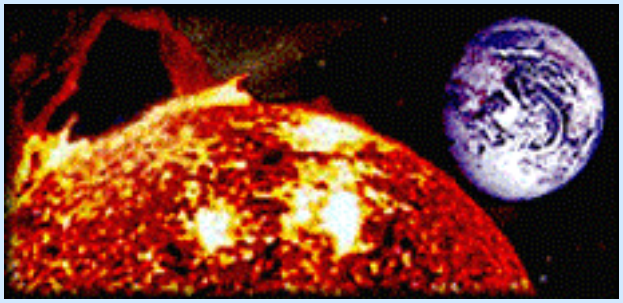
LASSO 2008

Los Alamos
Space Science Outreach



A Teaching/Learning Enhancement Program for

Science Teachers (grades 4-12)

Sponsored by

Los Alamos National Laboratory

and the

National Aeronautics and Space Administration
(NASA)

Application Packet

Los Alamos Space Science Outreach

Call for Applicants

The Education and Postdoc Office (EPDO) of Los Alamos National Laboratory is committed to the improvement of science education throughout the State of New Mexico and the nation. Through a variety of content enhancement programs, we have helped students and teachers increase not only their science content knowledge, but also their critical thinking, problem solving skills, and pedagogy.

We invite you to apply for participation in the Los Alamos Space Science Outreach (LASSO) program, featuring on-going NASA projects that include Los Alamos National Laboratory science instrumentation and personnel. The educational component for the combined projects includes a teacher enhancement program that involves teachers from grades 4-12 in the process of designing and creating space science lessons for inclusion in an online Space Science Activity Book. Built around multiple space science projects conducted at Los Alamos National Laboratory, participant teachers will examine the issues and sciences involved in these complex projects. They will examine sciences involved in exploring our Solar System, interact with Los Alamos National Laboratory personnel and participate in the development of space science activities for distribution via the Internet. This program is a collaborative effort between the Postdoc, the space science groups of Los Alamos National Laboratory and the National Aeronautical and Space Administration.

Selected teachers will be involved in a 10-day summer institute (July 14– 25), followed by a 5-day application workshop July 28 – August 1. All workshops will be held at Los Alamos National Laboratory. Selected teachers will receive a $133.33 per day stipend to cover time, accommodations and travel for a total of $2000 total stipends paid for the summer and culminating workshops. In addition, participants will be eligible to receive a $500 implementation allowance to cover purchase of technology equipment or software to be used in an educational setting. Participants are responsible for any taxes due. It is important to note that teachers are invited under the LANL Official Student Visitor program–Department of Homeland Security Internship. An Official Student Visitor is not considered an employee of the Los Alamos National Laboratory; and, accordingly, no benefits such as health insurance, vacation or sick leave are provided with this invitation.

We see this as an exciting opportunity for dedicated teachers to work collaboratively in the development of new skills and knowledge that can expand their horizons. We are seeking 3 high school science teachers, 6 middle school level science teachers, and 3 elementary teachers.

Please complete the application form in the enclosed packet and return to our office no later than April 18, 2008. Twelve participating teachers will be selected based on criteria listed in the application forms. Expectations and responsibilities for participation are listed in the application materials. Selected participants will be notified by May 2, 2008.

If you have any questions or concerns, please contact Scott Robbins at (505) 667-3639 or by email at srobbins@lanl.gov.

Sincerely,

Scott Robbins, Ph.D.

Sponsored by Los Alamos National Laboratory and NASA

Los Alamos Space Science Outreach

Background

The Earth is constantly bombarded with high speed particles coming not only from the sun, but also from outside of the solar system. A number of NASA projects are designed to study these energetic particles to help us understand the origin, composition, and evolution of our solar system and the universe.

The **ACE** project was designed to study the composition of several sources of matter in the Solar System, including the solar wind.

The **GENESIS** project was developed to collect solar wind particles to determine the elemental and isotopic composition of the Sun.

The **TWINS** project allows scientists to "see" the whole magnetosphere and provides us a picture of how its different parts interact.

The **Lunar Prospector** project led to the exciting discovery of water on the moon. Future endeavours will help to redefine our understanding of the moons composition and origin. Instrumentation designed for the Lunar Prospector is now being used on the **Mars Odyssey** spacecraft to search for water on the planet Mars.

The **Ulysses Mission** was the first spacecraft to explore interplanetary space at high solar latitudes. Ulysses is a joint endeavour of the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) of the USA.

