

PLAN NAME

Mobile Observatory (MESO)

ID

4303667

LOGO**CREATED DATE**

8/31/18 8:58:54 AM MST

LAST UPDATED

9/17/18 1:48:10 PM MST

SUBMISSION FORM**PERSONAL INFORMATION****FIRST NAME**

Jessica

LAST NAME

Olsen

JOB TITLE

Teacher

PHONE NUMBER

+1 (720) 554-2549

EMAIL ADDRESS

jolsen5@chenycreekschools.org

SCHOOL

Cherry Creek High School

GRANT TITLE

Mobile Observatory (MESO)

NUMBER OF STUDENTS IMPACTED

150

GRANT APPLICATION QUESTIONS

* Provide a two-sentence description of your Grant that can be used for publication.

The Mobile Earth and Space Observatory (MESO) will deploy for 1 week at Cherry Creek High School to engage students in hands-on science through telescope observation, infrared camera experiments, spectroscopy and other stimulating activities. Once some CCHS students are trained on the equipment, Campus Middle School students will invited to participate with CCHS students leading them in the activities.

MESO's website:

<http://www.gomeso.org/>

* Purpose (Explain what you hope to achieve. What will be different or better if successful: Why it is needed, and how it is INNOVATIVE.)

Science can be abstract and hard to comprehend from texts and lectures. Secondly, many students don't have a concept of what it's like to actually BE a scientist. What do scientists do? MESO can help solve both of these problems.

First, it is a hands-on laboratory which will demonstrate some key concepts such as how infrared light behaves, why hot objects shift frequency when cooled and what a solar flare is made of through scientific grade equipment. In small groups, students will discuss and experiment with these types of questions with myself and PhD Physicist Dimitri Klebe.

Additionally, when our High School students are trained to lead others (middle school students) in these activities, they learn in a deeper way. It is widely accepted that we don't fully understand something until we can teach it to others!

Secondly, some students will choose to do research using the telescope during nighttime observing. There are many projects to be done with a telescope of this size (12" reflector). For example, there are variable stars whose light curves (cycle of brightness) are still not well documented and understood. Students can perform photometry experiments on several stars using a CCD camera over the period of the week. This will be done with the assistance of the AAVSO (American Association of Variable Star Observers.) They can draw conclusions about those stars and perhaps choose to present their findings at a science fair or other outlet. In this way, students get a unique opportunity to do the work of a real scientist.

* Measurable Objectives:

1. Students will gain a deeper understanding of the electromagnetic spectrum, particularly the visible and the infrared.
2. Students will experience daytime and nighttime observation of planets, stars etc...
3. Some students will be the scientist who performs experiments related to variable stars.
(see below as to how these will be measured)

* How will your grant achieve a District/School goal?

This unique experience with real science supports the district's commitment to STEM. It promotes involvement and empowerment for students to take their learning into their own hands.

* Implementation of Strategy: (Instructional procedures)

A. Prior to deployment

Students will learn about lenses, mirrors, telescopes and spectroscopy.

Students will be prepared in class for procedures, topics and plans.

B. During deployment

MESO will be parked at a safe and approved location CCHS campus near the baseball field.

Day 1 & 2 Students (largely astronomy and physics students) will do 1. Solar Observing 2. Spectroscopy. 3. Infrared camera studies. 4. Nighttime Observation

Day 3 Nighttime observation & project data collection.

Day 4 Students who have been trained will lead middle school science students in the same activities they did on Day 1&2.

Additionally: Nighttime observation & project data collection.

Day 5: Trained students will lead a new group of middle schoolers. Dr. Klebe & Ms. Olsen will assist students doing variable star projects.

C. After deployment.

Dr. Klebe and Ms. Olsen will continue to assist student doing variable star projects.

Students will take the Light/Telescopes/Spectroscopy quiz after deployment. Results will be compared to 1st semester students who took the quiz without the benefit of MESO.

* Timeline: (Will additional resources be needed in the future? Outline when your grant will begin and end)

A. Prior to deployment (February-March 2018)

B. Deployment (One week in March 2018)

C. After deployment (Late March-April 2018)

* Evaluation Procedures: (Explain how you will measure the success of your program)

1. Students will gain a deeper understanding of the electromagnetic spectrum, particularly the visible and the infrared.
 - a. One way it will be measured that students are making gains in their deeper learning is how well they present and assist the younger students when they lead them through the same science they learned in the days prior. Student leaders will be monitored by Dr. Klebe and myself while they present to the middle school students.
 - b. Those students enrolled in Astronomy will be given the same test on light, telescopes and spectroscopy as 1st semester students were. The students' performance will be compared to those who didn't have the experience with MESO.
2. Students will experience daytime and nighttime observation of planets, stars etc...
 - a. Students will complete an observing log with entries with each object they viewed or photographed with the telescope.
3. Some students will enter the role of scientist who performs experiments related to variable stars.
 - a. These results may be submitted to AAVSO (the American Association of Variable Star Observers.)
 - b. Some of these students may choose to present their work at a science fair or other venue.

* School/Community partners involved in grant (financial or volunteer).

CCHS Science Department
MESO

Campus Middle School
CCHS PTCO

BUDGET QUESTIONS

Budget

Equipment/Supplies: What is it, number, title, type purchased?"?

COST \$
3000

DETAILS

This cost was a conservative and generous estimate given to me by Robert Salle and Dimitri Klebe, 2 members of MESO's Board of Directors. The actual cost to deploying the MESO is roughly \$5000 a week. But Dr. Klebe and Dr. Sallee are willing to bring it to Creek for less for two reasons. First, Dr. Klebe and I have a professional history together and have worked on many science projects together since 1993. Second, MESO is still in the beta testing stage. It has been deployed at a number of public events such as the solar eclipse of 2017 and others. But the goal is to deploy MESO to schools and local libraries where students have a longer-term opportunity with it. They are happy to do a deployment of MESO at CCHS early in its career to fine tune the curriculum and programming.

Other: (i.e. Guest speakers, scholarships, travel, postage, etc.)

COST \$
50.00

DETAILS

There is a donation cost for joining the AAVSO in order to work with them on the variable star research projects.

Total Requested \$: \$ 3050.0

HAS YOUR PRINCIPAL OR PROGRAM DIRECTOR APPROVED THIS GRANT REQUEST?

Yes

NAME OF APPLICANT'S PRINCIPAL OR PROGRAM DIRECTOR

Ryan Silva

EMAIL ADDRESS OF APPLICANT'S PRINCIPAL OR PROGRAM DIRECTOR

rsilva2@cherrycreekschools.org

I have read and agree to the Terms and Conditions of Educator Initiative Grants as listed on the 2018-2019 Guidelines

NAME: Jessica Olsen
EMAIL: jolsen5@cherrycreekschools.org
ADDRESS:
ADDRESS LINE 1
ADDRESS LINE 2
CITY STATE/REGION ZIP/POSTAL CODE

EDITORS		COMPANY POSITION	PHONE NUMBER
Jessica	Olsen	jolsen5@cherrycreekschools.org	
<		>	

ATTACHMENTS		
NAME	DESCRIPTION	CREATED DATE
No Data		
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NOTES		
FIRST NAME	LAST NAME	NOTES
No Data		

QUESTIONS/COMMENTS TO SUBMISSION

QUESTION/COMMENT	RESPONSE	MODIFIED DATE
No Data		



EVALUATIONS
HIGH SCHOOL

REVIEWER	CCSF EDUCATOR INITIATIVE EVALUATION FORM 2018-2019
Kathy Smith	Score: 18

