directed. This will allow them to gain background information on their natural disaster which can be tailored to the reading level of each student.

Traditional lecture format will make up the third component of student learning. This format will be integrated with the film selections and initial internet research so as to give the students the needed background information, scaffolding from the mechanics of the natural disasters to actual events in history. Due to the small percentage of students who are able to assimilate information through the medium of lecture, it is advised that this particular component be kept to a minimum and be woven tightly into both tactile and visual styles of learning. This will keep a larger part of the student population engaged. It is advised that end of class assessments be given after anything in lecture format to give the students and the teacher a gauge of what information has been digested and what concepts may need some more emphasis. This type of assessment can be as simple as a short writing prompt which can be given at the end of the lesson and finished for homework. Depending on the level of academic ability of the students, a short answer question sheet might be more appropriate.

Students will have the opportunity to learn the major causes of natural disasters, some of which have shaped

societies throughout history. As the class itself is a quasi-geography course embedded within survey style social studies of world cultures, it is necessary for students to understand the function that geography plays in the development of world societies. The lessons for this curriculum unit will focus on the "how" of natural disasters and will be integrated with teaching of landmasses and world climate zones. This will facilitate discussion on plate tectonics and weather patterns, the causes of volcanoes, earthquakes, tsunamis and hurricanes. These four types of natural disasters can then be used to illustrate aspects of the Five Themes of Geography on different societies in the world.

As this is a junior high level course in an inner city, student achievement and needs must be taken into account in an undertaking this comprehensive. The study of these events should contain sufficient depth to achieve a level of student comprehension in the causes of each type of event. This will provide background information for the students to understand the events, with a basic knowledge that they will then be able to apply to the Five Themes of Geography. For example, students will learn why living in a specific location increases the risk of certain natural disasters and decreases the risk of others. In these ways students, will not only have a fuller understanding of the geography of the world but will also be exposed to different societies that will be explored during later points in the year.

The two major lesson plans will center on plate tectonics and climate zones as these two aspects of geography can be used to explain the four major natural disasters I wish to cover with the students. Each of these can be split into smaller lessons as the need arises. Again, I have to stress that with the background of these students, it would be counter-productive to inundate them with more information that they can reasonably absorb and these initial lectures would best be supplemented with video clips from sources such as National Geographic. As in any teaching environment (especially in one where students are not there by choice), it is vital that the interest of the students is kept at the forefront. Too much abstract information, without enough "human interest" stories and the instructor runs the risk of losing their students to boredom by overwhelming them with facts.

Students then will be allowed a certain amount of flexibility in attempting to use other websites to locate further information and acquire visual supplements to their initial research. This will allow students to see pictures of natural disasters and give them a chance to interact with different types of websites, which may be used for their research. Many of these students will have had limited access and experience with the internet for this purpose and this approach will expose them to the non-social facets of using the World Wide Web. The concluding activity will be a project which will require each student to report to the class about their selected natural disaster. This will expose the class to different areas and cultures around the world. The concluding activity will be combined with a tactile hands-on project, such as a poster board which can be split up into four pages that could be the precursor to a Microsoft PowerPoint presentation.

As this is a Social Studies course, it is important not to get bogged down with the inexperienced student attempts at creating the actual PowerPoint presentations. Instead, students will use the poster board to indicate which images they would choose to use in the creation of their presentation. Each "slide" on the poster would represent different aspects of their natural disaster. One slide would be a map of where the actual event occurred combined with any pertinent information such as proximity to cities and the scope of the event. Another slide could include pictures gathered from the internet. If there are no pictures of the event or its aftermath then students should draw, allowing them an avenue to express their artistic side. I want to stress that artistic ability should not be a component in the grade; instead the particular choice of imagery that the student chooses should illustrate the impact of the event on the society under study. A bullet point slide should be assembled from the questions that the students answered from their handouts. This will be

limited to one full page and will be constructed from the responses to their questions. The students will also be asked to list the resources they have used. The use of primary sources should be encouraged for higher functioning students as they attempt to research their projects. In fact, the final slide should contain a written account by the student as if they were an eyewitness to the event. This will force the students to take the many facets of the relationship of the peoples to their surrounding geography into account. Are they near the Ocean? (Location would make peoples more vulnerable to tsunamis caused by either volcanoes or earthquakes.) Why are earthquakes more deadly in places such as Iran as opposed to California?

