"Documento original en mal estado"

OBJECTIVES

1. When the student has completed this unit he will define a natural disaster as a social disaster.

2. The student will be aware of the liklihood of experiencing an earthquake in San Francisco.

3. Students will learn projected earthquake intensities for various San Francisco neighborhoods.

4. The student will recognize that social institutions are composed of people with whom they have daily contact and are dependent upon. A natural disaster which destroys people damages and destroys social institutions.

INTRODUCTION AND EXTENSION

This is a one week unit which is designed to teach that a natural disaster such as an earthquake is also a social disaster. In spite of the current brevity of the lessons, most lend themselves to expansion through the use of supplementary materials. Because the unit is interdisciplinary in approach it readily lends itself to a team teaching effort which is not only applicable in the sciences but in San Francisco Experience, California History, Cultural Geography, Sociology, Psychology or Civics classes.

SUMMARY QUESTIONS - none

MATERIALS

TABLES

1 Major Historic Disasters

2 Frequency of Earthquakes in California

3 Mercali Intensity Scale of 1931

MAPS

1. Geologic map of San Francisco indicating earthquake intensity zones as well as arterial streets.

2. A street map showing neighborhood divisions in San Francisco.

MISCELLANEOUS

1. Telephone Directory

FILM

1. "The City That Waits To Die" released through kqed.

PROCEDURE

LESSON 1

1. Introduce students to the frequency of natural disasters and the frequency of earthquakes in California. (tables 1 & 2)

2. Examine intensity scales (table 111) and direct the discussion so students develop a concept about the nature and degree of physical damage sustained in a high intensity earthquake.

3. Complete the lesson by showing the film "The City That Waits To Die".

LESSON 2.

1. Have each student prepare a list containing the names of all the people with whom they have had contact in the past 24 hours.

2. Tell the students to match the people listed with the role each plays in their lives. See example page

3 Explain that the students have just listed people that they know and depend on with social institutions.

4. Tell students to imagine that an 8.6 magnitude earthquake has just shaken San Francisco. All the people on their list have been killed. Their assignment is to write an essay in which they explore the impact that the loss of their people would have on their lives. They might approach the essay by trying to repeat the events of the previous 24 hours without the people on their lists.

LESSON 3

1. Reproduce and distribute some of the essays anonymously for discussion purposes. Direct the discussion to stress the kinds of ties which bind people together to form a society. Examine the inter-dependencies which exist in a complex society and point out examples of psychological trauma when these ties are severed. You might lead into the discussion by asking some of the following questions:
   A) Which losses present the greatest trauma for people?
   B) Which losses present the greatest problems for the persons immediate survival?
   C) Does the loss of some people create a greater impact on the society than the loss of others?
   D) Which losses retard recovery and reconstruction plans for your community or for the city?
   E) Do you see evidence of the psychological effect of multiple deaths as opposed to singular death?

LESSON 4

1. Distribute geologic maps of predicted earthquake intensity in San Francisco to students. See page 11.

2. By using a street map of San Francisco or the telephone book, have the students superimpose San Francisco neighborhood boundaries onto their desk maps.

3. Have the class make judgements about the vulnerability of each neighborhood.

LESSON 5

1. Write the names of each San Francisco neighborhood on the board and ask each student to write 4 or 5 words or phrases which best characterize each neighborhood. Discuss and compare opinions adding to the descriptions which already exist.

2. Ask some of the following questions:

   a) Which neighborhoods would be likely to suffer the most damage during a major earthquake? Why?

   b) Is there any one ethnic group that would suffer more than the others?

   c) Which neighborhoods would most likely have the quickest recovery? Why?

   d) Are there any neighborhoods that might not ever be reconstructed. If so, why? Where would people living such a neighborhood go?

   e) Are there any vital social services which are more heavily concentrated in any one part of the city? If so, how would they survive in an earthquake and what impact would this have on the people who require these services?

   f) Would the destruction of any one neighborhood have graver consequences for the city than the destruction of other neighborhoods?

3. Based on your conjectures, write an essay in which you describe the changes which occured in either your neighborhood or San Francisco one year after an 8.3 earthquake struck San Francisco.

