Nature's Fury Shapes Our Lives

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INTRODUCTION

As a 4th grade ESL teacher in HISD, I am always looking for new and different ways to present the mandated curriculum to my English Language Learners. Because my students are transitioning from bilingual education, and are speaking, reading, and writing in English for the very first time, their learning curve is steep. As they struggle with a second language, they are still required to master new grade-level content and concepts. They find this task less daunting if the subject matter is of high interest and if it is presented in ways that allow them to make "real world" connections.

Houston Teacher Institute's Geologic Hazards seminar presents me with an opportunity to do just that; I hope to create a curriculum unit that will integrate three subject areas: science, social studies and language arts. The unit will revolve around the theme of hurricanes and is entitled "Nature's Fury Shapes our Lives." My inspiration for this unit was spawned by the recent active hurricane season of summer 2004, most notably the four successive hurricanes that battered the coasts of Florida in a four-week time span.

Our school year began in mid-August, and for the first three weeks of school, the brisk hurricane activity in the lower Atlantic and the Gulf of Mexico made national headlines. Although I was able to provide some pertinent, factual information regarding the hurricanes for my students, I couldn't help feeling that what I was doing was insufficient. I wished that I had had more time, information and creative lesson plans to maximize the learning potential in that ready-made set of current events. The student interest was already high; the media had done a fine job of creating the perfect "teachable moment" for me. (I don't think my students were necessarily disappointed in what and how we learned about hurricanes—I was!) As luck would have it, Dr. Dupré's seminar on Geologic Hazards was on the list of HTI's 2005 offerings. I jumped at the opportunity to create the very unit I needed last fall!

This unit will integrate three subject areas: science, social studies, and language arts. At this writing, I envision a three-week unit, with one week devoted to each segment, and I have tentatively divided the unit this way. It seems natural to begin with the science part of hurricane study. This section I have named "The Science of It." Basic questions to explore are:

1. What makes a hurricane?
2. How do hurricanes develop?
3. What is some scientific terminology related to hurricane study?
4. What geographic/ atmospheric conditions contribute to hurricane formation?
5. What are hurricane hazards and how can we best prepare for them?

I plan to begin this area of the unit with a high interest video entitled, *The Magic School Bus Kicks up a Storm.* By the time they reach 4th grade, most students are at least familiar with the Magic School Bus series. Originally a series of children's non-fiction science books told in cartoon format, The Magic School Bus was an instant success with elementary school librarians and teachers. The series was expanded by PBS into a thirty minute television show with science themes. (For a fairly comprehensive list of selections, interested parties can access

www.amazon.com or the series' own website at www.scholastic.com.) Although there is not a companion video that is hurricane specific for the book, *The Magic School Bus inside a Hurricane*, by Joanna Cole, I found the video cited above to be a good starting point for an introduction to weather and storms. I plan to use *The Magic School Bus inside a Hurricane* as a more specific resource after students view the video. Aside from the delightful cartoon format, and the very appealing, if eccentric, Ms. Frizzle, this book contains several easy to do's, "hands-on" experiments for children that will nicely suit the science portion of our unit. Along with these resources, I plan to use several non-fiction picture books to augment our study of the science of hurricanes. These include, but are not limited to, *Weather*, by Seymour Simon; *Hurricanes*, by Seymour Simon*; Hurricanes, Earth's Mightiest Storms*, by Patricia Lauber, and *The Scholastic Atlas of Weather*, edited by Martine Podasco.

Our study will begin with the definition of a hurricane. According to *The Scholastic Atlas of Weather*, hurricanes are known by different names throughout the world. In North America, they are hurricanes, thought to be named either for the storm god of the Mayans, *Hunraken*, or the evil god of the Caribbean, *Huraken*. In Southeast Asia, they are typhoons, the Chinese word for "great wind;" inhabitants of the Indian Ocean area call them cyclones, from the Greek word for "coil," as in the coil of a snake. Australians refer to them as "willy-willys," and the Atlas editors guess this may be the pejorative form of "whirly," referring to the shape and the sound of the storm. No matter their name, hurricanes the world over are well known as the most destructive storms in nature, and they are all formed in the same way.

Hurricanes form in the warm ocean waters near the equator, in low-pressure areas. When air in the atmosphere is sinking, or "pressing hard" on the earth, it is said we experience "high pressure." Hurricanes need the opposite type of atmospheric pressure, "low pressure," to form. The low pressure allows the warm, moist air from the ocean's surface to soar upward. As it rises, it cools into water droplets that form clouds. As the moisture condenses, heat energy is given off. This is the energy that powers the storm. The source of the storm's rain comes from the clouds. Because the low-pressure area below the clouds acts like a chimney, with warm air being drawn in from below, the rising air is expelled from the top of the "chimney" column and then spreads. One would imagine a straight pattern for the column of air, were it not for the rotation of the earth, which now figures into the equation. The rotation causes the path of the air to curve, rotate, and spiral upwards, hence the "whirly –whirly" name the Australians have for this storm.

