STEMBoost Newsletter

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Santa Clara Regional Competition and the Last Invitationals

Joseph Lee

We would like to congratulate the Kennedy Middle School Gold Team for their 1st place ranking at the Santa Clara Regional on March 6th! In this year's regional competition, a total of 24 teams participated, including Kennedy's Gold, White, and Blue teams. The top 4 schools from Regionals will earn the opportunity to compete at the NorCal State competition. This year, the middle schools that moved up were Kennedy, Miller, Chaboya, and Greene Middle School. For States, only the first place team moves on to the Nationals.

In 2018, the Kennedy Gold team won 1st place at the state competition for the first time. In previous years, they had placed 2nd with a small score difference from the 1st place team.

This was an honorable opportunity as it was the first time an SO team from the Bay area had reached Nationals. That year, the Kennedy team won 4th place at Nationals, receiving a certificate from CUSD for honoring the district. In 2019, the Kennedy Gold team once again reached Nationals. They became the champions, with every team member winning medals. In fact, they broke the record for the lowest ever score in the history of National competitions. In 2020, the Kennedy Gold team was very strong but competitions were sadly canceled due to COVID-19. Hopefully, Kennedy will win a great opportunity to compete at Nationals this year!

The final 2020-2021 invitational was the Marquette Invitational on March 20th. We congratulate all participants who won medals at the invitational and regional competitions, despite the difficulties COVID-19 has brought for everyone. We hope that everyone can continue to learn a lot from SO, including knowledge, teamwork, study strategies, etc. Finally, we hope that SO can continue in person next year, similar to before the pandemic.

Fun Fact
How far can all the DNA in a person's body stretch?
(See answer in the back)

Editorial – "Predicting" California's Temblors

Ryan Li

Although the threat of hurricanes, tornadoes, and blizzards don't exist in California, many Californians are worried about one problem, that is, the risk of earthquakes in the area. After all, in the greater Bay Area alone there are 8 earthquake producing fault zones present (1), with over 2 million people residing on or near the Hayward fault in the East Bay, the Bay Area fault with the largest chance of producing a magnitude 6.7 or higher earthquake by 2034 (14.3%, 2). They have always known that the so-called "Big One" was coming, but the question has always been, when will this monster strike?

Over the years, many scientists have been trying to figure out exactly when the next major earthquake will hit, but it has been nearly impossible due to the large variability in the occurrence of earthquakes. As of 2014, however, most have agreed that there is a 99% chance or greater of an earthquake of a 6.7 or greater magnitude striking California within the next 30 years (2). Despite the uncertainty surrounding an accurate method for predicting earthquakes some scientists at the California Integrated Seismic Network developed a smartphone app (ShakeAlert) which pinpoints an earthquake seconds before it creates damage.

When an earthquake strikes, it gives off three main types of waves: primary waves, secondary waves, and surface waves. Usually, the primary (or P) waves don't cause much structural damage, but the secondary (or S) waves and surface waves do, for they result in the most shaking. The concept of an early earthquake warning system, which is currently operating in many other seismologically active areas (such as Taiwan, Japan, and Mexico), uses the faster P-waves to pinpoint the place where the earthquake occurred (or the epicenter), and predicts the magnitude and the shaking intensity of it before the majority of the shaking from the slower S and surface waves arrive (3).

Using this system, scientists at the California Integrated Seismic Network can warn vulnerable areas in California, so people living there can have a few seconds or more to prepare themselves for the quake. Although seemingly insignificant, this amount of time can be enough for pilots to stop taxiing planes, engineers to stop moving trains, and civilians to prevent themselves from driving onto a bridge or into a tunnel, where they can potentially suffer from a disastrous outcome (3). This way, there would be far fewer casualties and accidents when the earthquake strikes.

Even though scientists haven't been entirely successful in predicting earthquakes, there are some instances of signs foreshadowing them. When the magnitude 7.8 Tangshan earthquake struck northeastern China in the early morning hours of July 28, 1976, villagers in Tangshan had already observed numerous unexplained phenomena in the weeks prior to the quake. Fish were restless in their bowls, gas spelt out of wells, and well water rose and fell many times before the temblors (4). However, there was little action taken due to the isolated nature of these occurrences in the large city, and along with the unreinforced buildings prevalent throughout the city 93% of residential buildings and 78% of industrial buildings completely collapsed, leading to more than 242,419 deaths (4).

Since then, however, building codes in seismologically active areas (including California) have gotten stricter to minimize the risk of a building crumbling in the event of a strong earthquake. In addition, through the presence of the new early warning system developed by the California Integrated Seismic Network, scientists are one step closer to predicting earthquakes in the near future, and Californians will be able to walk about their daily lives without the worry of the "Big One" constantly on their mind.

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4. Rosenberg, Jennifer. "The Deadly Tangshan Earthquake of 1976." *Thoughtco*, 25 Sep 2019, https://www.thoughtco.com/tangshan-the-deadliest-earthquake-1779769.