Grant Number	1288
Project Title	REDOX Reactions are Everywhere
Please select the **MAIN** curriculum area your grant addresses.	Science
Does your grant have a technology component? (Will you have technology equipment, software, etc. in your budget?)	◉ No ○ Yes

Primary Contact Information

First Name	Sandy
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Confirm Email	sandra.lee@allenisd.org
Last Name	Lee
Phone Number	469-727-0400
Campus	Allen High School
Main Subject	Science - Secondary
Grade(s)	Please select all applicable.
I have co-applicants.	☐

Social Media

Please provide your work-related social media contact information.

Facebook	
Twitter	@s_lee2013
Other (please specify)	
Grant Number	1288

Campus/Student Information

Your campus:	Allen High School
Will other campus' be involved/impacted by this grant?	◉ No ○ Yes
Your grade(s):	
Will other grades be involved/impacted?	◉ No ○ Yes

Project Purpose

What is the problem, need or opportunity that this grant will address? Describe the impact of this project on your students. (500 words or less.)

Students who graduate from Allen High School are expected to be effective problem solvers, responsible and engaged citizens, academically prepared for future pursuits and effective communicators. This grant will enable the Chemistry department to purchase equipment that will enable all levels of Chemistry students to engage in how solution ORP can be used to identify a variety of types of substances as well as determine the concentrations of those substances. They will be able to use equipment that is functionally similar to equipment that is used in various types of laboratories in the private sector as well as colleges. Just as laboratories can test blood, soil, air, etc. samples for various compounds and their concentrations, our students will test samples to determine the type of substance present (oxidizer or reducer) and at what concentration using the same technology that laboratories currently use. This knowledge of how samples are tested as well as the knowledge of the limitations of the testing equipment can leave our students better informed no matter their profession later, whether it be a lawyer defending if a sample was testable or contaminated, an environmentalist determining levels of acceptable contamination, quality assurance specialist trying to determine the cause of 'black specs' in water bottles, forensic specialist trying to identify an unknown chemical, fiction novelist making their book more realistic, or a chemical engineer trying to determine the amounts of chemicals and the rates of reactions to optimize production at their manufacturing plant.

Project Description

How will the project or program be implemented? Describe activities and tasks.
Who is the target population and in what ways will they benefit? (500 words or less.)

AP Chemistry students will use this equipment for 4 labs during the year in which they will determine the proper type of sensor to use to test a given unknown, to determine unknown concentrations of Vitamin C, aspirin, and hydrogen peroxide in several different solutions, as well as quantify the limitations of using ORP (Oxidation Reduction Potential) sensors to determine the type of an unknown chemical as well as its concentration in a sample. In each of these labs students will learn to critically analyze the data they collect to known values to determine procedures to change to obtain more reliable and reproducible results. By completing the experiments they learn the limitations of why ORP titration is a preferred method for determining chemical unknowns and concentrations in some situations and why it is not preferred in other situations. Students will learn to critically think about each situation and determine for themselves whether reliable results can be obtained using oxidation and reduction potentials as a method to determine the identity and/or concentration of a substance. They will be able to interact with equipment functionally similar to those currently used in laboratories in the private sector as well as universities. They will connect the relevance of an REDOX reaction to real world scenarios such as home and public pool chemistry, the decay of food , and how bleach works.

Project Summary

Provide a brief summary for use on the Foundation's website and social media. (2-3 brief sentences)

Students learn to use a ORP sensor to determine types of unknown substances, relative concentrations of known substances, and the limitations of determining the types of unknown substances and their concentrations.

Allen ISD Goals/ TEKS

Which Allen ISD goals/TEKS does this project support? Provide only two or three examples.

Texas Chemistry TEKS addressed:
2(E) The student is expected to plan and implement investigative procedures, including asking questions, ? and selecting equipment and technology, including ... probes ...

3(A) The student is expected to analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student.

AP Chemistry Science Practice addressed:
Science Practice 5: The student can perform data analysis and evaluation of evidence.