At this point in our unit study, I intend to use two simple experiments from the *Magic School Bus inside a Hurricane* book. Both are easy to do and will provide a "hands-on" kinesthetic learning experience for my students.

The first experiment is a "rainmaking" project. Students will direct the steam from a boiling kettle toward a raised bucket of ice. Beneath the ice, a bowl will be placed to collect our "rain". As the steam hits the ice, condensation and droplets will form. The ice will "rain" into the bowl. This is a simple, quick, yet powerful visual tool to help students understand how the water cycle figures into a hurricane's birth.

The second experiment will allow students to watch hot air rise. Using a spiral cut from paper and attached to a string, students can use a light bulb to heat the air above the bulb and below the dangling spiral. As the light bulb heats the air, the warm air will rise and make the dangling paper spiral spin. It is an especially effective visual tool to help children "see" the spiraling effect of the warm winds inside the storm wall.

Students will learn that as long as warm, moist air continues to feed a hurricane, the hurricane grows in strength and magnitude. The movement of rising air in the center column acts like a giant vacuum cleaner, sucking in the air and "growing" the storm. It is at this point in our discussion that I will briefly differentiate between hurricanes and tornadoes. Because my

students are English Language Learners, it is imperative that I note for them that there is a difference. Although certainly the Spanish cognates, huracanes and tornados, clearly point out the difference, I am acutely aware of the fact that my students have limited life experiences. I prefer to err on the side of caution, and not leave their understanding of the difference to chance. Tornadoes are much smaller than hurricanes, have faster winds for the most part, and destroy almost everything in their paths. Typically, they have very short life spans-- usually only a few minutes (Cole 32). Although both storms are wind driven, they differ in the way they form. Tornadoes are ground storms, which hang from a thundercloud, while hurricanes are born from the warm, moist ocean air. Unless a hurricane moves back out to sea once it has made landfall, it will quickly lose strength and dissipate, although tornadoes can often be born from hurricanes as they move over the land (Cole 33). Naturally, the most devastating effects of the hurricane are felt by those who live in the area of landfall. And, depending on the category of the storm (categories, which designate the force and strength of the storm, are assigned to hurricanes as they develop and grow before touching land), the extent of damages caused can be severe to disastrous. See the category chart below for a more comprehensive look at categories.

Hurricane Storm Categories: The Saffir–Simpson Scale

Category 1: Sustained Winds 74-95 mph, Storm surge 4-5 ft.
Category 2: Sustained Winds 96-110 mph, Storm surge 6-8 ft.
Category 3: Sustained Winds 111-130 mph, Storm surge 9-12 ft.
Category 4: Sustained Winds 131-155mph, Storm surge 13-18 ft.
Category 5: Sustained Winds > 155 mph, Storm surge > 18 ft.

Having learned some basic hurricane information, it seems appropriate at this point to introduce my students to the weather map. I am fortunate to have a daily classroom subscription to the *Houston Chronicle*; twenty-five copies of the newspaper are delivered to my classroom every day. We do some activity with the weather map almost daily, even if it is only noting the record highs and lows for each day, and the daily temperature differences between the highs and the lows predicted in the five day forecast. (This is often incorporated into a math warm up activity.) For this unit's purposes, I plan to make use of the weather map to make students aware of weather symbols (precipitation, warm fronts, cold fronts, stationary fronts, jet stream, etc.) Ultimately, my plan is to use the hurricane tracking maps provided by the *Houston Chronicle* at the start of hurricane season to teach elementary skills in storm tracking.(For those who do not have access to a set of classroom newspapers, hurricane tracking maps are also available free of charge from local grocery stores or can be downloaded from the National Oceanic and Atmospheric Administration website, www.noaa.gov). This is the perfect tool to teach latitude and longitude—a "must have" skill for kids tracking hurricanes!

Because only a fortunate few of my students have home computers, our activities involving interactive websites are generally restricted to class time.(This is the reason that individual hurricane tracking maps are so valuable---- they are portable extension activities that can be used at home.) We are blessed with a fully equipped computer lab at our school, as we are a science and computer magnet. Here students will be able to choose from one of several excellent interactive websites for kids. These sites are comprehensive in that their links provide information on hurricane topics from formation to preparedness. There are three sites I have found that should be appealing to students. The first is the FEMA website, (www.fema.org/kids/) , where students can click on the disaster area link. This will take them to a page of disaster options to choose from. Within the hurricane link, students can learn how to prepare a disaster supply kit, how to help protect their homes from disaster, take a hurricane disaster math or I.Q. quiz, or play a hurricane house game. The latter is an especially useful link for teaching hurricane safety. Students help to prepare the yards and outside of their homes by removing objects that could become dangerous during a storm.