[illegible]	EVENT/LOCATION	ESTIMATED DEATHS
[illegible]	Earthquake, Greece	42,000
[illegible]	Earthquake, Asia Minor	60,000
1290	Earthquake, China	100,000
1347		
1351	Bubonic plague, Eurasia	75,000,000
1456	Earthquake, Italy	60,000
1556	Earthquake, China	830,000
1693	Earthquake, Italy	93,000
1731	Earthquake, China	100,000
1732	Earthquake, China	70,000
1737	Earthquake, India	300,000
1755	Earthquake, Portugal	30,000
		60,000
1783	Earthquake, Italy	50,000
1797	Earthquake, Ecuador	41,000
1878	Famine, China	9,500,000
1881	Typhoon, Indochina	300,000
1883	Volcano, Krakatoa	36,000
1887	Flood, China	900,000
1889	Dam failure, Johnstown, Penn.	2,100
1902	Volcano, Mount Pelee	40,000
1906	Earthquake, San Francisco	700
1908	Earthquake, Sicily	85,000
1918	Influenza, worldwide	22,000,000
1920	Landslide, China	180,000
1923	Earthquake, Japan	143,000
[illegible]	Saint Francis dam failure, Los Angeles County, California	500
1935	Earthquake, Pakistan	60,000
1939	Earthquake, Chile	30,000
1939	Earthquake, Italy	60,000
1939	Earthquake, Turkey	100,000
1941	Snow avalanche, Peru	5,000
1963	Landslide into reservoir, Vaiont, Italy	2,800
1963	Earthquake, Iran	20,000
1970	Earthquake, mudflow, Peru	70,000
1972	Earthquake, Nicaragua	8,000
1976	Earthquake, Guatemala	23,000
1976	Earthquake, China	100,000
1976	Earthquake, New Guinea	9,000