The **LIBS** instrument being developed uses laser pulses focused on a rock some distance away to produce a spark on the surface of the rock. The light from the spark is collected and its optical spectrum is analyzed to tell us what elements are present in the rock, and their relative abundance.

Information learned from these projects helps scientists better understand phenomena such as solar flares, the auroras, and communication disruptions. Project results will help us design better warning system for encroaching geomagnetic storms that not only disrupt communications, but are hazardous to astronauts and can cause pipeline corrosion.

Who among us has not asked, "Where did I come from?"

This question is usually one about life, but behind it are scientific questions about the material of which we are made, the elements in the atoms and molecules of our bodies.

The answer to the question "Where did the matter we are made of come from?" is not so easy to find. Some could be satisfied with an answer such as "We are made of the same

elements that are found on the Earth we live on." But where did that material come from? The Earth is but one planet in the solar system, and most of the solar system material is inside the Sun.

How can we find out what the Sun is made of? Where did the Sun come from?

One can even go further and ask, "What is the galaxy made of?" There is a whole series of related questions that are involved in understanding the cycles the matter goes through as the universe and the structures within it evolve.

Science has barely scratched the surface in examining the actual source of the particles traveling through space around us. The mix of particles that the NASA projects will measure is the result of a complex history. The ability of our space craft instruments to measure a wide range of particle types and energies at the same time and location is what will enable scientists to separate the many processes the matter has undergone on its way to the Earth.

The prime purpose of the NASA projects is to study the composition of several distinct sources of matter; the Sun and solar system, the local interstellar space, and the galaxy as a whole. This, in turn, will lead us to a better understanding of the origin of the elements, and the subsequent evolutionary processing of matter (how it has changed since it was created). Along the way, we will learn more about particle acceleration and transport in the universe, and information needed to separate the changes in composition during the particles' travel. Learning the differences in composition between the solar wind and the Sun will help answer questions about how the solar corona is formed and how solar wind is accelerated. Solar wind particles will also help us compare the compositions of the other planets. Examining the interactions of the magnetosphere parts will help us learn to protect our power systems and communication satellites. All of these interesting problems are part of the larger question "Where did we come from?" Results from the NASA project are only a small piece of an enormous puzzle.

As new information becomes available, from both spacecraft and Earth-based instruments, the picture becomes clearer. Theories are upheld or upset, and new theories take their place. NASA provides an abundance of information to further our understanding of the way our solar system, galaxy, and universe were created and how they continue to evolve.

Science is more than a body of knowledge and a way of accumulating and validating that knowledge. It is also a social activity that incorporates certain human values. Students should experience science as a process for extending understanding, not as unalterable truth.

(Rutherford and Ahlgren, Science for all Americans).

The Education and Postdoc Office of LANL has designed the LASSO project for teachers to focus on the topic of current solar system exploration, and will involve teachers in examining this matter of scientific importance. Participant teachers will acquire current scientific knowledge along with

effective science instructional methodology to be used in the development and publication of online science education lessons and activities.

An introductory packet of information will be provided to selected teachers prior to the first weeks workshop.

Participant teachers will:

- develop and enhance instructional skills,
- expand their scientific knowledge base through exploration and collaboration, and
- create useful and intriguing lessons for the classroom.

Expectations for Participation in LASSO project

These expectations will be used in the application and selection process. Evidence of participants meeting expectations will be evaluated during site-visits by the LASSO education program coordinator.

1. Provision for teacher to have
   - E-mail access (at school or at home)
   - Computer workstation with Internet access (at school and/or at home)
2. Working level of software knowledge (word processing, spreadsheet, etc.)
3. Administrative support
   - Provision for teachers to implement their LASSO experience in the classrooms
4. Provide evaluation data as requested throughout the school year

Responsibilities and Expectations of Participants in LASSO project

The Education Postdoc Office is responsible for planning and implementing the program. Program coordinator will monitor progress of the program, provide support and appropriate instruction.

The LASSO project is comprised of four (4) components. Each component will assume certain responsibilities. These components and their responsibilities are:

1. LANL personnel (scientists and technicians involved in the program)
   a. provide a minimum of 2 hours per workshop to LASSO project including time for planning, communication, delivery of material, etc.
   b. provide pertinent information to the participant development teams
   c. provide feedback to participant questions
   d. act as an electronic mentor for participant development teams
   e. participate in the planning and/or delivery of a workshop component
   f. work with participants as needed

2. Teachers
   a. provide pertinent instruction in a classroom setting subsequent to the program
   b. meet assignment deadlines and complete all projects
   c. attend all workshop sessions
   d. provide pertinent evaluation data as requested

