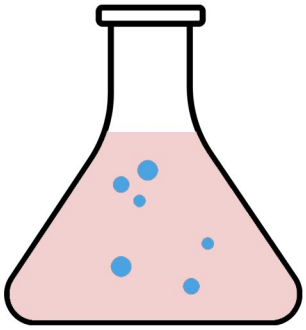
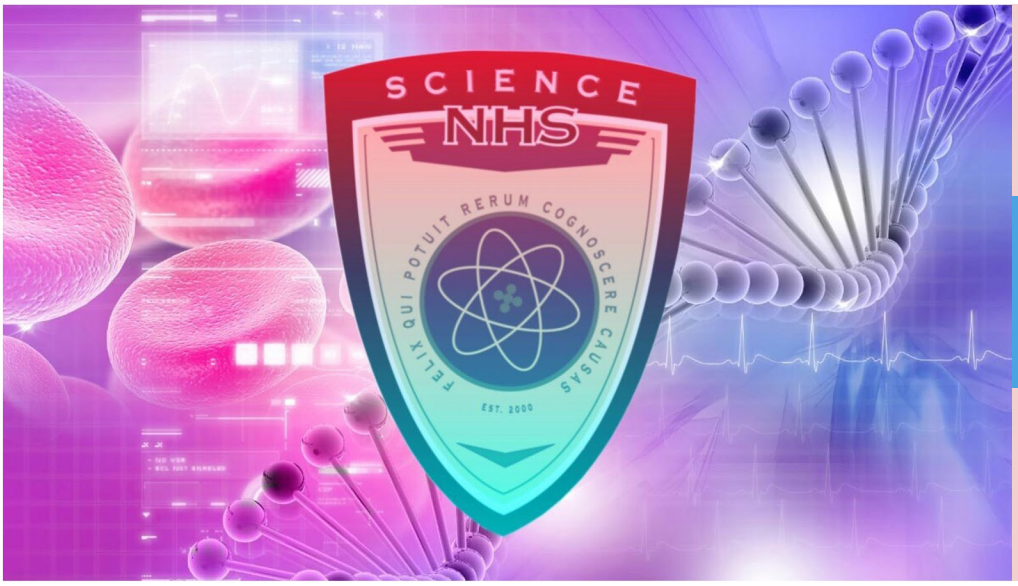
SNHS

Newsletter

Volume 1 June





Topic 1: Club Events
Future SNHS events that are coming up!

Topic 2: COVID-19 Update
A breakdown of new information/statistics relating to the COVID-19 Global Pandemic!

Topic 3: Current Events
New current events taking place in the science world!

Topic 1: Club Events

Tutor summer school science students online!

-Help fellow students succeed in their science classes!

-Receive volunteer hours

-For Biology, Biology Honors, Chemistry, and Chemistry Honors

-Email us at diamondbarsnhs@gmail.com if you have any questions or if you are interested

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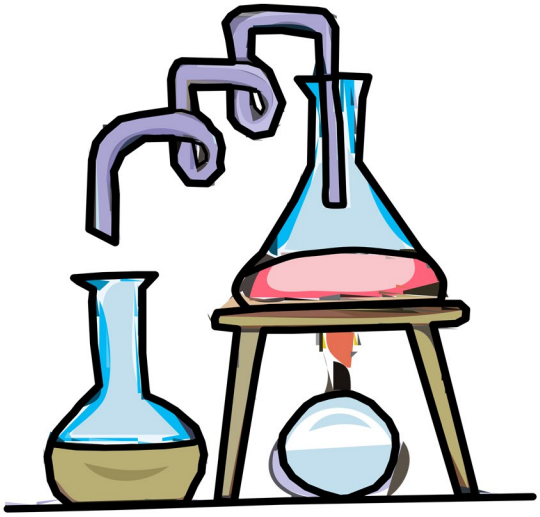
If you need a FREE science tutor for summer school email diamondbarsnhs@gmail.com with any questions

