QSM SAMPLE PROPOSAL – HIGH SCHOOL SCIENCE

The following sample proposal should be used to gain a better understanding of the grant application questions and components. Copying or including any part of this sample in your proposal will be considered plagiarism and your proposal will be disqualified.

I. Project Overview (9 points)

What is the approximate number of students that will be directly impacted by your project?

75

Which grade band levels will your project impact?

□ PK-3 □ 4-8 ☒ 9-12

Which subject does your project fall under?

□ Mathematics ☒ Science □ STEM

What class(es) will your project impact?

Three Environmental Science classes

Standards Sources

Identify source of the standards. Louisiana Student Standards should be given priority over national standards. National standards can be used if Louisiana State Standards are not available (e.g., upper level subjects). If other is selected, identify the source of the standards.

- □Louisiana Student Standards for Mathematics
- ☒Louisiana Student Standards for Science
- □Louisiana's Birth to Five Early Learning Development Standards
- □Computer Science Teaching Association Standards
- □Standards for Technological and Engineering Literacy
- □International Society for Technology in Education
- □Advanced Placement
- □Common Core Standards for Mathematics
- □Other

Standards Outline

Provide the following information for each standard.

a. Provide a standard (by code and text) addressed by this project.
b. List students' actions associated with the standard.
c. List evaluation methods associated with the standard.

Standard 1

1a. *HS-EVS1-1 - Analyze and interpret data to identify the factors that affect sustainable development and natural resource management in LA.*

1b. *Students will use water quality testing equipment to collect and analyze water quality of local waterways near their school sites.*

1c. *Students will complete a pre/post-test to determine prior knowledge of water quality in local ecosystems. Students will also be evaluated on lab techniques, specifically application of science practices while collecting and analyzing water quality data.*

Standard 2

2a. *HS-EVS2-1 - Design and evaluate a solution to limit the introduction of non-point source pollution into state waterways.*

2b. *Students will use a drone to identify debris, invasive species, and other human attributed factors that negatively affect local ecosystems. Students will use this data to design a solution(s) to minimize the impact of pollution in local waterways.*

2c. *Students' solutions will be measured using a rubric to determine the value, potential positive impact and feasibility to be implemented.*

Project Summary

Provide a brief summary of the project that addresses the items being requested and how this project will increase students' content knowledge, skills, and/or practices of the listed standards. (50-120 words)

Students will make observations and create solutions to diminish identified pollution in local waterways. Students will use water quality test kits to measure the pH, temperature, dissolved oxygen, and salinity of the waterways near their school. Students will also use a drone to make observations of the waterways to identify invasive species and determine the magnitude of humans' negative effect on the waterways and ecosystem. By completing the activities in this project, students will know what factors influence water quality and be able to identify non-point source pollutants. Not only will students be able to identify these factors, they will have the skills and knowledge to resolve current or even prevent future negative human impacts on local waterways.

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II. Rationale

State the primary motivating factor in proposing this project for the students (e.g., students' weakness, new curriculum, innovative project, challenges as a result of demographics, etc.). Include evidence supporting the motivating factor (e.g., student data, past experience, observation, education literature citations, etc.). (150-250 words)

The importance of this project is for students to be aware of human impacts on water quality of local waterways and how that affects the ecosystem. Students should be able to identify pollution and consider the impact they and other people have on water quality and how that affects the ecosystem. This project is unique because it requires students to use current technology in the form of drones and water quality test kits to make and record observations.

These activities were selected based on conversations with students about the impact events such as parades have on the ecosystem. Most students are unaware of the amount of pollution generated by these events in addition to daily activities. After surveying students, it was determined that 6% of students (113 surveys) are unaware of the volume of pollution that eventually ends up in local waterways annually. Students completed an attitudinal survey which revealed 82% of students do not think our waterways are polluted or negatively impacted by human actions.

III. Project Description

Timeline

Provide a timeline of project implementation.

The project will take approximately 12 total weeks. Students will collect water quality data and make observations of local waterways using the drone over the course of 8 weeks. Students will organize and analyze their data as it is collected. Following the data collection, students will have 4 weeks to identify a non-point source pollution and generate a solution to reduce or eliminate any negative impact.

Description

Describe the project's instructional plan and classroom activities that will be used to improve content knowledge, skills and/or practices of your students. The items requested in your budget should be included here. (350-600 words)

Before any instruction, students will complete the pretest and attitudinal survey to determine prior knowledge and students' perception of pollution in their local waterways. Next, the teacher will introduce key concepts relating to factors that affect natural resource management in Louisiana, define non-point source pollution and introduce them to types of invasive species in Louisiana. The teacher will show students a map of the Mississippi watershed and identify how all of the water from that area eventually flows through Louisiana. The teacher will then demonstrate how to properly measure factors that affect water quality: pH, temperature, dissolved oxygen and salinity using the probes, refractometer and LeMotte dissolved oxygen test kit. Students will practice these techniques in the classroom before applying their learned skills in the field. Students will become familiar with the function of the probes in order to collect accurate data. Over the course of the next 8 weeks, students will then go to the local waterway near their school site to measure and record each water quality factor.

