

National Defense Industrial Association (NDIA)

Gulf Coast Chapter

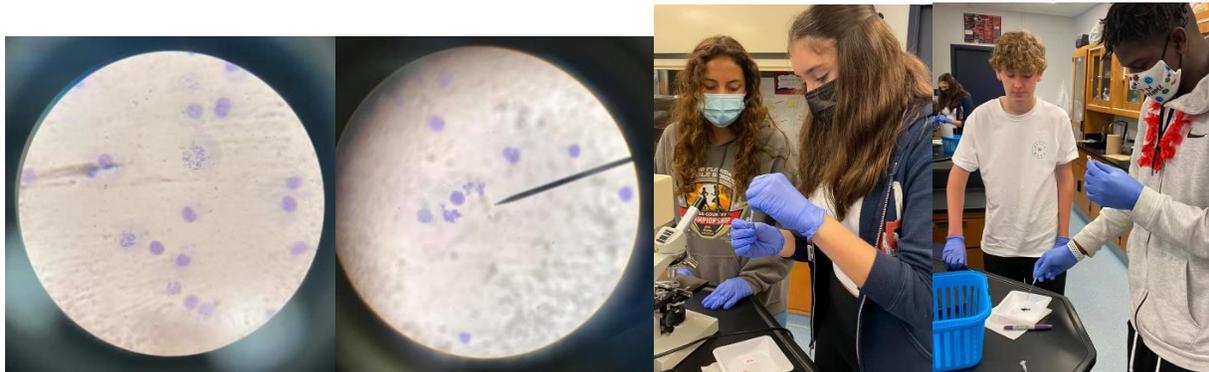
2020-2021 ACCEerator Grant Summary

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The ACCEerator Grant gave my ninth grade, Principles of Biomedical Sciences, students the opportunity to visual human chromosomes and better understand human inheritance patterns. Our program was able to purchase three great activities using the ACCEerator Grant funds. The first activity was Clues in the Chromosomes. Clues in the Chromosomes is an Edvotek kit the provides students with real HeLa cells from the immortal Henrietta Lacks. Students were able to use the cells to create a chromosome spread on a microscope slide. Students then viewed their work under the microscope. Students were amazed that they were able to see several different chromosomes spreads. They were able to clearly view all 46 double stranded chromosomes outside of the cell membrane. They were also able to see cells that did not open up as well.



The second activity was Disorder Detectives. This activity is one that I have the opportunity to use year after year. Disorder Detectives is a chromosome disorder board game. Students received a patient case file and a set of chromosomes. They had to read the patient information and look at the chromosomes that the patient inherited from their mom and dad. Then they had to interpret how the patient inherited the genetic disorder from their parents. This helped students better understand probability of inheritance patterns. This is something that students struggle with when learning about inheritance patterns. Students learn about Punnett squares and probability, but they have a hard time relating probability to human genetics. The Disorder Detectives game students an opportunity to make a better connection on how humans actually inherit common traits and genetic/chromosomal disorders.

The third activity I purchased with the ACCEerator Grant was A Family Affair Kit. This activity continued with the unit on genetics. The activity focused on a specific inherited disorder, familial hypercholesterolemia. Students read about an individual who found out that they had a family history of the inherited disorder, familial hypercholesterolemia (FH). Students then received DNA samples from

the Edvotek A Family Affair Kit. The kit included a DNA Marker sample, a positive control for FH, a negative control for FH and 5 DNA samples from different members of a family with history of FH. Students used a micropipette to aliquot 35 μ L of DNA in each of the 8 wells of an agarose gel. We then ran the gels in an electrophoresis chamber for 45 minutes. Students then analyzed the gels using a light box. The students really enjoyed seeing their end results. They visualized the DNA profiles of each of the family members' DNA samples from the kit. Then they compared the family members' DNA profiles to the negative and positive controls for FH. Students had to determine which members of the family were homozygous dominant (which expressed FH), heterozygous (which expressed FH) or homozygous recessive (which does not express FH).

Students admired their micropipetting skills with the end results of their gels. For groups that had a hard time seeing their results, I provided them with the expected results to analyze. Below are some images of the students loading their gels and their gel results.



Thank you again for such a wonderful opportunity to enrich student learning through hands on activities. My students really enjoyed learning about genetics and doing each of these activities. It makes them feel like scientists, while helping them better understand challenging standards.