-We can tutor you in Biology, Biology Honors, Chemistry, and Chemistry Honors

-Tutoring will be done through Zoom to follow social distancing guidelines



Topic 2: COVID-19 Update

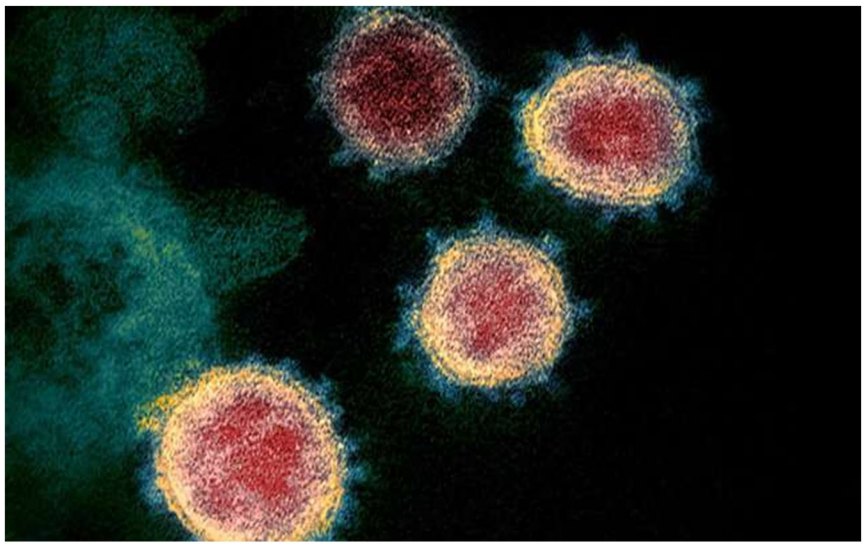
As of June 9, 2020 there are currently 7,185,573 documented cases worldwide and 1,973,803 confirmed cases in the United States, according to John Hopkins University. In addition, new antibody testing shows that 1 in 7 people in the State of New York might have contracted COVID-19 by the end of March. Furthermore, new studies show that the Nasal epithelium is the first point of contact for COVID-19, and that young children have lower levels of the ACE2 receptor, which is a molecule that the virus uses to infect a cell, than adolescents or adults. Outbreaks can also be detected in advance through checking the sewage, while symptoms don't show scientists find out that coronavirus RNA can be found in the fecal matter of patients.

Meanwhile, levels of air pollution (nitrogen dioxide and small particles) are going down due to lack of activity caused by COVID-19, but levels of ground-level ozone are going up in China. Ground-level ozone is normally destroyed by nitrogen dioxide, and with the declining levels of nitrogen dioxide, the amount of surface ozone has seen a dramatic increase. Surface Ozone is formed when sunlight and high temperature catalyze chemical reactions in the lower portions of the atmosphere. Ozone is considered harmful to humans when at ground-level, sometimes being the cause of pulmonary and heart disease.

The Numbers*

Worldwide	***U.S.***
7.27M Cases	2.09M Cases
413K Deaths	116K Deaths
California	***L.A. County***
133K Cases	68,875 Cases
4,697 Deaths	2,813 Deaths

*Numbers accurate as of 6/12/20



Topic 3: Current Events

Current Event 1: SpaceX Launch

On Saturday May 30, a spacecraft manufactured by SpaceX was launched into orbit. The launch was originally set on Wednesday, May 27, but was postponed to Saturday because of weather related issues. This was the first time that a commercially made spacecraft sent humans to the International Space Station. The pilots aboard the spacecraft were Robert Behnken and Douglas Hurley; flight time to the International Space Station was approximately 19 hours.