This project will impact 75 students in three environmental science classes. Each class will have five water quality testing groups and one drone group. Each group will consist of 4-5 students based on class size. Each student will have an assigned role such as lead, doer, recorder, and safety inspector when collecting data. Each group will be assigned a specific sampling site to collect data along the waterway. Groups will be spaced on safe water sampling locations, but within sight of each other. Students will use each kit and/or probe to measure and record the corresponding water quality factor. The bucket and rope will be used to collect the water sample. Students will toss the bucket (with a 20 ft. rope tied to the handle) in the middle of the waterway to collect a sample. A trained student pilot will fly the drone to make observations of the waterway and each sampling site. Students will have been previously trained by completing the summer drone class. The drone will be flown 100 meters upstream and downstream from first and last sampling sites. One group will serve as the aerial observation group that flies the drone. All students will rotate through the aerial observation group and vice-versa. This will ensure all students participate in water quality testing and in support of making observations using the drone. The aerial observation group will fly the drone and upload all video and images to a shared Google folder for all students to analyze.

Throughout the 8 weeks, students will track and post data in a shared Google sheet. Students will analyze data making note of any fluctuations. The teacher will lead class discussions to guide students' and ensure they are "connecting the dots" with the data.

Following the data collection period, students will be assigned to new groups of 4-5. Students will be assigned to new groups so they can each share what they learned from their sampling sites. Students will initially be given 1 class day to discuss data and identify non-point source pollutions. Over the course of the next 4 weeks, students will be given 20 minutes each day to discuss possible solutions to eliminate or reduce the impact of the non-point source pollution. In the 4th week, groups will present their solutions to the class. Groups will have the option of presenting their solution via a video or slidedeck and will be limited to 7 minutes each. Students will evaluate each solution and provide feedback through the form of a rubric, making suggestions or asking questions to be considered. After all presentations have been completed, each group will reconvene and modify their original solution based on peer feedback. Groups will re-present their modified solutions. The class will vote on the most viable solution based on value, potential positive impact and feasibility to be implemented. Students will then contact their local representatives with their findings and solutions.

Based on the LSSS environmental science standards, this project matches high school students' performance expectations. Analyzing and interpreting data are essential science practices and designing solutions is an appropriate engineering practice that students continue to develop through grades 9-12.

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IV. Evaluation

List and describe the evaluation method(s) that will be used to determine student growth during the implementation of your project. (150-300 words)

Student prior knowledge of water quality, invasive species, non-point source pollution, and natural resource management will be determined using a pretest. Students' ability to analyze and interpret data will also be assessed on the pretest. Students will also complete an attitudinal survey to determine level of perception of human impact on local waterways.

A posttest will be used to compare growth of students' knowledge as compared to the pretest. Students will be required to keep accurate and precise notes of observations and measurements. Students will be observed during the activities and evaluated upon their ability to use proper techniques to collect accurate data with a minimum proficiency. A rubric will be used to measure proficiency.

Students' proposed solutions will be evaluated using a rubric to determine the value, potential impact and feasibility to be implemented. Peer reviews will also provide feedback to students on their potential solutions. Students will use a rubric to guide their review.

Identify the target outcome(s) for student success. Indicate and describe the criteria for determining success at achieving the target outcome(s). (50-150 words)

Overall, 90% of students will be able to cite examples of how human behavior impacts our water quality and local ecosystem. More importantly, student success will be determined by the value of solutions offered to mitigate this impact. Project implementation will be successful if 70% of students' solutions provide a positive impact on the local waterway and implementation is feasible.

V. Budget (8 points)

Budget items includes equipment and materials that will be used for quality instruction to increase knowledge, skills, or practices in Math, Science, and STEM classes. The maximum award is $1,000 for PK-3 proposals and $1,500 for 4-12 proposals.

The budget should include all QSM eligible items and QSM ineligible items that need to be purchased to successfully implement your project. If your budget includes QSM ineligible items and/or the total of QSM eligible items exceeds the award limitations, an explanation of how these items will be funded is required.

Click "+ New Item" to add a new budget item. For each item, specify if it is QSM eligible or QSM ineligible and fill in the Item Name/Description, Quantity, and Cost/Item. For QSM eligible items, the Vendor Name and Vendor Link is required.

QSM Eligible/Ineligible	Item Name/Description	Quantity	Cost/Item	Vendor Name	Vendor Link
Eligible	*LaMotte® Dissolved Oxygen Water Test Kit (performs 50 tests)*	*5*	*$68.75*	*Carolina Biological*	link
Eligible	*Digital pH Probe*	*5*	*$73.37*	*Amazon*	link
Eligible	*Digital Temperature Probe*	*5*	*$9.33*	*Amazon*	link
Eligible	*Refractometer*	*5*	*$22.00*	*Amazon*	link
Eligible	*Small bucket (1 gallon)*	*5*	*$10.30*	*Amazon*	link
Eligible	*Rope (100 ft.)*	*1*	*$20.09*	*Amazon*	link
Eligible	*DJI Mini 2 Fly More Combo – Ultralight Foldable Drone, 3-Axis Gimbal with 4K Camera, 12MP Photos, 31 Mins Flight Time, OcuSync 2.0 10km HD Video Transmission, QuickShots, Gray*	*1*	*$599.00*	*Amazon*	link

QSM Eligible Items Total: *$1,549.80*
QSM Ineligible Items Total: *$0.00*
QSM BUDGET TOTAL: *$1,549.80*

Please indicate who will fund any overage for QSM Eligible items if needed. Select all that apply.

- [x] School Funded
- [ ] District Funded
- [ ] PTA
- [ ] Private Company
- [ ] Non-profit organization
- [ ] Not Needed- QSM Eligible Items within Total Limitations
- [ ] Other

Please indicate who will fund the QSM Ineligible items if needed. Select all that apply.

- [ ] School Funded
- [ ] District Funded
- [ ] PTA
- [ ] Private Company
- [ ] Non-profit organization
- [x] Not Needed- Budget does not have QSM Ineligible Items
- [ ] Other