

A photograph of a man in a blue suit and orange patterned tie talking to a group of students in a hallway. The man is holding a small object in his hands. The students are looking at him attentively. The background shows a hallway with other people and a red banner.

# JSTEM



2024

Journalism, Science, Technology, Engineering, & Mathematics



# JSTEM 2024

**During the 2024 Summer run of JSTEM, the student were given the opportunity to research topics that peaked their upmost interest with the support of the mentors and faculty. Here are the highlights of each groups' project this year.**





## Team: TMNT

### *Title: Investigation of Ocean Micro-organisms in Modern Medicine*

**Hennessy Rodriguez**  
Harlingen CISD  
Harlingen School of Health  
Professions

**Sophia Morrison**  
IDEA Public School  
IDEA McAllen

**Matthew Reyna**  
Harlingen CISD  
Harlingen School of Health  
Professions

**Elisa Martinez**  
Harlingen CISD  
Harlingen School of Health  
Profession

Do antibiotics found in the Gulf of Mexico demonstrate antimicrobial resistance or susceptibility, how are they classified, and what other beneficial or harmful effect may they have? We hypothesized that we would find mild antimicrobial resistance in one or more of the isolated strains and that several of the strains may carry medicinal properties. To perform the experiment, we first isolated certain microorganisms up to three generations using spread and streak methods. Then, we gram stained six of the isolated microorganisms and performed a Kirby-Bauer test to measure antimicrobial resistance through the formation of a zone of inhibition. Next, we did DNA Sequencing on 7 microorganisms for more exact identification in addition to the use of a dichotomous key and coagulase and catalase tests.



## **Team: 20/20 Visionaries**

### ***Title: R's Metals***

**Diego Herrera**  
La Joya ISD  
Juarez Lincoln High School

**Juan Vasquez**  
La Joya ISD  
Juarez Lincoln High School

**Ariel Alonso**  
La Joya ISD  
Academy of Health Science  
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**Ivan Gomez**  
La Joya ISD  
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Ferric (II) oxide ( $\text{Fe}_2\text{O}_3$ ) is a substance that is released when corrosion occurs in a metal. This corrosion is a redox reaction that occurs when water, oxygen, and iron interact and exchange electrons. This exchange in electrons causes the formation of  $\text{Fe}_2\text{O}_3$ .

The effects of  $\text{Fe}_2\text{O}_3$  may cause the collapse of iron structures that may contribute to contamination to the environment. The effects of  $\text{Fe}_2\text{O}_3$  when inhaled may cause metal fume fever. Metal fume fever may cause dizziness, vomiting, and respiratory complications.