The United States of America has not launched astronauts into space since 2011. Since 2011, the United States has relied on Russian spacecrafts and has spent more than 86 million dollars per seat. The SpaceX manufactured Crew Dragon's Capsule will carry up to four astronauts at a time to the ISS on NASA missions. Moreover, the Crew Dragon capsule has large touch screens that help navigate and control the spacecraft's functions. The Falcon 9 rocket, which was used to propel the Dragon Crew Capsule into space, has already successfully landed on a floating platform located in the Atlantic Ocean. In the future, SpaceX hopes to be able to send civilians into space which is estimated to be a 1.1 trillion dollar industry by 2040 according to Morgan Stanley. On the practical side, decreased per-launch costs and miniaturization of satellites are revealing new business opportunities well beyond aerospace and defense, and into IT hardware and telecom. Capsule reusability allows SpaceX to launch astronauts into space without the cost of constantly rebuilding rockets, making commercial spaceflight more possible than ever now that the Crew Dragon capsule has shown to be successful.

SpaceX Crew Dragon Capsule take off

Crew Dragon Capsule Interior

Topic 3: Current Events

Current Event 2: Murder Hornets (Asian Giant Hornets/Vespa mandarinia)

On May 15, 2020, one murder hornet was spotted in Langely, British Columbia. This hornet was most likely from the colony of a queen found in 2019, which would point to multiple hives in the area. Recently, there have also been two new specimens spotted in the Pacific Northwest. This hive most likely got into the Northwest through an imported package, because a similar incident was documented in 2016 when an inspector found a package at dock with a hornet's nest inside. This may not have been an act of intentional sabotage, but rather a gift. In some Japanese villages, the larvae of giant hornets are considered a delicacy and are eaten as snacks or used as drink flavorings. However, professionals found more hornet nests in Washington. DNA evidence shows that the two hornets from the nests in Washington and Canada had different sources, hinting at multiple independent introductions.

Although the term "murder hornet" sounds scary, they actually don't pose much of a threat to humans. Last year, only 40-50 people were killed in Japan and in 2013, only 41 people were killed in Shaanxi, China. Most deaths are a result of shock or cardiac arrest, not directly from the venom in the sting. Though the venom does contain a neurotoxin known as mandaratoxin, which damages tissue. The real danger that these hornets possess is their classification as an invasive species, proven by their tendency to rip off heads of honey bees and native bumblebees to feed their young. This is a huge problem, as both honey bee and bumblebee populations have been in steady decline over the past few years, and as we all know these insects are vital pollinators in the ecosystem. With a combination of an aggressive invasive species and human activity, the natural ecosystem could receive a massive decrease in the amount of plant life both wild and cultivated. Moreover, if the hornets are allowed to spread they could reach enough strength to even invade major agricultural farms in the Midwest, which would result in even less pollination and possibly even famine because we rely on bees to facilitate the production of at least a third of our food.

Man who was stung by asian giant hornet

Murder Hornet attcking bees

Topic 3: Current Events

Current Event 3: Mysterious Neutrinos Found in Antarctica

Three times since 2016, ultra high energy particles have burst through the Antarctic ice. However, these particles seemed to come out of the Earth's surface with no source. These anomalous particles (also known as neutrinos) have been detected by the Antarctic Impulsive Transient Antenna (ANITA), a machine that was made by NASA. Neutrinos are neutral subatomic particles that have a mass close to zero, allowing them to move almost at the speed of light. The ANITA measures the radio pulses that are produced when a high energy neutrino coming from space hits the Antarctic ice.

The mysterious neutrinos that ANITA has recently found do not match with the Standard Model particles and have an unexplainable source. The particles that fit under the Standard Model usually can be categorized as high and low energy neutrinos. The low energy neutrinos pass right through the earth like a ball falling through sand, and the high energy neutrinos bounce back into space like a marble hitting a rock. Mysteriously, the neutrinos that were discovered had extremely high energy levels yet they seemed to be coming from the earth itself.

This phenomenon could be proof of a parallel universe, as it is impossible for such high energy neutrinos to be coming from the earth. Scientists have speculated that a parallel universe with time flowing backward exists and that these neutrinos are coming from that universe. Other scientists are highly doubtful and hypothesize that these neutrinos are coming from space like the others, but have special physics that let them pass through the earth.

