

RESOURCES FOR TEACHING ABOUT THE Earthquake in Haiti



**Miami-Dade County Public Schools
Curriculum and Instruction
Social Sciences and Life Skills
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OVERVIEW

The Division of Social Sciences and Life Skills has developed this resource guide to assist teachers in teaching about the recent earthquake in Haiti. The resources are intended to help students understand earthquakes and the dangers they pose to humans. They are also intended to increase understanding and awareness of the historical, political and cultural aspects of Haiti. It is hoped that this guide will serve as a means of developing an understanding of natural events, heightening awareness, and reducing negative consequences through preparation and understanding.

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Background Information on the Earthquake in Haiti

On the afternoon of Tuesday, January 12, 2010, the worst earthquake in nearly 200 years hit the island nation of Haiti. The epicenter of the magnitude 7.0 earthquake was southwest of Port-Au-Prince, the capital city of Haiti. The earthquake was powerful enough to be felt strongly over 200 miles away, in eastern Cuba. The initial quake was followed by a series of at least 33 aftershocks recorded by the United States Geological Survey (USGS). Fourteen of the aftershocks were between magnitudes of 5.0 and 5.9. With most major earthquakes, aftershocks usually occur in the first 24 to 48 hours. With some they can continue days, even weeks longer. On January 20, 2010, eight days after the initial earthquake, an aftershock with a magnitude of 6.1 was recorded. Scientists are unsure as to how long these aftershocks might continue.

Damage from the earthquake has been catastrophic. Structures of all kinds have collapsed or been damaged. It is estimated that almost 80 percent of the structures in Port-Au-Prince were destroyed. Most of the major landmarks in the city including the Presidential Palace, the National Assembly Building, and the Port-au-Prince Cathedral were significantly damaged or destroyed. Compounding the tragedy was the loss of most hospitals and medical facilities. Countless other buildings including homes, schools, hotels and the local United Nations headquarters have collapsed. A spokesperson from the United Nations called it the worst disaster the UN had ever confronted.

The human suffering resulting from the earthquake is immeasurable. The death toll is estimated to be up to 200,000. Thousands more are injured, ill, and in need of medical attention. Large numbers of people are without shelter, food and water. Emergency assistance is being sent to Haiti from all corners of the world. Distribution of medical supplies, food and water is progressing slowly. The International Red Cross estimates that about three million people (one-third of the population of Haiti) have been affected by the quake. The World Health Organization (WHO) ranks the earthquake in Haiti as among the most devastating and challenging in recent history. Complicating the problem is the fact that Haiti, one of the poorest countries in the Western

Hemisphere, did not have a good public health situation before the disaster.

(Based on information gathered from various sources: USGS; National Geographic News; CNN; Wikipedia; Miami Herald; Washington Post)



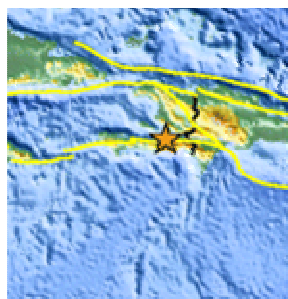
Photo: Marcello Casal Jr/ABr – Public Domain

Earthquake Summary from United States Geological Survey



Felt Reports

Severe damage and casualties in the Port-au-Prince area reported. Felt throughout Haiti and the Dominican Republic, in Turks and Caicos Islands, southeastern Cuba, eastern Jamaica, in parts of Puerto Rico and the Bahamas, and as far as Tampa, Florida and Caracas, Venezuela.



Tectonic Summary

The January 12, 2010, Haiti earthquake occurred in the boundary region separating the Caribbean plate and the North America plate. This plate boundary is dominated by left-lateral strike slip motion and compression, and accommodates about 20 mm/y* slip, with the Caribbean plate moving eastward with respect to the North America plate.

Haiti occupies the western part of the island of Hispaniola, one of the Greater Antilles islands, situated between Puerto Rico and Cuba. At the longitude of the January 12 earthquake, motion between the Caribbean and North American plates is partitioned between two major east-west trending, strike-slip fault systems – the Septentrional fault system in northern Haiti and the Enriquillo-Plantain Garden fault system in southern Haiti.