Date	Time GMT	Epicenter ° N	° W	Maximum Intensity+	Felt Area+ (km²)	Magnitude+	Location
1928							
Mar 17	06:15	34.9	120.4(1)	VII,MM(2)			Santa Maria
Apr 11	21:57	39.8	122.7(3)	VII,MM (3)	30,000(4)	4.5(1)	Glenn County
Jun 1	03:30	40.8	122.9(1)	VII,MM(5)		5.0(4)	Weaverville
Jun 9	02:22	35.2	119.5(1)	V,MM (4)		4.0(4)	Kern County
Sep 2	04:02	34.5	122.5(1)			5.0(1)	Off Pt. Arguello
Sep 5	14:42	34.0	116.0(5)	V,MM (5)		5.0(4)	Twentynine Palms
Sep 12	01:20	37.0	120.1(1)	VI,RF (2)			Madera
Sep 19	02:47	32.9	115.7(4)			5.0(1)	Imperial
Sep 23	17:44	32.7	115.5(1)	V,RF (2)			El Centro
Oct 2	19:01	32.9	115.7(4)		64,000(2)	5.0(4)	Imperial
Dec 31	10:45	33.8	118.3(1)	V,RF (6)			Compton
1929							
Feb 19	03:25	38.4	122.8(1)	V,MM (4)			Santa Rosa
Mar 13	02:28	35.2	119.2(1)	V,MM (4)	15,000(4)	4.5(4)	Bakersfield
May 5	01:07	34.0	118.3(1)	VI,RF (6)			Los Angeles
May 5	07:35	34.0	118.3(1)	V,RF (6)			Los Nietos
May 23	22:17	37.8	122.5(1)	V,MM (4)			San Francisco
Jun 20	22:12	40.5	124.1(1)	V,MM (4)			Scotia
Jul 6	23:00	41.8	124.2(1)	V,MM (4)			Crescent City
Jul 8	10:06	33.9	118.1(7)	VII,MM (7)		4.7(7)	Whittier
Jul 23	11:55	34.0	118.3(1)	VIMM (4)			Imperial County
Aug 1	10:02	37.8	122.2(1)	V,RF (2)			Oakland
Sep 9	05:15	34.5	119.7(1)	VI,RF (4)			Naples
Sep 23	3:[illegible]3	33.5	118.6(1)	V,MM (4)		4.0(4)	Santa Catalina Is.
Oct 15	07:[illegible]	40.5	124.1(1)	V,RF (4)			Scotia
Oct 21	19:39	33.3	118.3(1)	VI,RF (4)			San Pedro
Nov 20	08:05	36.4	121.0(1)	V,MM (4)		4.5(4)	San Ardo
Nov 21	19:49	36.9	118.2(1)	VII,MM (5)	85,000(5)	5.5(4)	Bishop
Dec 2	07:00	37.0	118.2(1)	VII,RF (4)			Aberdeen
Dec 7	23:24	32.0	116.7(4)	VI,MM (4)		4.5(4)	Ensenada, Mexico
Dec 7	00:05	34.0	117.2(1)	V,RF (4)			Chino
Dec 8	12:29	40.5	124.0(1)	V,MM (4)	15,000(4)	4.5(4)	No. CA coast
Dec 9	12:45	37.0	118.2(1)	VII,RF (4)			Aberdeen
1930							
Jan 9	08:06	36.8	121.5(4)	VI,RF (4)	4,700(2)	4.5(4)	Salinas
Jan 9	08:16	36.8	121.5(4)	VI,RF (4)	4,700(2)	4.5(4)	Salinas
Jan 9	09:56	36.8	121.5(4)	VI,RF (4)	6,000(4)	4.0(4)	Salinas
Jan 16	00:25	34.2	116.9(5)	VII,MM (5)	128,000(5)	5.2(5)	San Bernardino
Jan 16	00:34	34.2	116.9(5)	VII,MM (5)	128,000(5)	5.1(5)	Mountains
Jan 27	20:26	34.2	118.1(1)	VI,RF (4)			Arcadia
Feb 7	23:23	32.0	116.0(1)	V,RF (2)	20,000(2)	4.5(4)	Jacumba, Mexico
Feb 21	21:21	37.4	122.0(1)	V,RF (2)	12,000(2)	4.0(4)	Los Altos
Feb 26	02:30	33.0	115.5(5)	VIII,MM(5)	51,000(5)	5.0(5)	Imperial Valley
Mar 1	21:05	33.0	115.5(1)	VII,RF (4)		4.0(4)	Imperial Valley
Mar 1	23:44	33.0	115.5(5)	VIII,MM (5)	28,000(5)	4.5(4)	Imperial Valley
Mar 2	01:50	33.0	116.1(1)	IV,RF (2)	25,000(2)	4.5(4)	Imperial Valley
Mar 27	21:30	40.7	124.3(1)	III,RF (2)	7,000(4)	4.0(4)	Humboldt County
Apr 6	04:33	36.8	118.3(1)			4.5(4)	Independence
Apr 9	22:00	39.3	120.0(1)	VI,MM (5)	48,000(5)	5.0(4)	Lake Tahoe
Apr 29	20:13	40.6	121.9(4)			4.0(4)	Redding
May 4	20:55	32.3	115.3(1)	V,RF (4)			Holtville
May 11	04:14	33.3	116:3(1)			4.3(4)	Warner
May 12	05:25	33.3	116.3(1)			4.0(4)	Warner
May 13	15:30	40.5	124.2(1)		7,000(4)	4.0(4)	Briceland
Jun 29	23:25	32.5	115.5(1)			4.0(4)	Heber
Jun 30	22:09	32.5	115.5(1)	VI,RF (4)		4.5(4)	Holtville
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]

Modified Mercalli Intensity Scale of 1931, (1956 version)

Masonry A, B, C, D. To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering.

Masonry A. Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

Masonry B. Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.

Masonry C. Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.

Masonry D. Weak material, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

I. Not felt. Marginal and long-period effects of large earthquakes.

II. Felt by persons at rest, on upper floors, or favorable placed.

III. Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.

IV. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frame creak.

V. Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.

VI. Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc. off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken visibly, or heard to rustle.

VII. Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices also unbraced parapets and architectural ornaments. Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.

VIII. Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.