The initial question handout which the students will have to fill out as they are doing the research on their particular natural disaster should do more than just have them fill out particular facts on the sheet. Questions on this sheet should prompt students to explore the society affected by the natural disaster. Students should be asked to sketch a map along with this initial handout in order to give them an image of the geographical environment of the affected society. Students should be asking "what is life like there?" For example, is the city along the coast and what was the major occupation of its people? Are they mostly fishermen who returned from their day at sea with no knowledge of an earthquake, or the tsunami it caused which might have completed the devastation? Was the village at the foot of a large volcano and therefore buried under pyroclastic surge? Is the society mired in poverty or corruption and therefore unable to build structures which are resistant to natural disasters?

The overarching objective of this curriculum unit is to utilize natural disasters as a means of having students apply the concept of the five themes of geography to different societies around the world. The background information of climate zones and plate tectonics will then have for the students a real application beyond the dry mechanics of their processes. Students will explore first hand how these phenomena affect the development of societies within the context of the larger world while at the same time having exposure to varied geographical areas and cultures.

## **Content Standards**

The curriculum unit is intertwined within the appropriate Connecticut State Content Standards. The performance standard of Content Standard One: Historical Thinking will be achieved through student research. Initially, when examples of particular natural disasters are used in concert with their causes, primary sources (first hand accounts) and their analysis should be modeled with the students so as to give them the experience to accomplish this higher order function of learning on their own. Primary source evaluation will be encouraged for students of all ability levels. Further, students will have the opportunity to gather information from multiple sources and will have to distinguish between primary and secondary sources. Pictures of events will allow students to interpret data in historical maps and photographs. Finally, students will be charged with the task, as part of the closing activity, of writing their own "eyewitness account" of the event they are researching. This will force the students to think outside their own environment and consider the many different implications of the five themes of geography on their chosen natural disaster.

The performance standard of Content Standard Two: Historical Themes will be achieved through student identification and analysis of the various effects of movements of groups of people as a result of natural disasters. The mass movement of residents of New Orleans after Hurricane Katrina in 2005 is a strong illustration of this standard.

The performance standard of Content Standard Four: Applying History will be achieved as students write their first hand eyewitness accounts of their event. This will create a venue for the students to display empathy for the people who experienced their natural disaster. This will further be heightened as students describe the

event and its resulting impact on the society within its geographical range of impact.

The performance standard of Content Standard Nine: Places and Regions will be achieved through student research and analysis of the geographical setting in which the natural disaster occurs. Students will understand how the proximity to areas which receive hurricanes on a regular basis affects the development of that region. Students will also understand how proximity to volcanoes can affect societies. Volcanoes tend to create fertile soil. Many times, societies choose to ignore the risk of potentially deadly volcanic activity associated with the creation of this rich farming land. Despite historical evidence, many times with pending doom filling the background of their daily existence, people gamble their possible doom for their livelihood. Students will be able to evaluate these choices on their own terms fostering a higher order of thinking. Latitude and longitude will be used to calculate both the epicenter of the event and pinpoint the areas/cities which were affected.

The performance standard of Content Standard Ten: Physical Systems will be achieved through the study of plate tectonics theory and the climatic patterns. The resulting volcanoes, earthquakes and tsunamis will be analyzed as a byproduct of the movement of the earth's plates. Hurricanes (also called cyclones) will be used to illustrate prevailing climatic patterns in regions of the world. In this way students will understand how concepts in physical geography can be used to explain the occurrence of natural disasters.

The performance standard of Content Standard Twelve: Human and Environment interaction will be achieved through student use and creation of maps centered on the events studied, while at the same time identifying the relationship that societies have to the areas in which the events take place.