The location and focal mechanism of the earthquake are consistent with the event having occurred as left-lateral strike slip faulting on the Enriquillo-Plantain Garden fault system. This fault system accommodates about 7 mm/y*, nearly half the overall motion between the Caribbean plate and North America plate.

The Enriquillo-Plantain Garden (EPGFZ) fault system has not produced a major earthquake in recent decades. The EPGFZ is the likely source of historical large earthquakes in 1860, 1770, 1761, 1751, 1684, 1673, and 1618, though none of these has been confirmed in the field as associated with this fault.

Link to earthquake terminology/glossary: <http://earthquake.usgs.gov/learn/glossary/>

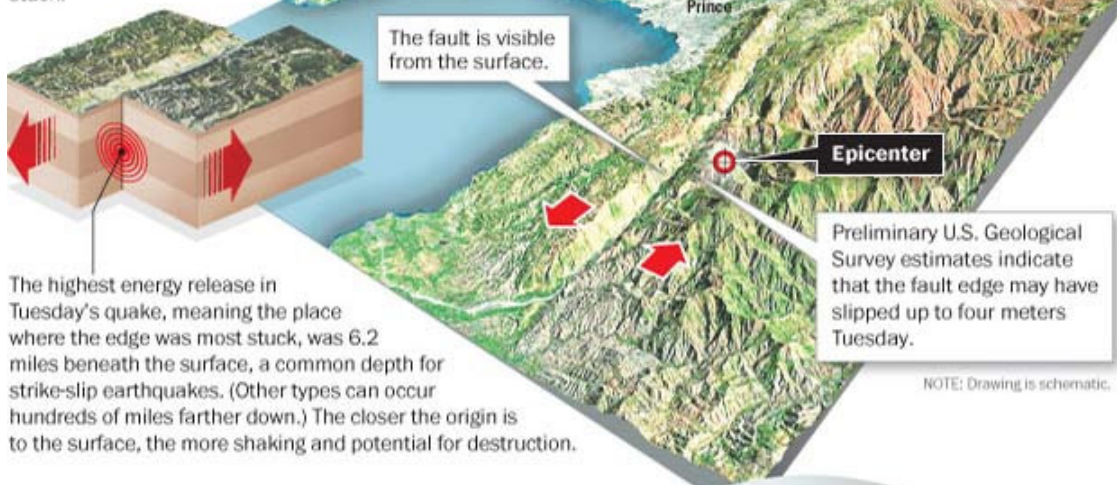
* millimeters per year

Credit: U.S. Geological Survey
Department of the Interior/USGS

Plates involved

Geologists consider the Earth's surface to be divided into about 12 major plates, which are constantly (but very slowly) moving. Tuesday's quake occurred along one of two faults under the island where the North American plate meets the Caribbean plate.

The Caribbean plate creeps eastward at 2 cm a year, but the **Enriquillo-Plaintain Garden fault** had not moved in a large earthquake in more than 200 years. Pressure builds when rocky edges get stuck.

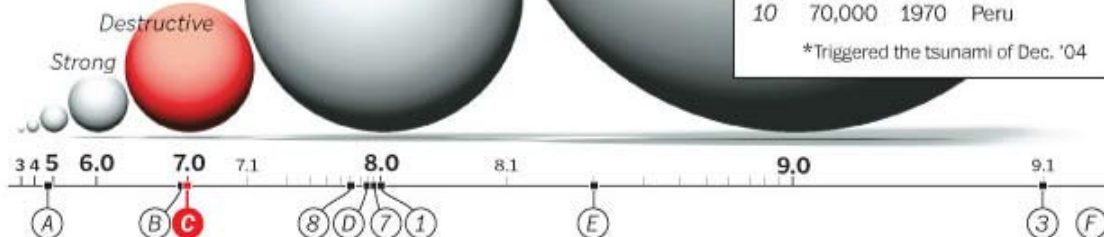


Measuring temblors

Energy released by an earthquake is measured on a **moment magnitude** scale. Each step on the scale is 10 times greater than the step before it. Each sphere below is 10 times greater in volume than the sphere to its left.

