

# Alpha Prime: The Next Space Odyssey

## *Proposal Summary*

We propose to develop an interactive database and purchase print material that will enable 5<sup>th</sup> grade students to engage in an eight-week inquiry project where students will simulate work of NASA scientists as they analyze, plan, and solve problems that arise during a space voyage to a fictitious earth-like planet called “Alpha Prime.” The project idea originated because many students come to class with misconceptions about space exploration from watching TV and videos. Unlike TV and the movies, this project will enable students to solve real problems using scientific principles, not the fictitious theories of common science fiction and fantasy. To do this, they need age-appropriate, scientifically-accurate resource materials. NASA is the best source on space exploration, but much of the data and scientific information available from NASA are not accessible for 5<sup>th</sup> graders, and the children-specific sites are not detailed enough to accomplish the goals of this project.

The database we propose to develop will provide students with scientific resources and realistic data that mimic NASA tapes and databases, but it will be age-appropriate so it can be accessed and understood by 5<sup>th</sup> graders. Beyond the database and print materials, students will contact NASA scientists who have agreed to serve consultants and role models for students.

The project will be interdisciplinary. Teams of students will work in science classes to access and analyze data. Then they will work in language arts classes to write about their decisions and “experiences.” The results of their work will be published in a journey log and will culminate in a Space Odyssey evening where students will orally present their work to parents, guests, and classmates.

### *Description*

This proposal seeks funding to develop an age-appropriate, scientifically-accurate interactive database and a library of print material that will enable 5<sup>th</sup> grade students to participate in inquiry-based research on space exploration. The database will provide students with scientific resource information and realistic data that includes animated surface images and “flybys” and data about conditions on a fictitious earth-like planet called “Alpha Prime” in the Alpha Centauri system. The database will enable students to simulate work of NASA scientists in order to analyze, plan, and solve problems that arise as they undertake a fictitious space voyage to Alpha Prime. The database will be realistic, mimicking NASA tapes and databases, but it will be age-appropriate and easily accessed and understood by 5<sup>th</sup> grade students. The database will also include an “on-board mission control” that will serve as a “help” function which students can use to access information to assist them in solving problems and dealing with emergencies that arise. In addition, age-appropriate print resources will be purchased that complements the database.

Besides the database and print material, students will directly contact NASA scientists Jim Klemaszewski, who is a planetary geologist, and Lloyd French, who is an engineer at the Jet Propulsion Laboratory. These scientists will serve as consultants to the students and will be available through conference calls and email. Jeffrey Morris from Project Universe will periodically visit classes. As an African American who has worked with NASA, Jeffrey will serve as a role model for our diverse student population as well as a consultant.

During the course of the project, teams of students will work in science classes to access and analyze data as they investigate the questions listed below. Then, they will write about their decisions and “experiences” in language arts/social studies classes. (In 5<sup>th</sup> grade these subjects are taught in a block.) Students’ work will be published in a journey log which students will orally present to parents, teachers, guests, and classmates at a Space Odyssey evening.

Questions that the students will investigate during the course of the project are:

Week 1: What does data from a probe we sent to Alpha Prime tell us about the planet? Why send a manned mission to Alpha Prime? Will it be safe to land there and explore? What motivated the manned space race in the 60s, and what motivates continued space exploration? What impact could our mission have on earth? What effects have these kinds of missions had in the past? What should be our mission?

Week 2: What type of propulsion system should we use to power our spaceship? How long will we be gone? Why can't we use warp drive to get us there faster? If we build a solar sail, how will it work and how big does it have to be to give us enough momentum to get us to Alpha Prime.

Week 3: Whom should we include on our crew, and what must we take along? What else can we take along beside the necessities and still have a reasonable payload? From where should the launch take place? What's it like to leave our solar system and what can we learn as we do so?

Week 4: How are we going to stay alive and survive the journey? What emergencies might come up and how will we deal with them? What's it like to be separated for so long from family and friends? What is life like on the spacecraft?

Week 5 and 6: What should we do to prepare to arrive at Alpha Prime? How can we reduce the speed of our spacecraft. What factors do we need to consider as we choose a landing site? How will we survive on the surface of Alpha Prime? What do we need to do in order to leave the spaceship and set up camp on Alpha Prime? How will we solve difficulties/emergencies that we encounter on the planet? What must we do in order to accomplish our mission?

Week 7 and 8: We have found artifacts on Alpha Prime, what story do they tell us? What information should we send back to earth now in our report before we leave? What has to be done before we can head back to earth? Did we accomplish our mission? What will be the value of our voyage for mankind?

## *Rationale*

The objectives of this proposal are to:

- Develop an interactive database and a library of age-appropriate, scientifically accurate information that students can use to support decisions they make.
- Engage students in inquiry learning where they construct their own knowledge about scientific concepts.
- Utilize connections with Project Universe and NASA to provide students with role models who are involved in similar work.

The project idea originated because many of our students come to class with misconceptions about space exploration from watching TV and videos. Unlike TV and the movies, this project will enable students to solve real problems using scientific principles, not the fictitious theories of common science fiction and fantasy. In addition, the goals of this project are to enable students to gather and analyze data in order to construct their own knowledge about space science that are suggested by the *National Science Education Standards*. But, to do this, students need age-appropriate, scientifically-accurate resource materials. NASA is the best source on space exploration, but much of the specific data and detailed scientific information available from NASA is not accessible to 5<sup>th</sup> grade students, and children-specific sites are not detailed enough to accomplish the goals of this project.

Finally, this project was initiated as a way to fire the imagination of students. It is meant to engage them using technology that is proven to attract and motivate students. As Seymour Pappert, a great promoter of the digital classroom, said, “Education should strive to engage students in the way that Nintendo does.” This project seeks to put Pappert’s ideas into practice. (A sample of the pilot of the work done by Project Universe is included as an attachment.)

### *Potential Impact*

Initially, this project will affect two teachers and ninety-two students. We expect that the project will raise student and teacher enthusiasm and excitement for science. We believe that students will be intrigued with the process of discovery they will use. We feel that this will entice them to learn more about scientific concepts involved in the study. We believe that the most exciting characteristic of this proposal is that it is based in scientific fact and has connections to actual societal issues that will affect the future of each student.

A pilot that we ran suggested that students are fascinated by the ideas and concepts behind this project. The questions that students will research are intriguing, given the likelihood that their mission will face many scientific challenges and adventures. However, unlike space missions portrayed on shows like “Star Trek,” the means to solve the problems the students encounter will be found using scientific data and concepts, not the fictitious theories of common science fiction and fantasy. As a result, this project will enable students to gain a better appreciation for the complementary scientific concepts that are being studied.

This project can serve as a model for other schools, since the database and list of library/media materials that are developed and purchased for this project will be available to other schools. In addition, the project director is committed to disseminating the work through NSTA and MnSTA conventions.