The Houston Chronicle provides hurricane lesson plans within its Chronicle in Education Department (www.chron.com/cie). There, students may choose from past issues (9/22/03, in particular) and follow a more structured lesson plan. Each step in the plan takes the student to a link for specific hurricane information. This is a better choice for teachers who may prefer not to allow students to wander freely within a website.

My personal favorite is the National Center for Atmospheric Research website. (www.meted.ucar.edu/hurrican/strike) This is an especially fun site that creates a virtual hurricane situation requiring students to respond to directions regarding hurricane preparedness and safety. This site also gives historical information on famous hurricanes in history as each page loads. Bright graphics, user-friendly interface and entertaining sound bites make this site a guaranteed hit with kids.

With this part of our unit of study complete, we can now turn our attention to the next segment of the unit. It is my hope that this scientific introduction will provide students with sufficient information and equip them with a reasonable amount of background knowledge upon which to draw, as we explore the next two unit segments.

Part 2: The History

To my dismay, I found that HISD's Project CLEAR Model Lessons for my 4th grade social studies curriculum do not provide information on the Galveston Hurricane of 1900. (This is true at this writing; the lessons for the unit concerning late 19th century Texas are still being written. It remains to be seen if this topic will be included for study.) Considering the fact that this is still documented as the nation's most devastating and dramatic natural disaster, it seems fitting to include a segment of my unit devoted to the study of this storm.

There are several fictional journal accounts in children's literature that are appropriate for this part of the unit. Some of them that I plan to use are; *Tragedy of the Sea*, by Bonnie Taylor*; The Great Storm: Hurricane Diary of J. T. King*, by Lisa W. Rogers; and *Galveston's Summer of the Storm*, by Julie Lake.

In addition, I intend to present material that is historically accurate, to acquaint the children not just with the storm, but with the city of Galveston in 1900. Some of the themes we will explore are: education (Did children go to school?) population, architecture, business, immigration and the cultural background of the island inhabitants. My students' experience with 2005 Galveston is as a beach town, an inexpensive day trip that is an hour's drive away from home. Few are aware that this city was once a bustling seaport, the third largest in the country, and the playground of the wealthy who vacationed there. The Hurricane of 1900 forever changed the economy, terrain and population of a place that was perhaps destined to be one of the wealthiest and dynamic seaport cities in America.

Galveston, TX, circa 1900

Galveston was the wealthiest city in Texas in 1900, and the country's third largest seaport. A city of 38,000 residents, it sat between the Gulf of Mexico and Galveston Bay, on a narrow 32-mile long strip of sand that was just slightly above sea level. At its highest point, the city was 8.7 feet above sea level, but most of the city was only about half that. Commerce in Galveston owed its success to its seaport; the city acted as the transfer point for ocean steamers that ran a route through Galveston Bay to Buffalo Bayou to Houston. Remarkably, the city was served by no less than 45 steamship lines, which provided service between Galveston and Europe. Indeed, the island was unofficially named the Ellis Island of the South, as immigrants from Europe poured in. Some stopped only long enough to refresh themselves after a long journey at sea, while many others remained on the island to settle in and prosper. By 1900, 16 countries of the world had consulate representation in Galveston; the 1900 census revealed that the city population had

grown 30% in 10 years! But the city's greatest source of wealth came from its rank as the biggest cotton port in the country (Larson 13).

At the time of the 1900 hurricane, more millionaires per square mile lived in Galveston than in Newport, Rhode Island, an acknowledged playground for the wealthy. The city of Galveston led the state of Texas in "firsts;" Galveston boasted having the first telephones, electric lights, telegraph, and electric streetcars (Larson 13). The city oozed wealth, luxury, and a taste for the finer things. Yet, it was 1900, and students of 2005 might find it shocking to learn that ladies wore bathing suits made of black wool, with mid-calf skirts and wool stockings. Victorian dress was the order of the day; ladies wore bustled dresses, large hats and lace gloves to church and tea. Children routinely wore long sleeved blouses to protect against the scorching Texas sun. Iceboxes, not refrigerators, cooled their perishables, and that meant daily visits from the iceman. Indoor privies were only for the very elite; some of the mansions on Broadway had them. Most folks, however, used the outhouse, both in the suffocating heat of summer and the damp cold of winter. Laundry was done by hand; the fortunate few who had wringers were blessed indeed. Private transportation meant horses and buggies, which the rich owned but the middle class hired when they were needed (Lake 48). The public streetcar ran the length of the island to the wharf, where a ferry could take passengers to the mainland. There was train service from Galveston to Houston, but the city streets were not paved. I use the word "paved' as we know the meaning in 2005. The main streets of Galveston had wooden blocks hammered into the dirt road, which provided a cobblestone road effect (Larson 66). However, rain made the mud mortar between the blocks ooze. The blocks often loosened and floated in floodwaters. In the Great Storm, they became lethal projectiles, powered by 100+ mph winds.