Reference earthquakes:

- (A) Virginia, 2003
- (B) San Francisco, 1989
- (C) **Haiti, 2010**
- (D) San Francisco, 1906
- (E) Missouri, Arkansas, Tennessee, 1811
- (F) Alaska, 1964 (9.2)



Deadliest earthquakes

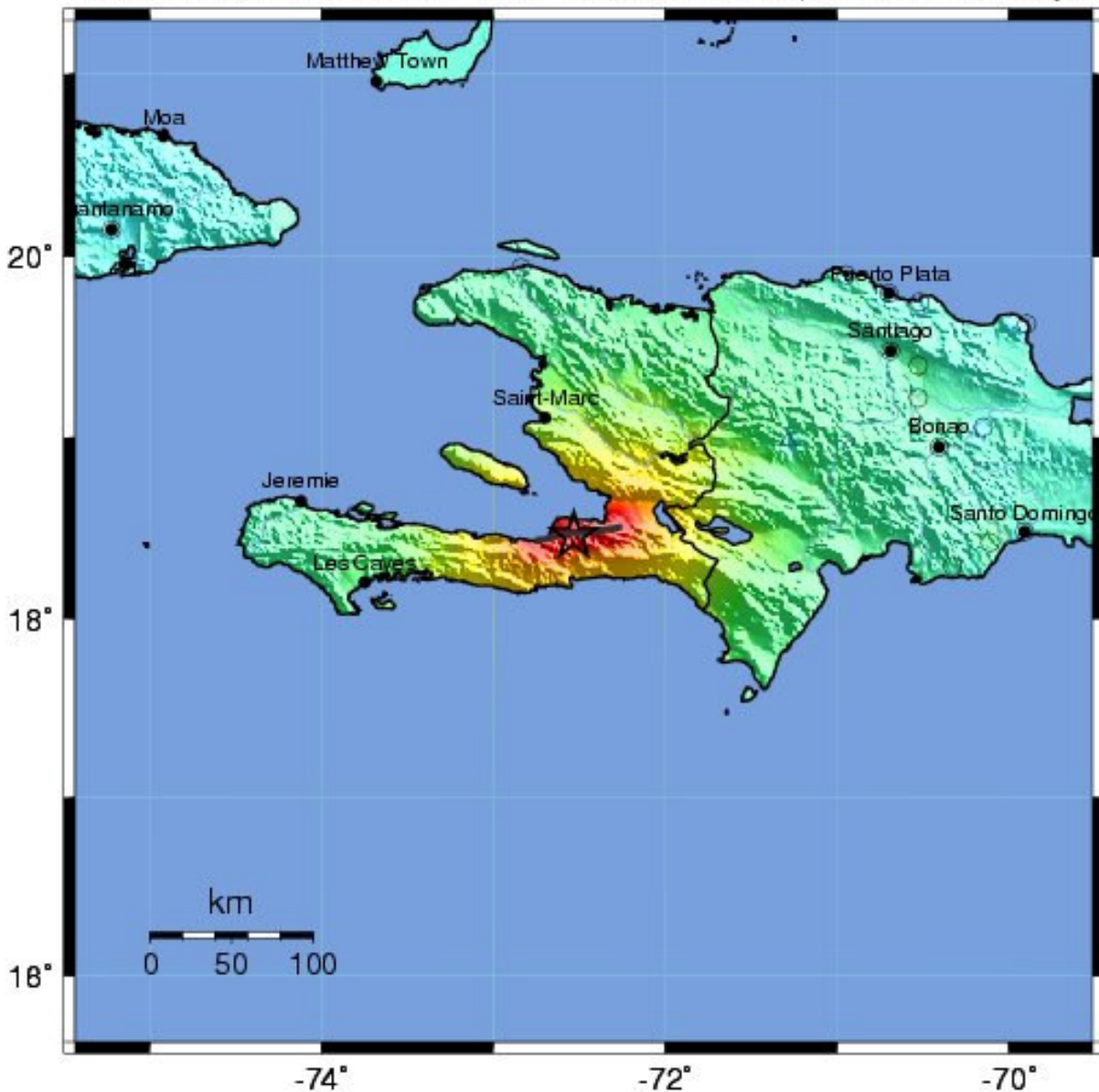
	DEATHS	YEAR	LOCATION
①	830,000	1556	China
2	255,000	1976	China
③	228,000	2004	Sumatra*
4	200,000	1920	China
5	142,800	1923	Japan
6	110,000	1948	Turkmenistan
⑦	87,587	2008	China
⑧	86,000	2005	Pakistan
9	72,000	1908	Italy
10	70,000	1970	Peru