IX. General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures, if not bolted, shifted off foundations. Frames wrecked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake fountains, sand craters.

X. Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.

XI. Rails bent greatly. Underground pipelines completely out of service.

XII. Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

CONNECTING PEOPLE AND SOCIAL INSTITUTIONS

Match the people below with the role they play in your life.

People Contacted In Previous 24 Hrs.		This Person Has To Do With Your-	
A	Jane Doe - Mother	A	Family
A	Elsa Doe - Sister	B	Education
G	Bus Driver	C	Social Life or Recreation
C	Alfred & Newman - Friend	D	Religion
B	Mr. Frank - Teacher	E	Health
B	Mrs. Gilmore - Teacher	F	Economic Livlihood
C	Annie Lee - Friend	G	Government
E	Dr. Fong	H	Other
G	Police Officer		
F	Gas Station Attendant		
F	Mr. Kao - Boss		
D	Pastor James - Clergyman		
F	Grocery Clerk		

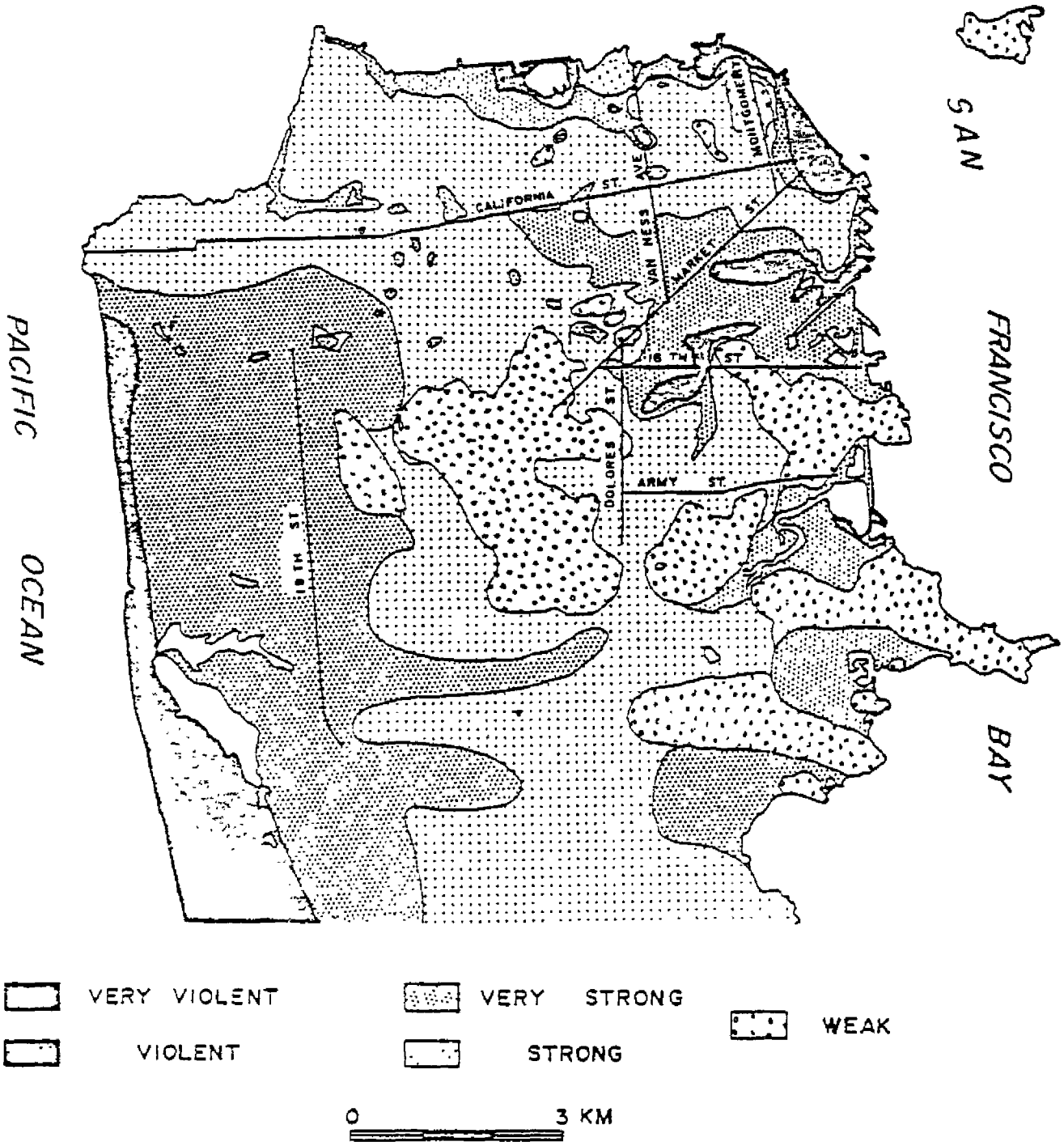

Figure 1. Apparent intensity of the 1906 earthquake in San Francisco, Calif. (see section entitled San Francisco Intensity Scale for 1906 Earthquake" for detailed description) (after Wood, 1908).

REQUIRED STUDENT BACKGROUND

1 It would be desirable for the student to have some background as to the geologic mechanisms which cause earthquakes although it is not an absolute pre-requisite.

2 The student should have studied social institutions and how they relate to society as a whole.

3 The student should possess an over-all familiarity with the city of San Francisco although it should be noted that the lesson could be adapted to suit any geologic region.

BACKGROUND INFORMATION - none

REFERENCES

1 Bolt, Bruce A. Earthquakes: A Primer W.H. Freeman and Co., San Francisco.

2 IACOPI: Robert Earthquake Country 1971 Sunset House, Menlo Park, California.

3 Jenkins, Olaf P. Geologic Guidebook of the San Francisco Bay Counties 1951, California Division of Mines. San Francisco P 151-174.