Children of the wealthy residents attended school at the Ursuline Academy, which was a boarding school run by the Ursuline nuns. It had a longer school year (from early September to late June) than the Bath Public School, which began in early October (Lake 87). The general consensus was that it offered a superior education to the area's public school.

All of this description paints a fairly accurate picture of Galveston 1900. But perhaps it is the Yankee in me that responds with such shock when I realize that this city thrived despite the intense heat of summer without benefit of air conditioning or even electric fans! Most students in Houston 2005 would have a hard time imagining such an existence. My students, however, all have family in rural Mexico. They know too well the experience of a subtropical summer without air conditioning. Many students have even used an outhouse. But they will also proudly state that the very first thing they brought to Mexico on a return trip was a portable a/c window unit! Some carry it to and from Mexico in the back of their family pickups whenever they visit! Once spoiled by such "luxury," even the poor cannot imagine life without air conditioning. Yet the 1900 residents of Galveston knew no such indoor relief from the scorching summer heat. Perhaps that explains their love affair with the Gulf of Mexico, whose tempting waters beckoned on a hot summer's day. Perhaps that explains how houses could be built so perilously close to the water's edge; the cool breezes from the Gulf would surely bring comfort at bedtime. And perhaps that explains how in 1900, such a bustling, cosmopolitan city could lay so unprotected at water's edge -- vulnerable, exposed, and totally unprepared for the Great Storm.

The Great Storm of 1900

One hundred five years later, the great Galveston storm is still considered to be the most devastating natural disaster in American history. According to Eric Larsen, author of *Isaac's Storm*, what made it so was a bizarre combination of events, some atmospheric, some geographic and some political. Together they worked to create a horrific blunder of catastrophic proportions; the storm's strength and savage force was seriously underestimated by local meteorologists and the United States Weather Bureau. Its potential threat was downplayed; citizens were told they

had nothing to fear .This resulted in a macabre scene of destruction and tragedy that later caused responsible parties to fret about whether more could have been done to save the loss of so many lives. Different accounts list the death toll anywhere from 6,000 to 8,000; the range of discrepancy due to the unknown numbers of vacationers, immigrant travelers, and tourists for whom Galveston was not home. Therefore, they were not accounted for in official census records. For nearly a century after the storm, historians would ponder the "what ifs,", and examine in detail the events (atmospheric, political, and human) that left residents so unprotected that fateful day.

I have chosen to use two primary sources in this particular segment of the unit, as well as accounts taken from Larsen's *Isaac's Storm.* The primary sources are letters written by survivors, published in Greene and Kelly's, *Through a Night of Horrors*, a compilation of first hand accounts of September 8, 1900. It is my hope that my students will be able to read firsthand the eyewitness testimony of two members of the Hawley family. It will be the perfect opportunity to introduce them to the strength a primary source lends an historical account of an event. Throughout our reading, we will focus on corroboration of our sources, note discrepancies (if applicable) and establish a timeline for the events leading up to, during and after the storm. Even the language of the day will be examined; the formality of late 19th century epistles and prose may need translating into 21st century English for my ESL learners. Using a lesson plan designed by M. Edinger for Scholastic's *Instructor* magazine entitled, "Time Travels with Primary Sources," we can construct a dictionary of antiquated terms and syntax to help us in our reading. These tips will serve as a scaffolding construct to help my young readers fully appreciate and imagine those "faraway times and people as real" (Edinger 18).

The Politics

The Galveston population was swelling; the 1900 census figures showed a 30% growth in 10 years. The city was locked in a head-to-head race with Houston to become the most prosperous city in the state, and Galveston was in the lead. Population growth meant people, and people meant money. Where money and people gather, investors follow. It was the official public stance that Galveston was completely safe from serious coastal weather; tight control over this public image was tacitly endorsed by Galveston businessmen. No investors should fear for their investments; weather related concerns should be discussed minimally.