### **Five Themes Applied**

A detailed analysis of the five themes of geography's impact on the different aspects surrounding natural disasters would be extremely helpful at this point. Depending on student achievement levels, it might or should not be expected that every one of the five themes could be utilized in the concluding activity. This is entirely dependent on which natural disaster a student chooses to study. To avoid overlap of particular disasters, the teacher should refer to list of natural disasters and assign a broad enough sample to touch upon all of the applications of the five themes of geography to various areas of the world. This class is as much a survey course of the many world cultures throughout history to the present day, thus it would be advantageous for the teacher to make sure that these natural disasters span the cultures and time periods that are to be studied during the year. This will allow for students to recall the information they have learned on an ongoing basis. As each culture is studied, the particular disaster can be reviewed with students adding further observations and points throughout the entire year.

As for student utilization of the five themes of geography, absolute location can be used to pinpoint the epicenter of an earthquake, location of a volcano, the major cities surrounding the events and other important locations which would need to be identified. Relative location also should be utilized, as students are drawing maps they should also label surrounding countries or bodies of water bordering the area they are studying.

The theme of Place can also be treated by the majority of students as subjects such as population density can analyzed through the lens of a natural disaster. Were there many people who were affected? Were the buildings built to withstand the particular natural disaster? Is it possible to build anything that could actually withstand that natural disaster?

The theme of Region can also be engaged by most of the students. Some geographical and climatic regions

which are defined by the movement of plates and climate patterns can be used to illustrate a region's vulnerability to a certain type of natural disaster. Cultures that exist on the Pacific's Rim of Fire are more susceptible to volcanoes, earthquakes and tsunamis. Countries such as Bangladesh and islands such as Okinawa are prone to devastating Cyclones. The countries which are in and around the Caribbean are also subject to the annual threat of hurricanes. Some of these same island nations in the Caribbean are also dealing with the multiple threats earthquakes and volcanoes caused by shifting plates.

While some of the natural disasters will be able to delve into the theme of movement, it isn't feasible to expect that all students will be able to successfully incorporate it. Events such Hurricane Katrina can be used to illustrate movement as a significant percentage of the city of New Orleans's population have experienced a Diaspora. At present a year and a half after the natural disaster struck the Gulf Coast, only half the city's population has returned. Another example of a natural disaster which caused a type of movement was the earthquake in 1692 which struck the Island of Port Royale. Two-thirds of the island sank into the water and over half of the city's population either sank with the city or was washed out to sea by the resulting tsunamis. Port Royale ceased to be the economic center of British activity in the Caribbean, instead being replaced by the nearby port of Kingston.

The theme of human-environment interaction should also provide the student with ample opportunity of examples and analysis. Locations of cities to areas of tectonic plate movement in the form of fault line and volcanic activity should be a basic objective for each one of the students to complete as each natural disaster will provide for this type of examination. Students should be encouraged to further explore other aspects of human-environment interaction which require higher thinking skills. For example, students should question why the death toll resulting from an earthquake is much worse in one area while the same magnitude earthquake occurring somewhere else might be negligible. This could stem from government corruption, choice of building materials and the type of surface that structures are built on. The 2003 earthquake in Bam, Iran had a much higher death toll as floors were not properly secured to building walls, causing the floors to pancake on top of each other during the quake. This was the main factor to the large mortality rate.

It is necessary to include a selected list of natural disasters in which students will be able to find the needed information to complete the concluding activity poster board. It is advised that individual teachers do some research to evaluate which of the natural disasters will best suit the abilities and needs of their students. While there is information readily available on all of these natural disasters, many of them are covered in a recent publication called *The 100 Greatest Disasters Of All Time* by Stephen J. Spignesi. This book is in print and has a primary source and secondary information on many of the natural disasters listed below.

### **List of Natural Disasters**

- 2004 Indian Ocean Earthquake
- 2005 South Asia Pakistan Earthquake
- 2003 Bam, Iran Earthquake
- 1970 Bangladesh Cyclone
- 1556 Great China Earthquake
- 520 Antioch, Syria Earthquake
- 2005 Hurricane Katrina
- 1922 Great Kanto Earthquake
- 79 Eruption of Mount Vesuvius