4 Lawson, A.C. The California Earthquake of April 18, 1906. Report of the State Earthquake Investigation Commission Volumes I and II, 1969, Carnegie Institute of Washington Publication Vol. II p 220-245.

5 A Study of Earthquake Losses in the San Francisco Bay Area: Data and Analysis 1972. Prepared by the Office of Emergency Preparedness.

TITLE: EARTHQUAKE LIMERICKS

INTRODUCTION This is an interesting, easy activity to vary the requirement for learning to write Limericks, and make use of other earthquake information.

OBJECTIVES: To write two limericks--one regular and one earthquake

MATERIALS: Pencil, paper, some examples of Limericks

PROCEDURE:

1. Introduce Limerick with several examples (I had several posters about room.
2. Point out rhyme scheme a,a,b,b,a, and rhythmic pattern, and humor.
3. Practice by writing a Limerick--subject un-directed (but not dirty).
4. Write earthquake related Limerick.

EXTENSION: Once the Limerick pattern is known, it can be extended to other subjects.

Teacher Guide

REQUIRED STUDENT BACKGROUND

These students had received a lecture on earth's structure, trenching, volcan & quake frequency, & plated ([redacted]'s overhead projections). Many of them had also recently experienced an earthquake . They were als given a series of rapid-fire questions to stimulate their thinking about "What if...".

BACKGROUND INFORMATION :

This class of students is a mixed M.G.M. and"regular " class ranging in reading ability from about 3rd grade up. This activity was a "teaser" for a more extensive project which will, hopefully, turn the class into a disaster planning team for the school and their homes. This class is a "core" of Social Science and Language Arts.

ATTACHMENT: Copies of the results of the lesson (as always, they didn't all "get it" the first time around, and those who didn't will get additional help).

JACKIE LEE
NEW HAVEN MIDDLE SCHOOL
NEW HAVEN UNIFIED
UNION CITY, CA.