The Atmosphere

Although it had been excessively hot and humid in the week preceding the hurricane and rain gauges measured nearly a full twelve inches of recorded rainfall, citizens of Galveston thought this normal September weather. In truth, approaching storms were titillating; storms brought cool breezes and an excitement that was almost entertaining, especially if one felt safe and snug in a well built, elevated home. Storms could even bring a holiday atmosphere to the island. Families on the morning of September 8 brought children to the beach to watch the great waves crashing to shore. Nature was putting on a show, and they didn't want to miss the fabulous display. Even as water rose to knee level and the currents streamed down Broadway, evacuation was not even considered. It was not until the water continued to rise steadily that some residents realized the flooding was not from rain water, but salt water. The unthinkable was happening -- the Gulf of Mexico was swallowing the island. When high winds loosed a steamship from its mooring in the Bay, it crashed into the three bridges that offered islanders any hope of escape. They were completely severed from the mainland. The storm continued to rage and would get much worse before it got better.

The Geography

Meteorologists of the time incorrectly thought that that the wind of a hurricane was the most fearsome part of the storm. Indeed, it was powerful, as bricks, tree limbs and slate roof shingles flew by with blinding speed, propelled by the 150 mph winds of the hurricane (Larson 145). But it was the storm surge that caused the most harrowing situation. Waters in Galveston by early evening on September 8 rose to over 15 feet. Scientists of the time had incorrectly calculated that the normally tranquil waters of the Gulf and Bay were due to the shallow slope of the seabed off Galveston, (which was unlike the steeper slope of the Atlantic coast) and that any storm surge generated by high winds would be worn down before reaching the coast. Indeed, just the opposite is true; later re-evaluations of Galveston's geography and topography showed it to be particularly vulnerable, especially in severe storms (Larson 197).

The storm that night claimed the lives of one fifth of Galveston's population, and the city woke to an aftermath of horror that rivaled the events of the night before. Human corpses, as well as those of every type of animal that lived on the island, littered the streets. Most of the city's houses had been leveled or swept out to sea. Human and animal excrement, mixed with the salt water of the Gulf, floated by. The stench was overwhelming; the oppressive humidity unbearable. City officials recognized the threat of disease; it would spread quickly among survivors living in such unsanitary conditions if the remains of the dead were not soon disposed of. Massive sea burials were the first option, but to add insult to the injury it had already wrought, the sea returned the bodies and they were swept ashore. As a last resort, the city burned their dead (Greene & Kelly, 34, 58).

Galveston after 9/8/1900

The citizens of Galveston began immediately to rebuild their city. Within a week, the telegraph service was restored. After 4 weeks, the electric trolley was running again (Taylor 54). And amazingly, just 11 days after the storm, a new all weather bridge was built connecting Galveston once again to the mainland. The erection of the seawall began just 2 years later. The land itself was raised, adding as much as 17 feet in height in some areas, from sand (over 16 million cubic yards) that was pumped through large pipes from the shipping channel. The original seawall was 17 feet high and stretched 3 miles to 39th Street. Now, however, it extends all the way to 103rd Street (Lake 157). For an excellent, more detailed account of this island restructuring, teachers of older, abler students will find Don Walden's 1990 article, "Raising Galveston," very informative.

This enormous engineering feat exacted great amounts of money, energy and attention from Galveston business leaders. In the meantime, the city leaders of Houston seized the opportunity to dredge Buffalo Bayou, ultimately creating the Houston Ship Channel and Turning Basin. With better access to rail lines and a more protected location, Houston became the new favorite and a prosperous seaport. When we compare the populations of these two cities in 2005, we see that Houston has grown to 2 million, while Galveston has 60,000, a mere doubling of its post-9/8/1900 population. Most historians agree that the Great Storm of 1900 forever changed the economic future of Galveston, and cleared the way for Houston to profit from its demise.

At this point in the history segment of our unit, I envision a lesson I have named, "What If?" In cooperative groupings of 3-4 students each we will entertain such questions as, "If the Great Storm of 1900 had not occurred?"

a) Would Galveston have been a Manhattan? (full of high rises and World Trade Centers?)
b) Would we be living in Houston?
c) Would our families have been drawn to Galveston instead, as economic futures would be brighter there?
d) What would Houston be like?

My hope is that students will come away from these discussions with a better sense of how "Nature's Fury Shapes Our Lives." Although none of us were remotely connected to Galveston in 1900, we are still heirs to its dramatic effect on the history of Texas. The forces of nature forever shape where we live, how we live and what we ultimately do. Hurricanes can neither be redirected nor suppressed, but they can be understood as forces beyond our control and deserving of our respect.