*Triggered the tsunami of Dec. '04

SOURCE: U.S. Geological Survey; Tim Dixon, University of Miami professor of geology and geophysics; research seismologist Gavin Hayes of USGS/NEIC | The Washington Post – January 14, 2010

USGS ShakeMap : HAITI REGION

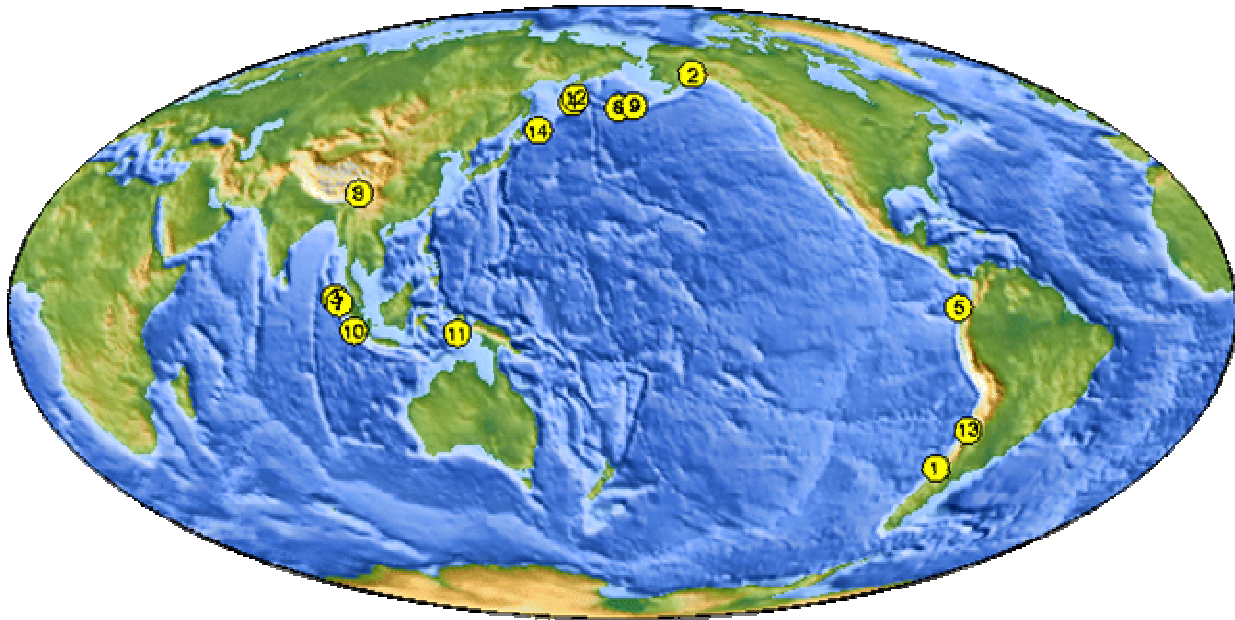
Tue Jan 12, 2010 21:53:10 GMT M 7.0 N18.46 W72.53 Depth: 13.0km ID:2010rja6