## **Team: MAD4**

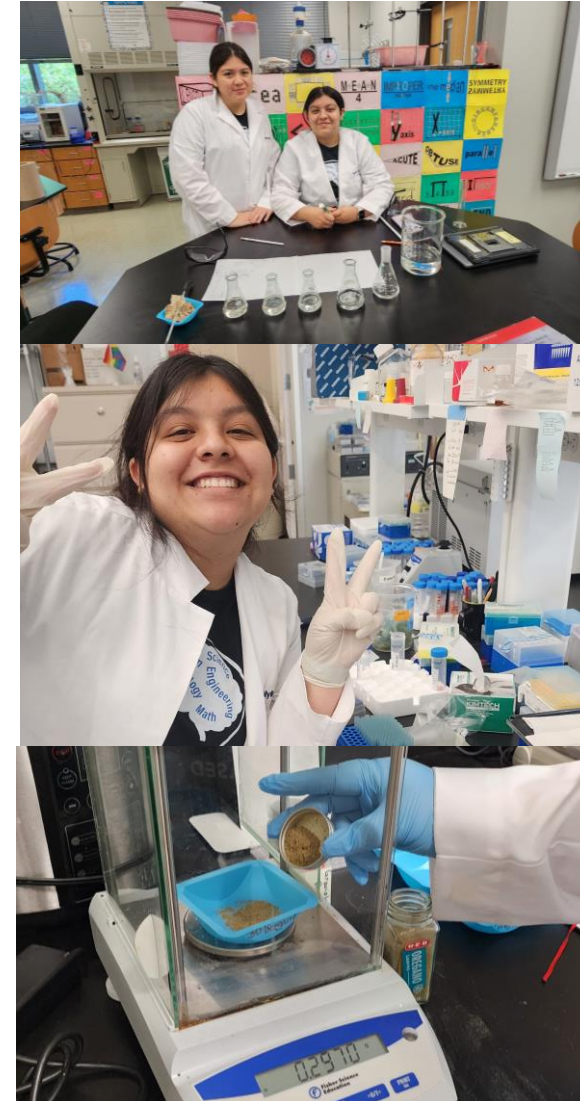
### ***Title: Herbs for Cancer***

**Miranda Sala Hilario**  
La Joya ISD  
Academy of Health Science  
Professions & STEM

**Nylin Alonzo**  
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**Destiny Rodriguez**  
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The purpose of this project is to analyze what effect the herbs we're using for this project will take on the breast cancer cells (this concludes a 1%, 10% and a 30% of each herb) and in which the herb could either be killing the cancer cells, decreasing the growth of them, increases the division of the cancer cells, or were just feeding them. The main motive of this is to show the fact that back in the years medicine wasn't as advanced as it is now, in the 2000's. And the lack of medicine and treatments were the death of many of our people, meanwhile now in the 2000's death rates have progressively gone down because of the evolution of medicine many have gotten treatment to deadly diseases.





## **Team: ADVL Just Us**

### ***Title: Effects of different Diets on Cancer Cells***

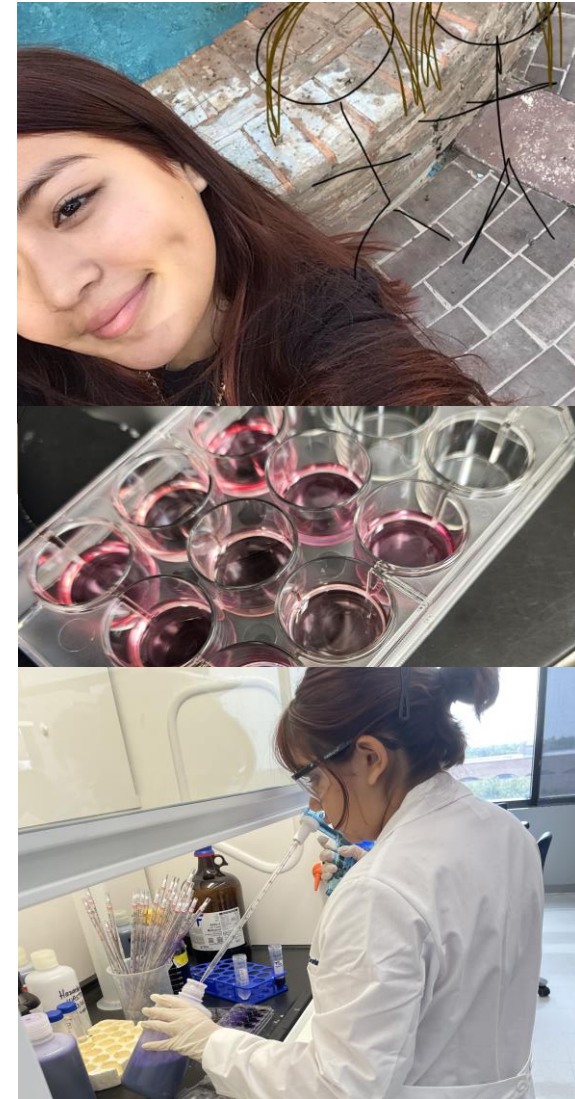
**Alma Cabrera**  
La Joya ISD  
Juarez Lincoln High School

**Venessa Dominguez**  
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Juarez Lincoln High School

**Danna Gaytan**  
La Joya ISD  
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**Luis Fernandez**

According to the existing research, cancer cells will experience the Warburg effect in which cancer cells produce ATP biased towards glycolysis rather than mitochondrial oxidative phosphorylation.