3. Administrators
   a. support the LASSO project and participating teacher
   b. provide teacher the opportunity and support to expand the LASSO experience in subsequent courses

4. Schools
   a. provide teacher appropriate access to phones, fax and e-mail
   b. provide teacher computer access/work station
   c. provide teacher internet access (appropriate connections - phone lines, T-1 lines, etc.)
   d. provide teacher with needed equipment (within budgetary constraints)

TEACHER/ADMINISTRATOR APPLICATION FORM

Los Alamos Space Science Outreach Project
Los Alamos National Laboratory / NASA

****All parts must be completed by teacher and administrator for consideration****

SECTION A - TEACHER

SECTION IA: Demographic information

TEACHER NAME _____

HOME ADDRESS _____ CITY _____ ZIP _____

HOME PHONE NUMBER _____

SCHOOL NAME _____ SCHOOL DISTRICT _____

SCHOOL ADDRESS _____ CITY _____ ZIP _____

SCHOOL PHONE NUMBER _____ FAX NUMBER _____

E-MAIL ADDRESS _____

GRADE LEVEL(S) TAUGHT _____

SUBJECTS TAUGHT _____

SECTION IIA: Please answer the following questions completely.

1A. Identify what you consider to be the most important elements for introducing science concepts to students.

2A. Describe how you use technology in teaching and for other uses in your school/classroom.

3A. Describe how you use New Mexico Science Standards and your districts' curriculum to teach science concepts in your classroom.

4A. List any teaching enrichment programs in which you have participated in the past 3 year.

SECTION IIIA:

List any experiences as well as expertise level you have had in the following computer and software applications.

1. word processing software yes/no types:

[Beginner] [Intermediate] [Advance]

2. spreadsheet software yes/no types:

[Beginner] [Intermediate] [Advance]

3. database software yes/no types:

[Beginner] [Intermediate] [Advance]

4. presentation software yes/no types:

[Beginner] [Intermediate] [Advance]

5. communications software yes/no types:

[Beginner] [Intermediate] [Advance]

6. type of computer used: Mac PC both

[Beginner] [Intermediate] [Advance]

If selected for participation in the LASSO project, I agree that I will complete the program. I will return all funds if participation is terminated prior to the programs completion.

SIGNED: _____ DATE: _____
(Teacher)

Section B - Administrator

SECTION IB: Demographic information – Completion of this section indicates administrator awareness of participation in the program and all requisite expectations.

ADMINISTRATOR NAME _____

SCHOOL NAME _____ SCHOOL DISTRICT _____

SCHOOL ADDRESS _____ CITY _____ ZIP _____

SCHOOL PHONE NUMBER _____ FAX NUMBER _____

E-MAIL ADDRESS _____

Section C - **For consideration, this application must be completed by both the applicant and the administrator.**

If selected for participation in the LASSO project, we agree that the applicant will complete the program.

SIGNED: _____ DATE: _____
(teacher)

SIGNED: _____ DATE: _____
(administrator)

Application Process Checklist

Applications must be complete for consideration. Successful applicants will receive training in activity design, and relevant science content.

Each participant will receive a stipend to cover time, accommodations, and travel. In addition, successful applicants will be eligible for a substantial follow-up award to be used to purchase personal computer hardware/software to enhance their integration of computer technology in the classroom.

Checklist:

_____ I have read the Call for Applicants (page 2)

_____ I have read the introductory information about LASSO (pages 4 – 7)

_____ I have discussed the program with my administrator

_____ I will be able to attend all LASSO workshops (July 14 - August 1)

_____ I will be able to implement LASSO educational activities in my classroom

_____ I have access to computer equipment in my classroom

_____ I have access to the Internet in my classroom

_____ I have completed the Teacher demographics - section IA (page 8)

_____ I have completed the questions – section IIA (page 8)

_____ I have completed the computer specifications – section IIIA (page 9)

_____ I have signed the Teacher Application Section A (page 9)

_____ I have given the application packet to my administrator to complete

_____ My administrator has completed the Administrator demographics (page 10)

_____ My administrator has signed and dated the application – section C (page 10)

_____ I have signed and dated the application – section C (page 10)

_____ The application has been completed and submitted before the April 18, 2008, deadline.

Submit Application to:

Scott Robbins
LASSO Project Coordinator
STB/Education and Postdoc Office
LOS ALAMOS NATIONAL LABORATORY
PO BOX 1663 MS M709
LOS ALAMOS, NM 87545

FAX (505) 665-6871

Deadline for Applications:
April 18, 2008