



**Rural School and Community Trust
Fund for Teachers
Project Planning Guide Coversheet**

Fellow/Fellowship Team Members: Keith Starr

Grade and Subject: High School Physics

School/District Name: KIPP: Pride High

Location: Gaston, NC

1. Briefly describe the nature and focus of your Fund for Teachers Fellowship experience.

During my Fund for Teachers Fellowship, I traveled to the inactive volcano, Mauna Kea, to interact with astronomers and visitors of the seven international observatory groups on the summit. My goal was to determine why people find astronomy so engaging and how to use that information to engage my students in their study of physics.

2. How does that experience relate to your teaching assignment?

I teach high school physics and AP physics. Although the topic of astronomy is not directly in the curriculum, it is a topic that is easy to weave into the course because an understanding of physics allows for a deeper understanding of our universe.

3. What student academic goals might your experience help to address?

My first goal for my students is that they will be more invested in the topics we cover in my course because they will be more invested in the class because of the connection to astronomy. My second goal is that my students will be able to take the physics that we study and apply it to astrophysical situations (such as planets orbiting one another.)

4. What needs, issues, or interests in your local community might your experience help to address?

The general community, including my students, has little to no exposure to current topics in astronomy. This is a problem because astronomy and astrophysics is a huge area of research done by scientists at the university level. Because the subject matter is so interesting, it may be a way to hook future astronomers.

5. Drawing upon your fellowship experience, list three student project ideas that might simultaneously address one or more student academic goals and community needs, issues, or interests.

| Project | Lead Person | Email Address |
|--|-------------|----------------------|
| Creation of an Astronomy Club | Keith Starr | starrkeith@gmail.com |
| Lessons that are directly tied to topics in astrophysics | Keith Starr | starrkeith@gmail.com |

Project Objectives: The goal of the project will be to create and sustain a student run astronomy club and outreach group. Students will:

- Meet to discuss current topics in astronomy.
- Learn and practice basic observational astronomy.
- Develop a plan for astronomy outreach (including elementary and middle school visits and community open houses).

Describe your project. Who are your community partners and how are they involved in planning and implementation?

I am going to start an astronomy club at my school. In the beginning, I will open it up to any interested students. I know that I will be able to gain the interest of many students based off of the interest they had in a mini class I co-taught on astronomy and Greek mythology. The club will be able to meet during our last period of the day which is a school wide study hall.

One community partner that I will enlist the help of is one of our school board members. He is a retired aeronautical engineer and has a lot of physics background. He has already donated a telescope to our club. I have recently just made contact with a local community member who is a cosmologist working at NASA Goddard Space Center. He worked on the COBE project which won the Nobel Prize in physics for their measurements. Last year, he came to talk to my classes about his work and has agreed to do it again. Finally, a physics professor from Howard University has just contacted me about getting involved with our school. He is originally from the area and has offered to donate time and supplies to our physics program.

All of these community members will be involved with the project at various levels. The school board member will help me raise the funds for the telescopes for the astronomy club. The two physicists will be involved by donating time to work with the students on various projects during the course of the year. My responsibility will be to making sure that we use these community members in the best capacity possible.

Essential Question: What is the theme of your project that will guide the work of students and community partners?

The theme of this project is connected to the discussions that I had this summer with many people at the Mauna Kea Observatories. The reason that people seemed to be interested in astronomy is because it seeks to answer some really big questions. “Where are we in the universe?” “How did we get here?” “Are we alone?” These seem to be questions that all people ask themselves. Therefore, I plan to make these questions the center of my work with my students and our community.

Learning Outcomes: What will students know and be able to do as a result of the project?

1. Students will be able to use basic observational astronomy techniques to locate objects on a star chart in the sky, and use a telescope to observe them.
2. Students will be able to discuss the history of astronomy and our current level of understanding about our place in the universe.
3. Students will be able to answer questions from community members about basic astronomy during astronomy open houses.
4. Students will be able to discuss current topics in astronomy such as dark matter and black holes.