EARTHQUAKE LIMERICKS

There once was a girl who was baking a cake
When suddenly there was a big quake.
It was so hard
That she needed a guard
And you should have seen the ugly cake.
Jaime Abaya

There once was a woman named Kate
Who was scared out of her wits of quakes.
She hid under the table
Isn't this a nice fable
For Kate to be scared of quakes.
Angela Alviso

Once there was a cake
That was baked in a quake
Even if it was flat
It made a good mat
And that's the story of the quake cake.
Brent Jensen

One day I felt a shake
I thought it was a quake.
I heard a rumble,
A building did crumble
It finally stopped, for goodness sake.
Rhonda Cunningham

There was a man named Jake
Who liked a big earthquake
He jumped for joy
When his friend named Coy
Said, "I'm afraid of a big earthquake."
Frances Garcia

When I was using a rake,
The ground started to shake.
So I looked around,
Didn't know where I was bound
When I found it was a quake!
Michelle Catingub

There once was a little blue bird,
Who felt a very hard shake, so absurd!
As he tried to fly,
He couldn't go high
Cause it was like nothing you've ever heard!
Michelle Catingub

Once there was a quake
When we were playing patty cake
I ran in the house
And put on my blouse
The house shook like a milkshake.
Lalaine Bugawan

There was a cake
That fell in a quake
It smashed to bits
And it was the pits
And that is the end of the quake cake.
Orson Curtis

While swimming one day in a lake
I happened to feel a quake
I shouted, "Help!"
For I was bit by a kelp
Though it really was a quite big shake.
Steve Guernse

There once was a great big quake
While the Baker was baking a cake
Most of them cried
While men said, "Hide!"
While the baker jumped in a lake.
Sammy Isaacson

Once, in the year 88,
There was a very big shake!
Well the people found,
They were running around,
And quit, for it was a quake.
Kathy Fensin

There was a silly young woman named Sue,
Who was stuck in a quake, What to do?
She could run next door,
Or run to the store,
All she did was cry, "Boo Hoo!"
Bridget Goranson

Once there was a huge quake
It caused the whole city to shake
It was so bad
Everyone was sad
And they cried a great big lake.
Stacie Lang

There are a couple of plates
Which are in our states
We heard the forecast
And we got out fast
And Ann ran away with her date.
Tish Price

Once there was an earthquake
Which made the city shake
But when the hill fell down
Everyone turned quite brown
And that was the end for goodness sake.
Hitomi Yasuda

There once was a man who lived through a quake
He said, "My, my what a shake!
It messed up my hair,
It smashed my chair
And even shook old Jake."
Eddie Osborne

There was a man named Drake
Who was startled in a quake.
He said, "Oh well,
It rang the bell,
And gave me quite a shake."
Eddie Osborne

One day I had the rake
I felt a rumbling quake
My brother began to cry
I said, "Oh my!"
That sure gave him a shake.
Eddie Osborne

One day I saw Dr. Blake
I asked if he felt the earthquake
He said, "Oh, yes
It sure was a mess
And even crumbled my wife's cake."
Eddie Osborne

There once was a quake
That brought up a big shake
It sailed at nine point five.
The kids said it was "live"
Everyone in town was awake.
Kim Gonsalves

Shake, shake, shake,
Went the big earthquake,
It moved and rumbled,
As the buildings tumbled,
The whole town needed a re-make.
Kim Gonsalves

There once was a man at a bank
Who felt a big earthquake and shrank
He ran by the vault
Which was on a fault
And the town almost sank.
Alicia Camacho

There once was a quake
Which shook for God's sake
The people were mad
Although very glad
Cause now they have built in a lake.
Amanda Olson

One day there was a gas line,
On which PG&E wrote a fine.
Well we didn't pay,
So the very next day,
Every wire we had was in twine.
Daren Pepe

Once there were a couple of quakes
Which gave some people the shakes
However much money it takes
I'll buy some steaks
And eat until my stomach aches.
Alicia O'Neill

Jack and Jill went up the hill
To get a pail of water
Then the hill started to shake,
Jack said it must be a earthquake
Then Jack and Jill fell down the hill.
Rene Valenzuela

While I was making a cake
The pans started to shake
I yelled out, "Quake!"
But no one was awake
To feel the earth shake,
And that was the end of the quake.
Heidi Robinson

Old man Earthquake
Came to me with a shake and said
and said
I need a room and a bed
Said old man earth quake.
Sean Farley

There once was a quake.
It sure was a shake.
My brother Mo,
had made some dough
Then the house was like playdough.
Carmelita Torres