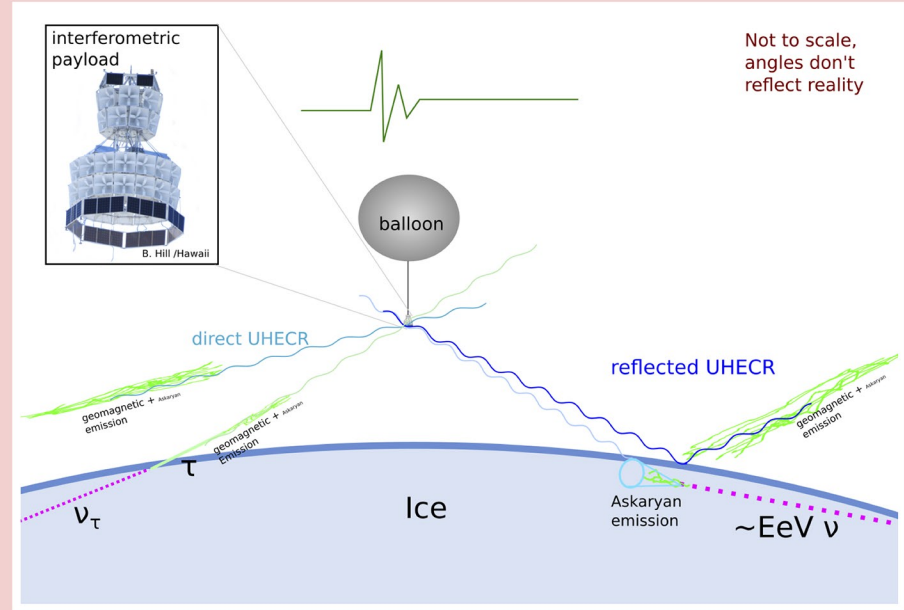
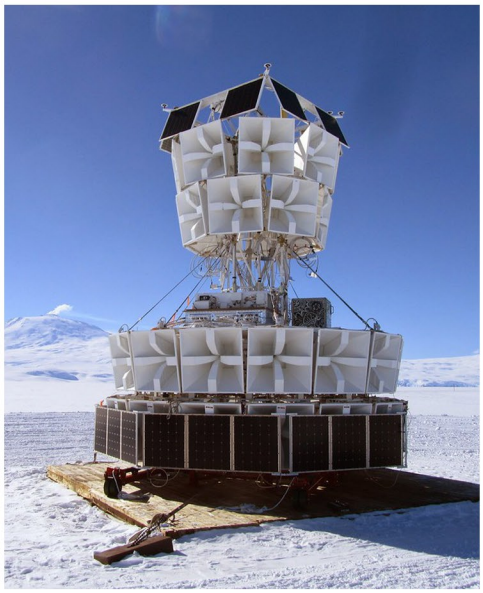


Diagram of how the neutrinos hit the ice



ANITA machine

Topic 3: Current Events

Current Event 4: Newly Discovered Class of Cosmic Explosions

Astronomers discovered a new, unprecedented type of cosmic explosion in June 2018. While it shares many characteristics with supernovas, what distinguishes it is its unusually high initial brightness. Another unusual blast known as ZTF18abvkwla occurred in a galaxy 3.4 billion light years from Earth. The blast was as bright as a gamma ray, so bright, in fact, that the author of the study, Anna Ho, thought that she had made a mistake.

These blasts are now known as Fast Blue Optical Transients (FBOTs). While ordinary supernovas consist of a normal spherical blast wave, FBOTs have dense material surrounding what used to be the star coming into contact with the blastwave, creating bright lights. The explosions are also so powerful that they eject large amounts at as much as half the speed of light. FBOTs are important because they are emblematic of how, in spite of all the advancements we have made in the past century and a half, we still have a lot to learn.

Regular Supernova

An FBOT

We will be frequently updating our Instagram @diamondbarsnhs with upcoming events and informational videos. There will be interactive polls to answer questions about the videos and the articles you read in this newsletter. Make sure to follow us on Instagram to stay informed and participate in these events!