Measurement

What specific measurements will be used to evaluate the effectiveness of the project? (500 words or less)

Effectiveness of this project will be measured through the critical thinking skills communicated in the student lab reports and through the post-lab assessments. Students will engage in laboratory experiments, collect data, and submit lab reports explaining their data. AP Chemistry's Student Learning Objective goal for 2019-2020 school year will be a continuation of this year's goal to increase student's critical thinking skills. A rubric has been designed to measure student's critical thinking achievements and is used on all lab reports. The effectiveness of the ORP sensors will be determined by the improvement of critical thinking skills. In addition, questions will be placed on assessments. Some of the questions will measure students ability to plan and implement an investigation using the ORP sensors. Also, some of the questions will measure the students ability to analyze, evaluate and critique scientific explanations from evidence collected from an investigation using a ORP sensor.

Teaching Methods

What teaching methods will be used to implement this project? (500 words or less.)

Teachers will use the ORP sensors as a demonstration while they introduce the equipment and concepts. As students gain familiarity with the content and technology, they will proceed with hands-on, self guided inquiry and project -based labs that are filled with active and engaged learning that inspires students to seek a deeper understanding of the topic.

Timeline

What is the project timeline and the date of implementation?

The equipment will be purchased the beginning of Sept. 2019 to be ready for the first laboratory experiment early/mid September when an introduction to various types of sensors are introduced in AP Chemistry. The ORP sensors will be used again in late October for the Solutions Unit in determination of the best type of sensor to use to determine of the concentration of Vitamin C in different solutions of carrot, broccoli, spinach and orange juices. The ORP sensors will be used again in early March where students will determine the concentration of aspirin in different tablet brands and the concentration of hydrogen peroxide in different brands. AP Chemistry will revisit the ORP sensor along with other sensors in mid April through to the end of April while reviewing laboratory techniques, possible errors, and how each sensor can be used to gather various types of data on unknowns and concentrations of compounds and solutions for the AP Chemistry Exam in May.

Curriculum/System Support

Explain how this idea or project enhances/supports Allen ISD curriculum or existing systems.

Students who graduate from Allen High School are expected to be effective problem solvers, responsible and engaged citizens, academically prepared for future pursuits and effective communicators. In order to achieve this expectation, we must provide students with rigorous, authentic content, and activities to illustrate curriculum objectives, to send technologically savvy critical thinkers on to postsecondary education and/or the working world. The ability to use, conduct, and understand the same types of equipment and analytical procedures that people use in the public and private sectors will encourage students to be self -motivated learners, successful in school and in the working world. Close academic collaboration between students and between student and teacher will also ensure that we have a strong peer/peer and strong student/teacher working relationships that will pave the way for success.

Budget Details ** All awarded funds will be available by September of the next school year.

Budget Item	Item Type	Unit Cost	Quantity	Total Cost
Oxidation Reduction Potential Probe	Instructional Supplies or Resources	40.0	10	400.0
USB Bluetooth Adaptor	Instructional Supplies or Resources	14.0	3	42.0
Shipping	Other Expenses	20.0	1	20.0

BUDGET TOTAL 462

Are there any additional funds available for this grant? Campus or District Funds? PTA funds? Let us know if you have or will be seeking funds from other sources to help with this project.

Additional funds? (•) No ( ) Yes

Principal Approval Required

Please provide the Name and Email of your PRINCIPAL. (Not your name)

First Name	Last Name	Email Address(Completed)
Gwendolyn	Dilts	gwendolyn.dilts@allenisd.org

Applicant Signature

By entering my name below I signify that I understand that if I move within the District and have written the grant myself, I may take the grant with me to my school (as long as it is appropriate for my classes). If I have written the grant as part of a team, I will leave the

grant behind with the team. If I leave AISD, I will leave the grant with the school for which I wrote the grant. As a condition of this grant, I will complete an evaluation form provided by the Foundation.

Signature Sandy Lee

Date 02/01/2019

I certify that this would be a good use of funds for our school and this grant supports the district goals and/or our campus improvement plans. **Do NOT include any identifiers, such as: campus name, your name, teachers name or mascot **

No actions possible.

Comments

Ms Lee would use these funds to help her students better understand redox reactions in chemistry.

State Change History

State Change sandra.lee@allenisd.org
02/01/2019 15:40:42
Submitted

State Change ******
02/04/2019 13:08:46
Accepted

Grant Status

Grant Awarded ○ Yes

○ No

Award Amount 462