



## Foundation For Allen Schools Grant Application

**Scholarship Fund Amount: \$0**

Application #: AP239122

Applicant First Name: Jennifer

Applicant Last Name: Sweaks

Applicant Email Address: jennifer.sweaks@allenisd.org

Gender:

Cell Phone #:

High School:

Post Secondary School:

Application Status: Submitted

### Application Questions and Answer

Question	Answer
Preferred name/name that you go by:	Jennifer
Best phone number to reach you at:	+12816820267
Campus	Allen High School
Grade(s)	10;11;12
I have co-applicants:	Yes
Please provide your work-related Facebook contact information.	
Please provide your work-related Twitter contact information.	jsweaksK213
Name of Grant	Upping Our Biotechnology Game
Please select the MAIN curriculum area your grant addresses.	Advanced Academics - AP/IB/GT

Does your grant have a technology component?	No
Will other campuses be involved/impacted?	No
Will other grades be involved/impacted?	No
How many students will be involved in this grant?	300
Are there any additional funds available for this grant?	No
<p>What is the problem, need or opportunity that this grant will address? Describe the impact of this project on your students.</p>	<p>Biotechnology has grown tremendously over the past decade. The biotech industry, seeing exponential growth, will need new and qualified workers for the foreseeable future. Post-high school opportunities abound and we can start preparing students for those opportunities in high school. At Allen, our motto is “We DO science!”. But doing high level, relevant science can be expensive. Biotech equipment is usable year after year, but the upfront cost can be substantial. We believe the rewards are worth the initial investment as our students, in addition to becoming prepared for college and career, will get to experience high tech and engaging lab work, practice critical thinking and possibly find their place in a high tech world.</p>
<p>How will the project or program be implemented? Describe activities and tasks. Who is the target population and in what ways will they benefit?</p>	<p>Mini-PCR will allow us to use cutting-edge biotechnology with advanced science students. Though this equipment is high tech it is easy to use and is classroom-ready. Specific implementation will occur through scenerio-based inquiry during our genetics and biotechnology units in both AP and IB Biology courses. Using this equipment will allow our students to explore concepts in molecular biology, genetics, and biological engineering. These topics tend to be the most challenging they encounter. Scenerio-based inquiry presents students with opportunities to experience DNA extraction from cheek cells, PCR amplification of human genomic DNA, restriction digest analysis of human SNPs (single nucleotide polymorphisms), and DNA Gel electrophoresis, staining, and visualization. And that is just one example lesson! Other planned inquiries will test for target genes for</p>

	<p>the presence of mutations which will elucidate why the plants we grow in class look the way they do. The experience continues with completing DNA gel electrophoresis to diagnose the genetic disease sickle cell anemia. These are just a few examples of potential uses.</p>
<p>Provide a brief summary for use on the Foundation's website and social media.</p>	<p>At Allen, we are taking our “We DO Science!” motto to the next level. In our classes, We DO HIGH TECH Science! Preparation for a biotech advanced world begins right here at Allen High School.</p>
<p>Which Allen ISD goals/TEKS does this project support? Please provide 2 or 3 examples.</p>	<p>Through the use of high tech and sophisticated biotechnology equipment, students will master the skills needed to design innovative solutions within independent and team settings. Students will gain the necessary skills to seek educational and career options as they continually pursue and integrate knowledge of biotechnology. Each opportunity using miniPCR moves students one step closer to participating in an industry that is increasing faster than the economy overall. In addition to Allen ISD goals, AP Biology goals supported by experiences using this technology include:</p> <p>Science Practice 3: Make observations, or collect data from representations of laboratory setups or results. Science Practice 4: Represent and describe data. Science Practice 5: Statistical tests and data analysis. Science Practice 6: Develop and justify scientific arguments using scientific evidence. Topic 6.7 Mutations IST-2.E.1 Mutations in the CFTR gene disrupt ion transport and result in cystic fibrosis. Mutations in the MC1R gene give adaptive melanism in pocket mice. IST-4.B.1 Antibiotic resistance mutations, Pesticide resistance mutations, Sickle cell disorder and heterozygote advantage Topic 6.8 Biotechnology: IST-1.P - Explain the use of genetic engineering techniques in analyzing or manipulating DNA. IST-1.P.1-Genetic engineering techniques can be used to analyze and manipulate DNA and RNA Electrophoresis separates molecules according to size and charge. During polymerase chain reaction (PCR), DNA fragments are amplified. Bacterial transformation introduces DNA into bacterial cells. DNA sequencing determines the order of nucleotides in a DNA molecule. Amplified DNA</p>

	<p>fragments can be used to identify organisms and perform phylogenetic analyses. Analysis of DNA can be used for forensic identification.</p> <p>Genetically modified organisms include transgenic animals. Gene cloning allows propagation of DNA fragments. IB Biology goals supported by experiences using the technology include: 3.5 Genetic modification and biotechnology Application: Use of DNA profiling in paternity and forensic investigations. Skill: Analysis of examples of DNA profiles. B.2 Biotechnology in agriculture B.4 Medicine Application: Use of PCR to detect different strains of influenza virus. Application: Tracking tumour cells using transferin linked to luminescent probes. Internal Assessment experiences designed and implemented by students.</p>
<p>What specific measurements will be used to evaluate the effectiveness of the project?</p>	<p>All lab experiences culminate with summative assessment, as students are given the opportunity through scientific writing (or other means) to explain their learning. In addition, AP and IB exams are designed to specifically assess students' ability to process and interpret data from lab experiences at a high level. These assessments come at the end of each unit, in addition to the AP and IB exams held in May to earn college credit.</p>
<p>What teaching methods will be used to implement this project?</p>	<p>These are inquiry based learning experiences, giving students an opportunity to do science at a high level. In these types of experiences, students will be exposed to questions, problems and scenarios that require them to work together to solve real world problems through the use of biotechnology</p>
<p>What is the project timeline and the date of implementation?</p>	<p>This project will be implemented in the Fall of 2020 in molecular genetics and biotechnology units in AP Biology, IB HI 1 Biology, IB HL2 Biology and SL Biology.</p>
<p>Explain how this idea or project enhances/supports Allen ISD curriculum or existing systems.</p>	<p>One of our most precious and closely guarded resources in our classrooms is time. The experiences using miniPCR can be done in one 45 minute class period. This is a game changing time frame, as old biotech equipment can take a full day or more to process, a huge impediment to the learning process. Since all of these courses test at the beginning of May, we have no minutes to spare. The purchase of</p>

	MiniPCR will also allow us to specifically meet course requirements in the topics of molecular genetics (DNA, protein synthesis, heredity, etc.) and biotechnology in a doable timeframe and at an exceptionally high level.
Total Grant Budget Requested:	5020.00
	

**Additional Co-Applicants Set Number 1**

Question	Answer
First Name	Lee
Last Name	Ferguson
Email	lee.ferguson@allenisd.org
Campus	Allen High School
Grade:	10;11;12

**Project Budget Set Number 1**

Question	Answer
Item Type	Instructional Supplies or Resources
List item to be purchased under item category:	The miniPCR™ Biotech Classroom Pack (SKU: QP-2500-20 )
Unit Cost	4990.00
Quantity	1
Total cost of items in this category:	5020.00