- 1692 Port Royale Earthquake
- 1815 Eruption of Tambora (year without a summer)
- 1988 Armenia Earthquake
- 1896 Japanese Tsunami
- 1906 San Francisco Earthquake
- 1755 Lisbon, Portugal Earthquake
- 1999 Izmit, Turkey Earthquake
- 1883 Eruption of Mount Krakatoa
- 1900 Galveston Hurricane
- 1998 Hurricane Mitch
- Great Hurricane of 1780
- Eruption of Mount Pelée
- 1990 Iran Earthquake
- 1970 Peru Earthquake
- 1864 Calcutta Cyclone
- 1908 Messina, Sicily Earthquake
- 1920 Gansu, China Earthquake



The particular selection of these natural disasters are based upon several factors including location, severity of the event, effects upon the surrounding societies, ease of available information and their applications to the Five Themes of Geography.

## The Science

---

### Tropical Cyclones

A tropical cyclone is the generic name for all cyclone circulations originating over tropical waters. A series of environmental factors must all work in collaboration to create a tropical cyclone. A low pressure system is caused by the upwelling of warm air (Abbott, 304). If this occurs over warm ocean waters, then water evaporates creating humidity. As this humid air is then sucked into the upwelling, condensation occurs, which releases energy in the form of heat. This process heats the surrounding air which continues the cycle of updrafts. Warm air rises; drawing in more humid air which then condensates (becomes rain). At this point a positive feedback or cycle occurs which acts as a giant engine that strengthens the tropical cyclone. Tropical cyclones have different names depending upon where they occur. In the northern Atlantic and eastern Pacific, a tropical cyclone is called a hurricane. In the western Pacific Ocean it is called a typhoon. Finally in the Indian Ocean a tropical cyclone is called a cyclone (Langley, 34).

Tropical cyclones begin as a tropical disturbance originating in the tropics or subtropics which is characterized as a low pressure system with thunderstorms, weak surface wind circulation and warm moist upwelling (Abbott, 304). If a tropical disturbance strengthens then it becomes a tropical depression which has wind speeds of no greater than 38 miles per hour. Once a Tropic Disturbance reaches wind speeds above 38 miles per hour and under 73 miles per hour it is called a tropical storm. If a tropical Storm's sustained winds reach over 73 miles per hour then it is called a Tropical Cyclone. Each particular region which experiences Tropical Cyclones has their own way of categorizing the intensity of the storm itself.

Due to the Coriolis Effect, tropical cyclones occurring in the northern hemisphere rotate counterclockwise and clockwise in the Southern Hemisphere (Abbott, 276). This phenomenon keeps tropical cyclones from crossing the equator. As the earth rotates, it moves faster at the equator and slower towards the north and south poles. This means that when an object moves from the equator to the north, the faster speed of the rotating earth causes the object's path to be deflected to the right. Conversely, when an object moves from the northern latitudes toward the equator, the faster speed of the rotating earth causes the object's path to be deflected west. This accounts for the differing rotations of tropical cyclones. It also explains why it is rare for tropical cyclones to occur in latitudes outside of area between 5 degrees north and south of the equator.

To describe the destructive strength of hurricanes occurring in the Atlantic and eastern Pacific oceans, meteorologists use the Saffier-Simpson model which puts hurricanes into five potential categories one through five (Abbott, 305).

- Category 1 Wind Speeds 74 - 95 MPH Storm Surge 4 - 5 feet
- Category 2 Wind Speeds 96 - 110 MPH Storm Surge 6 - 8 feet
- Category 3 Wind Speeds 111 - 130 MPH Storm Surge 9 - 12 feet

- Category 4 Wind Speeds 131 - 155 MPH Storm Surge 13 - 18 feet
- Category 5 Wind Speeds 155 MPH + Storm Surge over 18 feet

It also should be noted that a storm surge can be exacerbated if it coincides with a high tide. Most deaths caused by hurricanes are actually a direct result of people who are caught in storm surges (Abbott, 313).

### **Plate tectonics**

Plate tectonic theory is used to explain the movement of the crust which "floats" above the earth's mantle. The earth is divided into three sections, the first being the crust, the second the mantle and the third the core. The continents are the part of the crust which rise above the bodies of water that cover the earth. The crust itself is divided into different plates which are constantly moving in various directions. The outer edge of where each plate meets is called a boundary. Along these boundaries, the plates do one of three things; move parallel to each other (transform zone), crash into each other (convergent zone) or move away from each other (divergent zone). The movement of the plates can be measured in centimeters per year.