**Team: The 4 Mustyteeners**  
***Title: Investigating the Effects of Music on Brain Cancer Cells***

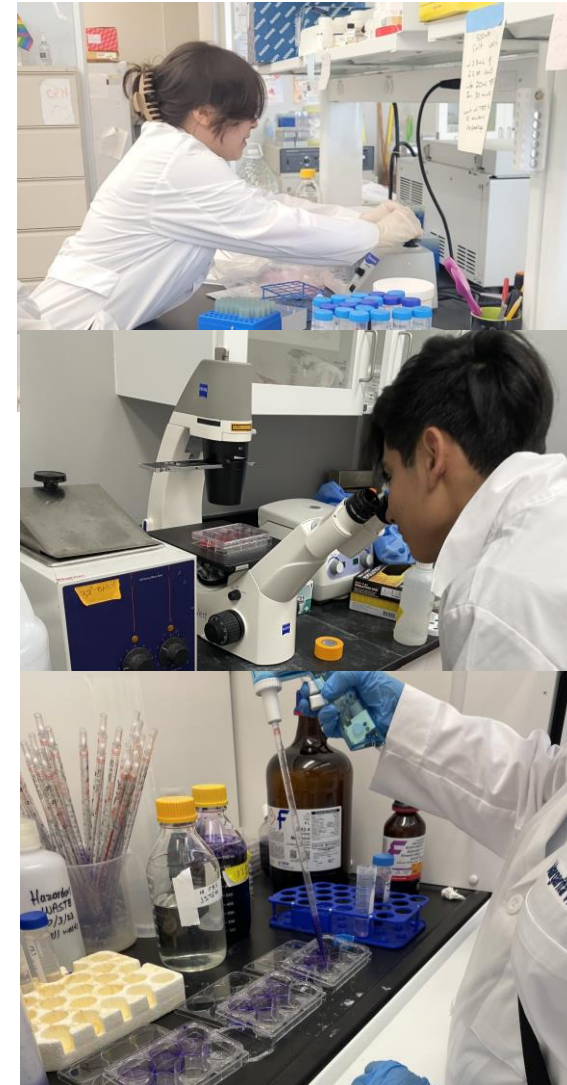
**Wendy Villalobos**  
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**Jose Salinas**  
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**Margarita Villasana**  
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**Nelly Contreras**  
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Brain cancer is a serious health issue. We hypothesized that if cells are exposed to music, then the proliferation of brain cancer cells will slow down. We found that brain cancer exposed to relaxing music grew faster compared to heavy metal. We chose this topic to better understand the effects of music on cancer cells.



# Team: The Incredibles

## *Title: The Effects of Different Glucose Concentrations on Telomere Length in Yeast*

**Aimmy Zuniga**

La Joya ISD  
La Joya High School

**Amy Dominguez**

Grace Christian Academy

**Suleidy Zuniga**

La Joya ISD

Unbeknownst to many, telomeres play a vital role in regulating cell division and preventing premature age-related diseases such as Alzheimer's, hypertension, and cancer. Unlike other segments in DNA on chromosomes, telomeres are found at the tips with high concentrations of nitrogenous base pairings of Guanine and Cytosine that become reduced with age due to mitosis. This shortening of chromosomal length becomes detrimental if it happens at an abnormal rate within a short time lapse in the organism's life span. With this in mind, our goal was to explore the potential effects of diabetes (high glucose concentration) on *C. cerevisiae* telomere length. Yeast was used as a model organism to see its reaction to stimuli due to its similar nature to human cells since both are eukaryotic. Not only does yeast prove to share a comparable genomic structure to that of human cells, but it's also able to undergo cellular division at a faster rate. Our hope was to identify any trends in the data collected and offer explanations for the nature of the results. Perhaps after close examination, we may be able to determine whether high glucose concentration in cells is the result or mere correlation of telomere shortening.