Map Version 7 Processed Wed Jan 13, 2010 06:53:11 PM MST – NOT REVIEWED BY HUMAN

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL. (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Largest Earthquakes in the World Since 1900



USGS National Earthquake Information Center

Location	Date UTC	Magnitude	Lat.	Long.	Reference
1. Chile	1960 05 22	9.5	-38.29	-73.05	Kanamori, 1977
2. Prince William Sound, Alaska	1964 03 28	9.2	61.02	-147.65	Kanamori, 1977
3. Off the West Coast of Northern Sumatra	2004 12 26	9.1	3.30	95.78	Park et al., 2005
4. Kamchatka	1952 11 04	9.0	52.76	160.06	Kanamori, 1977
5. Off the Coast of Ecuador	1906 01 31	8.8	1.0	-81.5	Kanamori, 1977
6. Rat Islands, Alaska	1965 02 04	8.7	51.21	178.50	Kanamori, 1977
7. Northern Sumatra, Indonesia	2005 03 28	8.6	2.08	97.01	PDE
8. Assam – Tibet	1950 08 15	8.6	28.5	96.5	Kanamori, 1977
9. Andreanof Islands, Alaska	1957 03 09	8.6	51.56	-175.39	Johnson et al., 1994
10. Southern Sumatra, Indonesia	2007 09 12	8.5	-4.438	101.367	PDE
11. Banda Sea, Indonesia	1938 02 01	8.5	-5.05	131.62	Okal and Reymond, 2003
12. Kamchatka	1923 02 03	8.5	54.0	161.0	Kanamori, 1988
13. Chile-Argentina Border	1922 11 11	8.5	-28.55	-70.50	Kanamori, 1977
14. Kuril Islands	1963 10 13	8.5	44.9	149.6	Kanamori, 1977

Updated 2009 May 14

Source USGS

The Republic of Haiti



The Republic of Haiti occupies the western third of the island of Hispaniola, the second largest island in the Caribbean.

Columbus discovered the island in 1492, naming it Isla Espanola and claiming it for Spain. The island would become a strategic location for the Spanish in their quest for the Caribbean and parts of the North American mainland. The Spanish exploited the area while introducing forced labor and disease to the island. Within 25 years, the native Taino (or Arawak) were effectively obliterated by the Spanish settlers.

By the early part of the 17th century, the French had come to Hispaniola. Colonists were also arriving from Martinique and Guadeloupe. Sugar and tobacco plantations plus forestry-related industries had been established. By the end of the century (1697), Spain ceded the western part of Hispaniola to the French by the Treaty of Ryswick. The French named this region Saint Domingue. This is the area which would eventually become Haiti. Thousands of slaves had been brought to the area from Africa. Using their skills, the French colonists made considerable profits from sugar, coffee and indigo. By the late 1700's, Saint-Domingue was the wealthiest French colony in the Caribbean, known as the "Pearl of the Antilles." Its capital, Cap Français, was referred to as the Paris of the New World.

As the 18th century ended, there were about 30,000 French settlers in Saint Domingue. They operated a cruel but productive slave colony. Records indicate that possibly more than 500,000 slaves, mostly from Africa, were working in the colony. They were treated harshly, often beaten and starved. In response to their brutal treatment, the slaves began to rebel. In 1791, nearly a half million slaves revolted under the call of Dutty Boukman, a voodoo priest. Thus began a war that would eventually end the French colony. Toussaint L'Ouverture led the slaves to defeat the French. He restored order and tried to rebuild Saint Domingue. In 1804, Haiti declared its independence, becoming the world's first free black republic.



Throughout the 1800's, Haiti struggled to recover from the ravages of war. The new country was besieged with problems of rebuilding, creating a government, and bringing stability to the people. From 1843 until 1915, there would be 22 different Heads of State in Haiti, with only one completing his term of office. The majority were deposed by violence or revolution. After a revolt in 1915 ended with a mob execution of Haitian President Jean Vilbrun Guillaume Sam, the United States sent forces to occupy the country. Although the occupation by U.S. troops

restored some order, built roads, and improved the infrastructure of Haiti, it was greatly resented by the people. By the time the troops were withdrawn in 1934, improvements had been made in public health, education and agriculture. Haiti held a democratic election in 1934, electing President Sténio Vincent who would remain in office until 1941.