Part 3: The Literature

Part 3 of my unit will provide a language arts segment. This area of the unit will focus on a fictional account of the hurricane, entitled *Devil Storm*, by Theresa Nelson. Nelson is a Beaumont native, educated at The University of Saint Thomas in Houston, and an award-winning children's author. I first read *Devil Storm* in the late 80's and thought it to be an excellent piece of children's literature. I thought that someday I might like to use it with students as a read-aloud selection. Although it is too sophisticated for 4th grade independent reading, it seems perfect for read-aloud purposes, as students are capable of listening to higher level reading materials than those they can read independently. It fits naturally into my plan for this unit, and I think they will enjoy Nelson's fast-paced, well- written tale about the R. F. Carroll family and the perils they endured and ultimately survived. I am hoping that with the background knowledge gained from the previous two segments of the unit, my children will be able to enjoy and appreciate more fully the contents of the novel.

This novel is intended to be used for read aloud purposes to help my students further develop their listening comprehension skills. It is not intended to be an in depth novel study. Nonetheless, as we read together we will take note of unfamiliar vocabulary, unusual colloquialisms and character development. Nelson has neatly divided *Devil Storm* into two main parts; Book One, which deals with events before the storm, and Book Two, which tells the story of the storm itself. There is a much shorter Book Three, which serves as more of an epilogue, with a post-storm conclusion.

Novel Summary: Part One

We first meet the Carroll family in September of 1900. Mr. Carroll, once a ship's carpenter, now farms watermelons on Bolivar peninsula, a narrow strip of land between Galveston Bay and the Gulf of Mexico. Now a family of five, they collectively mourn the loss of the young child William, who died the summer before from yellow fever. Mrs. Carroll, grief stricken, has not been the same since the death of her young son, and Mr. Carroll bears the brunt of her unspoken blame. Raised in Houston and very much a "city lady," she reluctantly settles on Bolivar to be a farmer's wife when she marries Mr. Carroll. Bolivar is largely rural and "in the middle of nowhere" to Mrs. Carroll. The reader senses a silent tension between the husband and wife; perhaps young William might have been saved if he had received proper medical attention.

Walter, the eldest child at age 13, cannot bear to witness his mother's sadness. He is the main character in the novel, and the one the reader immediately warms to. Perplexed and frustrated by the awkward changes adolescence brings, he is emotionally and physically "off balance"

throughout much of part one. No longer a child but not yet a man, he is aware of the tension in his parents' marriage and sadly watches as they silently drift apart. Both parents tend to the "business of family," but their conversations lack emotion and their actions seem mechanical. Because their livelihood is farming, there are plenty of chores, and keeping busy has a mind-numbing appeal for the Carrolls.

This summer Walter is full of questions, and like any adolescent seeking the answers that help to shape identity, Walter looks at his parents' life choices with wondering eyes. As the first born, he is automatically responsible for his younger siblings. Alice, a seven year old, is full of mischief, and Emily the baby, requires constant tending. In addition, he has the many chores a first-born male child has on a farm.

Word arrives through town gossip that Tom the Tramp, an African American of dubious character, is back on Bolivar. Intrigued by the oral histories told about Tom, Walter is entertained by the outrageous tall tales, but now doubtful about their veracity. He and his sister spy on Tom and eventually work up the nerve to talk to him. They find him harmless and very entertaining; Tom has a colorful history and cryptic speech patterns that titillate them. They learn that he is the offspring of a slave girl and Jean la Fitte. Tom roams the island looking for buried treasure left by his infamous father. The sea is the devil to Tom; it took his mother's life and he is sure it will try to claim him too. (A conjurer has foretold it.) Tom is wary of storms and has a natural instinct for forecasting bad weather. He lives off the charity of others and prefers the life of the wanderer. A master storyteller, he entertains the children with tales of his travels. They are convinced after their first encounter that he is not dangerous and only a harmless old drifter.

When the children return from their adventure with Tom the Tramp, they learn that their father has business the following day in Galveston. They also learn that the town leaders consider Tom a civil threat and are planning to put him in jail. A storm is approaching, and Mr. Carroll puts Walter in charge as the man of the house during his business travels to Galveston. Walter is alarmed by the news that Tom is to be captured and jailed, and sets off to warn him later that night. Unfortunately, his parents discover that he has left the house and he returns home to find them anxious and very angry. For his disobedience, Walter earns a whipping, but his father's harsh scolding and disappointment causes him more pain. So far, independent thinking and acting on his conscience has caused nothing but trouble for Walter. In this regard, Nelson develops Walter's character well; his coming of age is fraught with confusion. He is man enough to be put in charge of his family during his father's absence, but still child enough to earn a whipping for disobedience. Any adolescent reader can easily identify with Walter's dilemma; it is the ultimate contradiction that defines adolescence.

