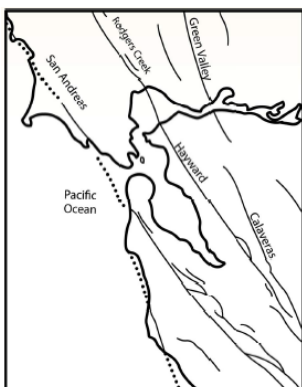


1868 Hayward Fault - 150th year Anniversary

Education, Exhibit and Tours in City of Fremont

Request for Funds

Math Science Nucleus



The Hayward Fault is part of the San Andreas Fault system that dominates the landforms of eastern San Francisco Bay. The relative motion between the North American Plate (southeast) and the Pacific Plate (northwest) creates stress. The Hayward Fault is part of the plate boundary zone, and its movement follows the San Andreas Fault motion. The Hayward fault is one of only a few dozen faults in the world that “creeps,” or slowly moves.

1868 “Great Earthquake”

October 21, 1868 was a day that people in the East Bay would not forget for a long time. At 7:53 am a very large earthquake shook the San Francisco Bay area. The energy released was so great it had surface rupture from Berkeley to Fremont. The estimated right lateral strike slip motion for the event is up to 1.9 meters (about 6.5 feet) on the Hayward Fault. The magnitude of the earthquake is projected to be between a 6.9-7 on the Richter Scale (this scale was not invented until 1930) so this is a projected magnitude. The epicenter was in what is now Castro Valley (Cull Canyon).



Court house in San Leandro collapses after 1868 earthquake

SUMMARY

Math Science Nucleus is seeking funding for various events and exhibits on the Hayward Fault for the 150th Anniversary of the Great Quake in 1868. The exhibits and signs from this proposal will be permanent. Funds are also requested for animations that would be used at the exhibit, as well as public friendly graphics for a new educational brochure. An Earthquake Awareness Fair is also proposed at Central Park, Fremont. The one-day event at Central Park on

Oct 21, 1918 from 11-4 pm will help to remind people in the East Bay that there is a significant danger on the Hayward Fault. This will be a grand opening of new signs in 6 areas that will represent a self-guided tour. So the 1 million visitors each year will be able to educate themselves on the Hayward Fault. Many of the people living in Fremont are new to the area, as the allure of family homes attracts new residents. We feel this series of events will help to educate the public on the possible impact.

PROPOSAL

The Math Science Nucleus is seeking assistance to create appropriate displays at the Fremont Earthquake Exhibit. Currently we have scientific posters up with outdated material. We have little information on hazards. More people want to see the exhibit but without a scientist giving them an explanation, it is difficult to increase their knowledge. Most people who see the crack in the exhibit think it is fake. Most people do not have a working understanding of plate tectonics. We would like to make the Fremont Earthquake Exhibit available for digital displays so we can accommodate elementary as well as the public. MSN has created many animations, but difficult to show in the exhibit. As part of this funding we would create new animations which will be used on tours and also to be put online. It would be geared toward the general public.



Fremont's population is varied and changing all the time. Many of the residents are unaware of the fault and with little understanding of plate tectonics and the Hayward Fault. This proposal seeks funds to create publicity of the available tours for schools and public, and to make public think about the dangers of earthquakes. It would also fund new brochures and updates on our websites.



With the new signs and digital displays at Central Park, we will be able to train docents to do tours. We would like to create a Docent Script. In the script, we would like to put more information on the history of the quakes (at 3rd and 4th grade level). This way also we can do some teacher workshops, so they can also do the tour on their own.

Over one million people visit Central Park during the year. Tule Ponds has over 120 classes visit each year, with public events that on average attract 400 people per public event. Fremont Unified School District has over 34,000 students within their system.