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Standards Addressed: (Learning Results or Benchmarks)

1. NC SCOS Physics Goal 1.01: Students will be able to identify questions and problems that can be answered through scientific inquiry.
2. NC SCOS Physics Goal 1.02: Design and conduct scientific investigations to answer questions about the physical world.
3. NC SCOS Physics Goal 1.03: Formulate and revise scientific explanations and models using logic and evidence.
4. NC SCOS Physics Goal 1.04: Apply safety procedures in the laboratory and in field studies to safely manipulate materials and equipment needed for scientific investigation.
5. NC SCOS Physics Goal 1.05: Analyze reports of scientific investigations of physical phenomena from an informed scientifically literate viewpoint.

Final Project Assessment; How will students demonstrate what they know and are able to do?

Students will run a series of astronomy open houses and outreach trips to local schools.

What **major activities** will get students to the final assessment?

Students will practice observational

How will you **assess** these activities?

I will assess these activities by judging

During these events, they will guide participants around the night sky as well as answer questions that the participants have about the night sky and current astronomy.

astronomy during our weekly meetings and monthly night observations. We will also hold discussions about the history of astronomy and current topics at our monthly meetings.

the effectiveness of my students ability to talk about astronomy with their community.

How are students involved in the planning and implementation of the project?

Students will plan the astronomy open houses and outreach programs. They will determine the topics to be covered, how they will be covered, and how we will advertise the events and entice the community into attending.

What specific Literacy Strategies will the project address?

Students will learn how to read scientific literature during our discussions of current astronomy. They will read articles from current astronomy publications and we will incorporate practices such as identifying new vocabulary and annotating the text.

What technology tools will enhance learning?

We will use several free online sky map programs as well as tools that help explain difficult astronomy topics to younger students.

Project Timeline (attach a detailed Timeline to Planning Guide)

Attached.

How will you document and celebrate the project?

We will keep an updated blog for the astronomy club run by the students. This will be a place for interested community members to go to get updates on upcoming observing open houses as well as activities run by the astronomy club. We will also be able to advertise when we have our community member speakers attend to discuss their work in the field of astronomy. Eventually, I would like to have my students completing some astrophotography and placing the work on the blog.

Budget for the Project

The biggest expense for this project is the telescopes. I am currently working on several grants to get money for a telescope for our club. The telescopes can run anywhere between \$500 and \$4000. I first will have to determine how much I can raise before deciding on which telescope to buy.

| Month | Tentative Activities |
|----------|--|
| October | <ul style="list-style-type: none"> • Advertise first meeting. • Reach out to community partners about gaining funds to purchase telescopes. • Look at possible grants for telescopes on DonorsChoose.org. |
| November | <ul style="list-style-type: none"> • Hold first meeting. • Topics to cover in first meeting: History of Universe, Select readings from “The Universe in a Nutshell”, creating a scale model of the solar system. • Schedule naked eye observing night. Students will learn to navigate the night sky. |
| December | <ul style="list-style-type: none"> • Hold second meeting. • Topics to cover in the second meeting: Phases of the Moon, Universe Hierarchy, Objects in the Sky, More basic observing techniques. • Schedule naked eye observing night (Bring a friend, or family member) |
| January | <ul style="list-style-type: none"> • Schedule first community observational Open House. (Publicize) This is will only happen once we have a telescope. • Hold third meeting. • Topics to cover in the third meeting: The Sun, Planning the open house |
| February | <ul style="list-style-type: none"> • Schedule visits to middle school. • Create an astronomy program for outreach to the younger students. • Hold fourth meeting. • Topics to cover for the fourth meeting: Black Holes, The Beginning of the Universe, The Changing Universe. |
| March | <ul style="list-style-type: none"> • Plan a trip to UNC Chapel Hill’s Morehead Planetarium. • Begin talking about astrophotography. |

April

- Schedule an observation night.
- Final meeting.
- Topics for final meeting: Current topics in astronomy (exoplanets, etc.)