### **Earthquakes and Volcanoes**

The majority of earthquakes occur at plate boundaries and convergent zones are the most active cause of earthquakes, volcanoes and tsunamis (Wade, 62). Convergent zones also create mountains as one plate is pushed up and crumpled while the other plate is forced underneath back into the mantle. This process occurs over millions of years. Although convergent zones generate the largest and most deadly earthquakes, transform zones are also prone to large earthquakes. Divergent zones generate small earthquakes which usually are not life threatening. The area of the world where the vast majority of earthquakes occur is the convergent or subduction zone called the Ring of Fire. The Ring of Fire is located along the boundaries of the Pacific Plate (Langley, 61).

The vast majority of volcanoes occur at plate boundaries (Abbott, 152). Subduction zones are where the most violent volcanoes occur. Divergent zones generally cause slow minor eruptions which occur at mid ocean ridges. The violence of an eruption is dependent upon two factors, the amount of gas and silica in the magma. The amount of silica within the magma affects its viscosity (Abbott, 155). If the magma contains high amounts of silica, it is said to have a high viscosity which means it flows very slowly and traps the gas in the magma. This type of magma is usually found in convergent zones and causes explosive eruptions. Lower viscosity magma has a lower silica content which allows most of the gas to escape and usually creates less violent volcanoes such as the ones which make up the Hawaiian Islands (Abbott, 156). People tend to live near volcanoes because they produce very fertile soils for growing crops.

### **Tsunamis**

Tsunamis are usually caused by earthquakes which occur in subduction zones. As one plate is forced downward, it sometimes catches the plate above dragging that top plate down with it. An earthquake occurs when the top plate finally breaks free, springing back up. This action causes the water sitting on top of that

plate to be displaced to generate an ocean wave (Langley, 12). The resulting waves such as the December 2004 Indian Ocean earthquake can wreak death and destruction upon anyone in the path. Tsunamis can travel hundreds of miles per hour and can occur as several different waves even up to an hour apart from each other. While earthquakes are the most common cause of tsunamis, they also can be caused by landslides, volcanic eruptions and meteors (Abbott, 87).

## Lesson Plan Outlines and Narrative

---

The actual introduction to the unit curriculum should be a review of the seven continents. As many of the students have not learned the continents by seventh grade, it is necessary to ensure they have this background knowledge to be effectively processed. This development should not take longer than one or two days and should also be accompanied with the introduction of the theory of plate tectonics. It may well also be of benefit to ensure that the students have learned the major oceans and seas. Again in this environment, student comprehension of basic geography is severely limited and this elementary knowledge must be memorized before one can delve into deeper material of higher level thinking skills.

### Lesson Plan: Plate Tectonics

#### *Objectives*

Students will be able to explain and demonstrate the theory of plate tectonics

#### *Materials*

1. one blank world map (in which the continents can be cut out)
2. pair of scissors
3. colored pencils
4. glue stick
5. piece of construction paper (to be used for backing)

#### *Introduction*

Plate Tectonics should be introduced with the concept of Pangaea. Pangaea should be defined to the students.

#### *Procedure*

1. Students should be asked to cut out the continents from a map provided to them.

2. Students should paste the continents to a construction paper backing in a shape that should approximate what Geologists believe Pangaea (the super continent) may have looked like two-hundred and twenty million years ago.
3. Students should also draw and label a rough sketch of what the continents look like today.

### *Evaluation*

Students will have completed the puzzle/piecing of the continents together to form Pangaea. Students will also have to draw rough sketches of the present-day location of the continents.

### *Narrative*

This activity will introduce the concept of plate tectonics and reinforce knowledge of the seven continents. Students will be able to visualize what geologists believe the continents to have looked like two-hundred and twenty million years ago. Students will also have the chance physically put the continents where they are located today next to their Pangaea puzzle.