Political instability returned to Haiti when President Elie Lescot was removed by a military coup. After a series of overthrown governments, forced resignations, and provisional presidents, the people of Haiti elected Francois Duvalier (Papa Doc) in 1957. Papa Doc became a brutal ruler, terrorizing the country. He enforced power with a private militia. In 1964 Duvalier declared himself "President for Life." He later changed the constitution so that he could name his own successor. Upon his death in 1971, he was succeeded by his 19 year old son Jean Claude (Baby Doc) Duvalier. Baby Doc did little better than his father, causing economic conditions in Haiti to deteriorate. By 1986 political unrest forced Jean Claude into exile in France, leaving Haiti as the poorest country in the Western Hemisphere.

After the departure of Baby Doc, the army held power until the election of Father Jean-Bertrand Aristide, a Roman Catholic priest, in 1990. Aristide was in power for only seven months before being overthrown by a military coup and being forced into exile. The military government ruled Haiti for three years until pressured to let President Aristide return. In 1996 Rene Preval was elected president, followed by a re-election of Aristide in 2000. After many refused to accept his election Aristide unveiled a wave of human rights abuses and violence. A revolt in 2004 forced Aristide to once again leave Haiti. An interim government ruled the country until 2006 when the current president, Rene Preval was elected.

Map, Coat of Arms Source: CIA Factbook



Port-Au-Prince prior to earthquake (Ketounette – Wikipedia)

The Economy of Haiti

Haiti is the poorest country in the Western Hemisphere with 80% of the population living under the poverty line and 54% in abject poverty. Two-thirds of all Haitians depend on agriculture, mainly small-scale subsistence farming, and remain vulnerable to damage from frequent natural disasters, intensified by the country's widespread deforestation. While the economy has recovered in recent years, registering positive growth since 2005, four tropical storms in 2008 severely damaged the transportation infrastructure and agricultural sector. Haiti suffers from a lack of investment because of insecurity and limited infrastructure, and a severe trade deficit. The government relies on formal international economic assistance for fiscal sustainability. (Source CIA Factbook)

Geography and Environment

Haiti occupies the western third of the island of Hispaniola between the Caribbean Sea and the Atlantic Ocean. It is bordered on the east by the Dominican Republic. Haiti is a mountainous country with five mountain ranges dividing the country into three regions – northern, central and southern. The country's native name, Hayti, which comes from the language of the Taino, means land of the mountains. Steep land covers most of Haiti, leaving only about twenty per cent suitable for farming. Several fault systems run through Haiti, making it vulnerable to earthquakes.

Haiti's land area is 10,741 square miles, making it about the size of the state of Maryland. The country has five main rivers: the Artibonite, Grand-Anse, L'Estère, Trois Rivières, and Cavaillon. The "wet" or rainy season often cause the rivers to overflow. Haiti has a warm tropical climate. This, combined with its location, put the country at risk of hurricane activity.



In 1925, Haiti was lushly forested. At that time, it is estimated that about 60% of the original forest remained in the land and mountainous regions. Since then, an estimated 98% of the original forest cover has been cut down. It has been used mainly as cooking fuel. The removal of trees has destroyed fertile farmland soils, contributing to desertification. Most Haitian logging is done to produce charcoal, the country's chief source of fuel.