Tule Ponds at Tyson Lagoon, which has two traces of the Hayward Fault, is a great example of a pull-apart basin and sag pond. We had an Eagle Scout project over 12 years ago to make signs. However, the signs were not professionally designed nor constructed well. Many of them are not readable now, and we would like to replace them with more information. During our tours, we have many parents and this would be ideal for them to read. We also are on a busy street near the Fremont BART Station, so we would like an earthquake sign that can easily read by people who walk by.

At Tule Ponds classroom, we have an earthquake peel from one of the many trenches. Dr. Schwartz gave us the peel when we opened up the center. We never had it professionally installed and over the last 25 years, it needs to be preserved better.

We are seeking funds for an Oct 21, 2018 Earthquake Event that would make people aware of the Great Quake Anniversary and the science behind earthquakes. There will be several tours at Tule Ponds at Tyson Lagoon funded



by an Alameda County Grant Agreement, while Oct 21 will be at Central Park (dates tentative). Activities will be along the Hayward Fault (below). Tule Ponds is to the left, Lake Elizabeth is in center area.

The Gallegos Winery on Osgood and Washington Blvd was built on the fault scarp of the Hayward Fault. This area has significance uplift during the 1868 Earthquake. BART (Bay Area Rapid Transit District) owns the property and will be building a smaller station in the area (Irvington). The design of the station will preserve the wall and wine cellar of the Winery and make it into an acre park. In 2026 it will be transferred to City of Fremont as a park. However, it is now



Ruins of Gallegos Winery on fault scarp covered by trees

overgrown with shrubs, small trees and homeless. U. S. Geological Survey has a continuous creep meter in the area. Math Science Nucleus has had preliminary conversations to open the area up and do field trips.



Television personality interviewing USGS scientist in front of new map

BUDGET

We are requesting any funds to help us with any of the projects below. If you need more details on each of the event, please contact us.

	FUNDED	UNFUNDED
1. SIGNS FOR CENTRAL PARK (City of Fremont is paying the cost of design (MSN involved)	150,000.00 3/4 complete	
2. Seismic retrofitting of beams (City of Fremont) for Fremont Earthquake Exhibit	50,000 (complete)	
3. Replacing of doors so people can see inside, doors have warped over last 60 years (City of Fremont)	\$25,000.00 (complete)	
4. Exhibit refurbishment, including installation of new map from USGS; projection system, redoing exhibit inside (MSN responsibility)	5000.00 (USGS) complete	\$40,000.00
5. Tule Ponds Signs (inside 3-4 signs; outside 1 large sign) and design, artist ; preservation of earthquake peel, coordination		\$50,000.00
6. Oct 21 earthquake celebration 150 anniversary at Tule Ponds, Central Park, Family, including tours, lectures, articles, media, coordination Tours at Tule Ponds are funded.	\$5000.00 coordinator hired	\$20,000.00
7. Animations used for lectures that will permanently be on our website for teachers to use; a new storybook and slideshow for educators to use (as part of our Integrating Science, Math, and Technology Curriculum) redoing the informational brochure and website	\$5,000.00 (drawings, photos ½ complete)	\$40,000.00
8. Clean up and removal of shrubs and trees at Gallegos Winery in preparation of it becoming a park under City of Fremont (BART presently owns) at Irvington Station, USGS creepmeter is located at site		40,000.00
Total \$470,000.00	280,000.00	190,000.00

BUDGET NARRATIVE

1-3 These line items are fully funded from Capital Improvement Projects (CIP) or Building Maintenance of the City of Fremont.

4. The inside of the Fremont Earthquake Exhibit was recently retrofitted because the beams were starting to warp. The exhibit display needs to be modified. We also had put in a large map of the Hayward Fault, and it faded because of the type of ink the USGS used. We realized we might have a problem, but because we did not have funds to coat it, we left it. Also we need an electronic display area where we can use many of our electronic materials. A new map from USGS was installed.