The actual movement of plates need not go beyond the idea that plates and the continents are basically floating on top of heavier material below. Terms such as divergence zone, subduction zone and transform fault should all be introduced to the students so they will understand the concepts behind plate tectonics and the resulting earthquakes and volcanoes which they cause. It is recommended at this point that a documentary or excerpts be shown on earthquakes. National Geographic has a large selection of films on earthquakes and even a series titled "Forces of Nature" which if accompanied by a question list to be answered during the viewing should reinforce the concept introduced previously.

Students should also have been already introduced to the concept of climate zones, so some review should take place after plate tectonics, volcanoes, earthquakes have been assimilated by the students. Climate zones should be reviewed and re-taught in concert with the causes of hurricanes. Terms such as tropical depression, tropical disturbance, humidity, pressure, tropical storm, cyclone, hurricane, typhoon and tropical cyclone should be introduced to the students. The National Geographic website could be utilized as it reviews many of the aforementioned terms and also allows the students to play with various factors which will create a hurricane in the Caribbean Sea.

After students have been assessed on their comprehension of the material, the concepts of the Five Themes of Geography should be introduced. The introduction of this material should be combined with student research into their assigned natural disasters. At this point, examples of hurricanes, volcanoes, earthquakes and tsunamis should have been reviewed with the students. In this way the Five Themes of Geography can be applied to actual historical events that will model teacher-student expectations for student research. The instructor should create a rubric and a fact sheet which students will be required to fill out as they research their particular natural disaster.

## **Lesson Plan: Natural Disaster PowerPoint Storyboard**

### *Objectives*

Students will be able to explain the relationship of a geographical area and the societies which reside near it

### *Materials*

1. Computer with internet access
2. Question sheet created by instructor to allow students to gather pertinent information
3. Colored pencils
4. Large piece of white construction paper (12x18)

### *Introduction*

Students will have been assigned a particular natural disaster from the list previously cited.

### *Procedure*

1. Students will be given the opportunity to research their particular natural disaster on the internet.
2. Once the question sheet has been filled out and reviewed by the instructor, students should use the information gathered to begin work on their PowerPoint storyboard.

### *Evaluation*

- Slide one would be a map of where the actual event occurred combined with any pertinent information such as proximity to cities and the scope of the event.
- Slide two would include pictures gathered from the internet. If there are no pictures of the event or its aftermath then the students should draw.
- Slide three would include bullet points of different facts which are associated with the natural disaster.
- Slide four would include a narrative from the perspective of someone who had survived the particular natural disaster describing the actual occurrence of the event.

Students will have created a storyboard which describes a natural disaster and the people it has affected.

## Lesson Plan: The Five Themes of Geography Applied

### Objectives

Students will apply the concepts within the Five Themes of Geography to various natural disasters

### Introduction

The instructor will review a previously created PowerPoint board with the class.

### Procedure

1. Students will be broken up into groups.
2. Students will be asked to discuss their PowerPoint storyboards in relation to the five themes of geography.
3. Students should discuss how or if the deaths caused by their particular natural disaster could have been avoided.
4. Students will report back their finds to the group

### Evaluation

Students will be asked to write a one - two page paper explaining how the five themes of geography related to their natural disaster and also recap the group's ideas as to whether or not it was avoidable.

## Resources

---

### Print

Abbott, Patrick L., *Natural Disasters*, (New York, New York: The McGraw-Hill Companies, 2004)

Spignesi, Stephen J., *The 100 Greatest Disasters of All Time* , (New York, New York: Kensington Publishing Corp., 2002)

### Student Print Resources

Griffey, Harriet, *Volcanoes and other Natural Disasters* , (New York, New York: DK Publishing Inc., 1998)

Langley, Andrew, *Hurricanes, Tsunamis, and other Natural Disasters* , (Boston, Massachusetts: Kingfisher Publications, 2006)

## Web

National Geographic

<http://www.nationalgeographic.com/forcesofnature/interactive>

Center for Educational Technologies

<http://www.cet.edu/ete/modules/mseese/earthsysflr/plates1.html>

South African Weather Service

<http://www.weathersa.co.za/References/Cyclones.jsp>

---

<https://teachersinstitute.yale.edu>

©2019 by the Yale-New Haven Teachers Institute, Yale University

For terms of use visit <https://teachersinstitute.yale.edu/terms>