Satellite image depicting the border between Haiti (left) and Dominican Republic (right) 2002

(Source: Wikipedia)

Culture and People of Haiti

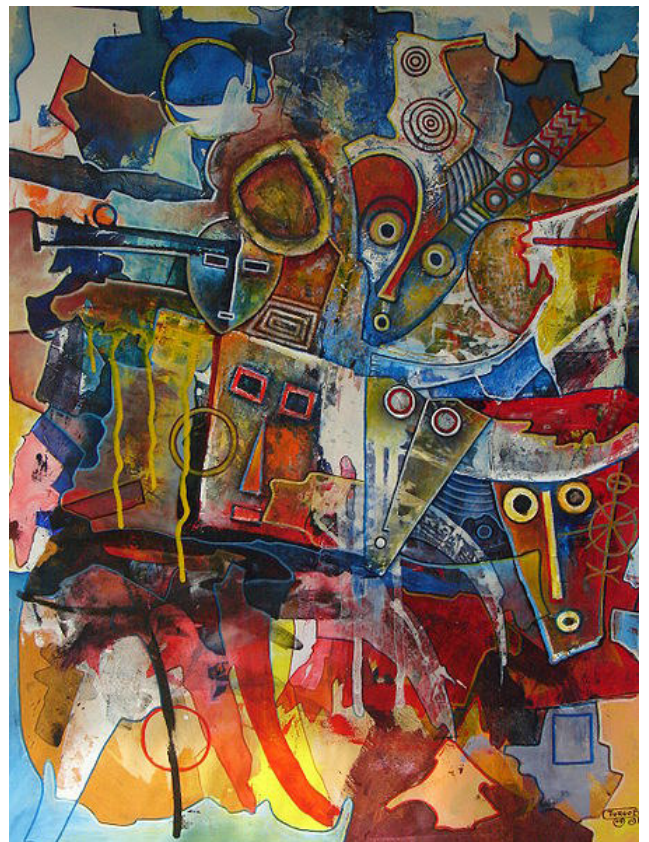
Haiti's population is more than 9 million people. Nearly 95% of the people are of African ancestry. The remaining 5% are white or mulatto. Haiti has two official languages, French and Haitian Creole (kreyol). French is used more often in business and education, but Creole is spoken by nearly all of the people in Haiti. The literacy rate for the country is a little over 50%.

The culture of Haiti is a mixture the various aspects of its history. Strong African influences are mixed with a variety of features from the French, Spanish, and Caribbean. Most of the country's customs also stem from these traditions. Nearly 80% of the people in Haiti are Roman Catholic. Yet Catholicism in Haiti is often mixed with the practices of voodoo. About 16% of the population is protestant.



Groupe au marche by Jacqueline Nesti Joseph

The people of Haiti, beset by many tragedies and natural disasters, have proven to be resilient survivors. All genres of their art display their spirit of hope. This hope is illustrated below in the words of Haitian artist Turgo Bastien in his release of his painting *Another Call From Africa* for public use. 2009 “my artwork represent the space of life – my philosophy of life is to search for the light in the ultimate darkness. And present a global vision of truth and reality”



Another Call From Africa by Turgo Bastien

Helping Haiti

In response to the earthquake in Haiti, Miami-Dade County Public Schools has created a "Help Haiti" initiative. A telephone hotline has been established to disseminate information to those who have questions or would like to help. The hotline number is 305-995-3000. Information on the M-DCPS "Help Haiti" initiative may be accessed at: <http://helphaiti.dadeschools.net/>

The site provides a link to make an online donation as well as information on making a donation by check. Additional resource links are provided.

While monetary donations are most critical at this time, all DONATIONS will be accepted at any Miami-Dade County Public School. The list below is what has been requested:

- Search and rescue volunteers
- First aid kits
- Sleeping bags
- Tents
- Lanterns
- Mosquito repellent
- Screens
- Batteries
- Water
- Crutches
- Wheel chairs
- Baby products
- Hygiene products
- Non-perishable food items (lift-off tops preferred)

Resources/Links

Earthquake Facts – USGS Grades 6-12

<http://earthquake.usgs.gov/learn/facts.php>

Earthquake Fact and Fantasy by the USGS

http://earthquake.usgs.gov/learn/topics/megaqk_facts_fantasy.php

Earthquake Quiz (Grades Intermediate- Senior)

<http://projects.crustal.ucsb.edu/understanding/quiz/>

Earthquakes for Kids (USGS- variety of links)