5. The signs at Tule will be 24"w X 18"h. The graphic panel with printing will cost \$156.00 each and the aluminum double pedestal stand for the panel will cost \$418.00 each. Larger signs will be about \$1000. One would be on the outside where the neighbor could read about earthquakes. Since this is a busy site with BART only 100 yards away, it should educate the immediate community. Tule Ponds is a sensitive wildlife restoration, so the public is not allowed on facility except for guided tours. Funds needed include producing new graphics to explain the story and to design the signs. We will include a link to information that will be on our website. A paper brochure will be available for a self-guided tour.

6. A series of events will be at Tule Ponds, which would be co-sponsored by Alameda County Flood Control and Water Conservation District. It will include materials especially for families including preparedness. It will include several scientists to provide tours (about 1 hour). Most of the funds will be for salary, materials and advertisement. Because of the sensitive nature of the wetlands, we would have preregistration and only 500 people are allowed. This would be a free event.

The event at Central Park would center on the Earthquake Walk. Most of the funds will be for salary, coordination, rental of larger facility. We could attract up to 3000 people if advertised correctly. This would be a free event. We currently have a director, Kathy Kimberlin for the event who is coordinating different fractions. Funds from City of Fremont is also helping on the day. We need funds to create brochures and to help with the science stations, preparedness booths, science activities. Need person to help with advertisement as this can be a regional event.

7. Funds would be used to create a video of the area using a drone. This would be shown at the Earthquake Exhibit and put on our YouTube Channel. We will also create an animation slideshow that teachers would be able to use to illustrate the features. Since the signs will be installed, teachers can do a self guided tour with little expense.

8. The Gallegos Winery needs to be preserved. Although the winery collapsed in the 1906 earthquake, it tells a story of why not to build on a fault scarp. As the Irvington Station for BART is scheduled to open in 2026, this can attract people just to see the ruins and learn about the Hayward Fault.

WHY THE MATH SCIENCE NUCLEUS?

Our staff and volunteers have been involved with Earthquake Education since 1982, and events like these can help to permanently remind people of the dangers. Our expertise in public events outlined below.

1982- present

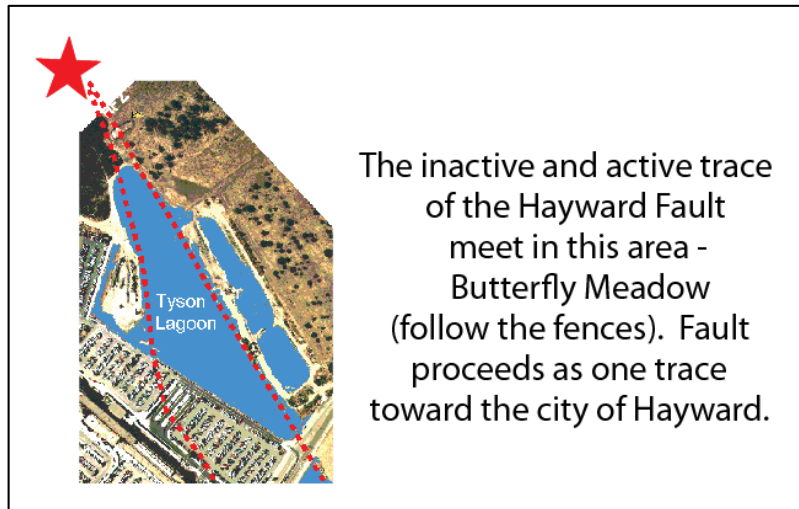
The Math Science Nucleus is a nonprofit organization started in 1982 by a group of scientists wanted to give back to the public schools. The majority of the founding board was from the U.S. Geological Survey who saw a great need for more earth science in the public schools. Although many of the founders were on educational committees, there was little focus on curriculum development for long term impact. Plate Tectonics was our first curriculum book that we developed and it is still updated and used today

(K-6) <https://msnucleus.org/membership/html/k-6/pt/index.html>
(secondary) <https://msnucleus.org/membership/html/jh/earth/index.html>

The Math Science Nucleus have developed a plan for the “Fremont Educational Corridor” (<https://msnucleus.org/corridor%20plan.pdf>) which follows the Hayward Fault in Fremont. Since it is associated with wetlands due to the breaching of the Niles Cone aquifer, it is a perfect example of how to preserve environmental as well as geologic treasures. Below are the accomplishments of our group including our partners.