To Walter's horror, it is his own father who leads the sheriff to Tom. He feels it is his civic duty to act on information supplied by his son. Walter's guilt is enormous; his action, though born of the best intentions, actually facilitates Tom's capture. Mr. Carroll leaves for his business trip assured of his family's safety now that Tom is in jail.

Part Two

Although a storm is approaching and Mrs. Carroll's delicate nature makes her especially skittish in storms, Mr. Carroll leaves knowing that his family will be safe in the house he built for them himself. True enough; the heavy rains could cause serious flooding, but not enough to warrant undue concern. Mr. Carroll had built his house high above ground. He was a ship's carpenter after all, and knew well the dangers of a churning coastal storm.

Tom, on the other hand, paces restlessly in his jail cell. He is not fretful about being held captive- he is fretful about being held captive during a hurricane. He knows all the warning signs and when it is time to evacuate. Had he not been arrested, Tom would have been long gone.

When the deputy returns to the jail to announce that Tom will be freed come daybreak, Tom begs to be released immediately. No one, including the deputy seems to think that the storm will be more than a nuisance, but Tom knows otherwise. The deputy sees no harm in honoring Tom's request and frees him that evening. Tom begins to leave town but turns back to the Carroll farm to urge them to evacuate. He meets Walter, who is outside assessing the impending storm's force. Still smarting from the pain of his good deed gone awry, Walter tells Tom to leave them alone. The family has no plans to evacuate and Walter fears old Tom would only frighten his already nervous mother. Despite Tom's persistence, Walter refuses to heed the warnings. Reluctantly, Tom leaves without the Carrolls.

As late evening turns into dawn, the Carrolls awaken to discover that the rain is not to be their main concern. It is the Gulf that is rapidly swallowing the tiny peninsula. The waves have moved so far inland as to have completely eliminated the beach, and are creeping ever closer to the Carroll property. Horrified, they watch the floodwaters rise well beyond any level they have experienced before. Walter realizes he should have urged them to evacuate earlier, when it was safer to do so. Now, he must choose which is the lesser danger—staying in the house that cannot protect them much longer or venturing out into the terrors of the storm. But how can he hope to do it alone? He is responsible for three other family members, who are all incapable of fending for themselves. As if in answer to his silent prayers for guidance, Tom the Tramp appears again to urge the family to evacuate.

Walter needs no urging, but his mother strongly objects and rudely rejects Tom's heroic offer. This time Walter overrules her and orders the family to follow Tom out into the storm. Tom's plan is to lead them to the lighthouse, which is on higher ground, but the going is treacherous the minute they step out into the storm. The swells are over Alice's head, so Tom carries her. Mrs. Carroll carries Emily and Walter follows with Crockett, his dog. For what seems like an eternity they push onward, against howling winds and biting rain. As swells all but cover them, they lose sight of one another from time to time. As darkness falls, the black pitch of night makes them permanently invisible to one another. A mighty wave topples Walter and he feels his lungs filling with water. Then, nothing.

In the wee hours of dawning light, Walter awakens to find himself alive, safe, and draped over the steps inside the lighthouse. There he surveys the more than hundred survivors who made it to the lighthouse the night before. All of his family is there, thanks to Tom. Mr. Carroll arrives later that morning by rowboat from Galveston. He stops only briefly to survey the rubble that was once his home, and numbly trudges on in search of his family. He arrives at the lighthouse with plenty of time now for a joyful reunion but too late to thank old Tom. It was Tom who carried all of the Carrolls into the lighthouse-- Tom who had gone back into the storm for Walter. But Tom silently slipped away once the storm passed.

Tom is now a hero, albeit an absent one. And Mrs. Carroll experiences an epiphany in the days following the storm. The storm that has claimed the lives of so many friends, relatives and neighbors has spared her entire family. She has much to live for and with a renewed vigor the family has not seen since the death of William, she signals the rebuilding of the Carroll family home and future.

And what has become of Tom the Tramp? Despite the Carroll family's exhaustive searches, Tom cannot be found to be properly thanked and rewarded. He does return over a year later, just to check on Walter, but he refuses to accept any rewards for his good deed. The following spring he is found dead in a pasture not far away from the Carroll farm. His death is apparently from natural causes. As a final gesture of gratitude, the Carroll family buries Tom the Hero in their family plot, right next to little William. And the Carroll family now has their own buried treasure, Tom.