<http://earthquake.usgs.gov/learn/kids/>

Experts warned of earthquake (Article)

<http://www.cnn.com/2010/TECH/science/01/12/caribbean.earthquakes/index.html>

Haiti- CIA World Factbook (background information/statistics on Haiti)

<https://www.cia.gov/library/publications/the-world-factbook/geos/ha.html>

Haiti Earthquake – Wikipedia Article

http://en.wikipedia.org/wiki/2010_Haiti_earthquake

Haiti Earthquake – CNN Article

<http://www.cnn.com/2010/WORLD/americas/01/12/haiti.earthquake/index.html#cnnSTCText>

Measuring the Magnitude of Earthquakes – CNN Slideshow (Grades 4-8)

<http://www.cnn.com/2010/TECH/science/01/12/earthquake.magnitude/index.html>

National Geographic – All About Earthquakes- Seismic Destruction (all grades)

http://environment.nationalgeographic.com/environment/natural-disasters/earthquake-profile.html?source=sem_G2303c&kwid=ContentNetwork|3302874977&gclid=CPHt79ndrp8CFQdiSwodbDUa1w

National Geographic Daily News- Earthquake in Haiti (Middle-Senior High)

<http://news.nationalgeographic.com/news/2010/01/100113-haiti-earthquake-red-cross/>

National Geographic Kids – Spotlight on Haiti (Elementary grades)

<http://kids.nationalgeographic.com/Places/Find/Haiti>

Plate Tectonics – Wikipedia

http://en.wikipedia.org/wiki/Plate_tectonics

Lesson Plans and Activities

CNN- FYI-Teachers – Searchable Lesson Plans

<http://www.cnn.com/fyi/teachers.lessonplan/>

ESOL Lesson Plan on Haiti Earthquake

http://www.breakingnewsenglish.com/1001/100114-haiti_earthquake.html

Freely Educate – Lessons & Resource Links – Earthquake in Haiti

<http://www.freelyeducate.com/2010/01/free-lesson-plans-and-educational-sites-on-haiti-earthquakes.html>

Lesson Planet – Lesson Plans on the History of Haiti (all grade levels available)

http://www.lessonplanet.com/search?grade=All&keywords=history+haiti&media=lesson&rating=3&search_type=narrow

National Council for the Social Studies – Haiti’s Earthquake: Teaching Resources

http://www.socialstudies.org/haiti_disaster

National Geographic Expeditions – Links to lesson plan sites (links for all grade levels)

http://thinkfinity.org/PartnerSearch.aspx?Search=True&orgn_id=4&subject=all&partner=all&resource_type=all&q=earthquake&grade=all

National Geographic Expeditions- NGS Lesson Plans (all levels selection key on site)

<http://www.nationalgeographic.com/xpeditions/lessons/15/g35/earthquakes.html>

New York Times Education- Resources for Teaching and Learning About the Earthquake in Haiti

<http://learning.blogs.nytimes.com/2010/01/13/resources-for-teaching-and-learning-about-the-earthquake-in-haiti>

PBS Teachers –Searchable Lesson Plan Database

<http://www.pbs.org/teachers>

PBS News HOUR- Articles, Classroom Activities, Slideshows on earthquake in Haiti

http://www.pbs.org/newshour/extra/features/world/jan-june10/haiti_01-13.html



The School Board of Miami-Dade County, Florida, adheres to a policy of nondiscrimination in employment and educational programs/activities and programs/activities receiving Federal financial assistance from the Department of Education, and strives affirmatively to provide equal opportunity for all as required by:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Education Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits sex discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

School Board Rules 6Gx13- 4A-1.01, 6Gx13- 4A-1.32, and 6Gx13- 5D-1.10 - prohibit harassment and/or discrimination against a student or employee on the basis of gender, race, color, religion, ethnic or national origin, political beliefs, marital status, age, sexual orientation, social and family background, linguistic preference, pregnancy, or disability.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.

Revised 5/9/03