1997-present TULE PONDS AT TYSON LAGOON(funding for tours, field trips Alameda County Flood Control and Water Conservation District)

We provide over 120 free tours of this 17 acre facility which has two traces of the Hayward Fault forming a 5 acre pull-apart basin that has been around since the end of the Pleistocene. We created signs as an Eagle project about 12 years ago, which need to be replaced and updated. The area is surrounded by homes, and 100 yards from the Fremont BART Station.



2005-2006 TRENCH AND TOURS (funding from Bay Area Earthquake Alliance, California Earthquake Authority, and many other funders)

The original site of the Fremont Earthquake Exhibit was located near the Teen Center in Central Park. It was chosen to allow the public to view subsurface evidence of the Hayward Fault. It was trenched in 1987 by Dr. Glenn Bochart of the California Department of Conservation (now California Geologic Survey), under contract from the U.S. Geological Survey. Several important studies came from the initial trenching to help scientists understand the movement of the Hayward Fault in this area.



A view from the surface of the Fremont Earthquake Exhibit. People can walk up to the Hayward Fault and observe the offset.

Drs David Schwartz and Mary Lou Zoback, of the U.S. Geological Survey felt that this site would be ideal for public viewing. The 1906 Centennial Alliance (commemorating the 100th year since the 1906 San Francisco Earthquake) found funds to create the exhibit. In June, 2006 the Math Science Nucleus became managers of the exhibit and extended its opening until November, 2006. It was filled in after the event.

2007-present FREMONT EARTHQUAKE EXHIBIT (in Fremont Community Center, funded by City of Fremont and Math Science Nucleus)

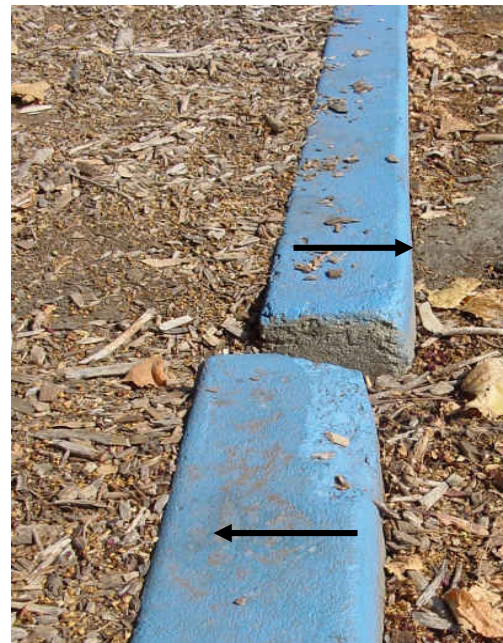
In 1962 the first government building was created next to Lake Elizabeth, a man-made lake created for flood control. In 1972 the first crack was spotted on the chamber floor and the crack has been “creeping” ever since. Math Science Nucleus convinced the city to create tours from the building and to walk through Central Park. MSN provide a monthly tour through COF’s recreation department. It recently went through a retrofit to secure the top beams. Currently we are awaiting funds to open to public. Currently we are doing college tours only.

2015 – present SIGNS THROUGHOUT CENTRAL PARK FOR SELF GUIDED TOUR (funded by City of Fremont)

To make the Fremont Earthquake Exhibit more accessible, Math Science Nucleus proposed a series of signs showing tectonic features including compression knolls, en echelon cracks, and many curb offsets. The City of Fremont put \$150,000 toward the project. Math Science Nucleus consulted with many geologists and seismologist for the design. Should be installed by the event planned for April, which we are seeking funds.



En echelon fault pattern seen in the asphalt



Offset curbs