Unit Wrap-up

I have decided to extend this unit by an extra day or two to help my students internalize what they have learned thus far, and make real world applications for their lives in Houston, 2005. The *Houston Chronicle* (February 20, 2005) recently published a front-page story that presented a "worst case model;" a fictional storm of hurricane 5 proportions named Hurricane Carly. Using computer simulation, they created Houston's "perfect storm." Together we will read the newspaper's prediction of what could occur if a Category 5 storm made a direct hit on Houston. Several excellent diagrams are included in this article. Two that will be of particular interest to us are the diagram that pictures what hurricanes of varying intensity do to properties by means of the Saffir-Simpson category rating system, and the one entitled " What Causes Storm Surge." The latter is an easy to follow, step by step explanation that my 4th graders should find easy to understand.

Recalling the activities in the interactive website that we did earlier in the unit, students will be asked to consider what they could do to best help their families prepare for a storm. Aside from the usual household preparations and the inevitable "stocking up" trip to Wal-Mart, students will be asked to think about how using what they now know about hurricanes can help their families stay aware of danger, and become hurricane savvy too. It is most likely that they will be the "hurricane experts" in their families; this is a position they should be proud of and take seriously. Indeed, this wrap-up may be the most important part of the unit, for lessons learned are rarely valuable to us, unless we can make some meaning of them in our lives. For those of us who wonder if these types of teaching efforts make a difference, we need only recall the most recent example of a teacher's influence on a 4th grade child who had recently studied about tsunamis. (Indonesia, December 2004) That lesson saved lives.

LESSON PLAN ONE—LITERATURE*, DEVIL STORM*

Literature Circle Discussions

In cooperative groupings of 3 students each, the following duties will be assigned to facilitate group discussion. Students will take on the roles of reporter, recorder and leader, and discuss the following questions:

1. What is your definition of a hero? Compare yours with the dictionary definition. How is your definition different? The same?
2. Was Tom a hero? Why or why not?
3. Do heroes possess certain qualities? What are they?
4. Does Tom have heroic qualities?
5. Does the community see Tom's heroic potential? Why or why not?
6. Are heroes "perfect people"? (i.e., are they always heroic?)
7. Was Walter a hero? Why or why not?

Teacher led group discussions will follow the literature circles, as each group presents findings.

LESSON PLAN TWO: SOCIAL STUDIES

Primary Sources

In this portion of the unit, I hope to expose my students to the value of primary sources in historical research. Using two excerpted letters from *Through a Night of Horrors*, we will focus on two main objectives: word meaning and corroboration of sources.

Part 1: Word Meanings

Together we will read the Hawley family letters. Students will circle unfamiliar words or expressions that seem antiquated or puzzling. To decipher word meanings, we will first attempt to

understand their meaning from sentence context clues. Next, we will check the dictionary for definitions. Finally, we will compile our own dictionaries of those unfamiliar terms for cross referencing purposes as we re- read the texts of the letters together.

Part 2: Corroboration of Primary Sources

Students will search both documents for identical or similar references (i.e., timelines of events, extents of damages and storm force as perceived by the authors). When similar events are referenced almost identically, students will label those items as strong indicators that corroborate evidence to influence our interpretation as solid facts. Weaker, nebulous references will be noted as less substantive.

In cooperative groups, students will compile lists of events we can consider to be facts, based on corroborative evidence from our primary sources.

Teacher led discussion will follow each group presentation.

LESSON PLAN THREE: SCIENCE

Hurricane Preparedness

Part One

At the National Center for Atmospheric Research website, Students will access the page http://www.meted.ucar.edu/hurrican/strike. There students will visit the living room in the home of the Castillo family on Sunday July 30, and learn from the television that a tropical storm has been sighted. From there the site requires students to respond to situations that develop from hour to hour, day to day, straight through to the storm's downgrade at landfall. Included in this virtual hurricane situation are hurricane safety and preparedness tips, the home readiness test, and storm tracking and analysis.

Part Two

Once students have completed the interactive storm situation of the Castillo family, they will be ready to apply their knowledge with a follow-up activity at home. Before completing the at home activity, however, students will be asked to mentally picture their homes and list all of the preparations they believe are necessary to make their homes hurricane safe. The next step will be an at home activity that will test the comprehensiveness of their lists. Specifically, students will match the prepared list against the actual needs of their homes. (Did they remember all of the pets? What about lawn furniture? Children's play equipment? Untrimmed tree limbs? Potted plants? etc.)

My hope is that this activity will help my students understand that hurricane safety begins with hurricane preparedness. Reducing risk by eliminating situations that cause vulnerability is the first step toward taking control. While risk and exposure cannot be completely eliminated, they can be minimized. Even 4th graders can make a difference in hurricane preparedness.

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