

① Eisenhower - 95 - 1

UTAH STATE BOARD OF REGENTS  
PROPOSAL FOR FUNDS AUTHORIZED UNDER  
Dwight D. Eisenhower Mathematics and Science Education Act  
DUE ON APRIL 24, 1995

1. LEGAL APPLICANT/RECIPIENT

- a. Name Dr. Joseph Andrade, PI, Center for Integrated Science Education
- b. Institution University of Utah
- c. Street/P.O. Box 2480 MEB
- d. City Salt Lake City
- e. State/Zip Code Utah 84112
- f. Telephone number (801) 581-4379 or (801) 581-4171

2. TITLE OF PROJECT:

Inservice Professional Development Utilizing a Mobile Hands-on Science Center

3. PRIORITY ACTIVITY AREA:

A and B: Retraining and Inservice

4. NUMBER OF INSERVICE TEACHERS PARTICIPATING: ELEM 200 SECONDARY 50

5. THE APPLICANT CERTIFIES THAT:

To the best of my knowledge and belief, data in this application are true and correct, and the applicant will comply with the assurances listed in herein.

J.D. Andrade, Professor & Co-Director  
(Applicants typed name and title)

[Signature]  
(Signature)

Robert G. Glass, Director, OSP

6. DEAN OF EDUCATION OF SPONSORING INSTITUTION:

Dr. Colleen Kennedy, Dean  
(Dean or other official name and title)

[Signature]  
(Signature)

7. CHIEF ACADEMIC OFFICER

J. McIntyre, Vice-President  
(Typed name)

[Signature]  
(Signature)

SEND PROPOSALS TO:

Dr. Phyllis "Teddi" Safman  
State Board of Regents  
3 Triad Center, #550  
Salt Lake City, UT 84180-1205

(801) 321-7119

B. Abstract

Utah now has a core elementary science curriculum which is hands-on, process, and activity-based. Complementary secondary core science curricula are in the final draft and implementation stage. Many Utah teachers need and desire retraining and inservice opportunities to provide them with the experience, skills, content, and confidence with which to effectively utilize and apply the new state core curricula.

Utah is now designing and building "Leonardo on Wheels" -- a traveling, interactive, hands-on, experiential science center -- the initial project of the Utah Science Center Authority. "Leonardo" will provide environments, activities and facilities for teachers, students, parents, and other community members to explore, discover, experience, understand, and apply science, math, and technology. "Leonardo" activities are and will continue to be closely tied to the new course curricula, without duplicating it. Leonardo is designed to complement and enhance the classroom experience.

We propose to use Leonardo as a unique teacher inservice/retraining laboratory in science, math, and technology. Prior to Leonardo's opening for class use and for the general public, Leonardo will be reserved for teacher and docent/volunteer courses and workshops, organized along grade-specific and discipline-specific lines. These inservices will actually be initiated months before Leonardo comes to town, with video, print, and experiment materials. With such advance preparation, teachers and trainers will be able to make most effective use of Leonardo in their local community. The training will fully empower teachers to make most effective use of Leonardo for their classes. Teachers will lead their classes through Leonardo, and provide follow-on and follow-up instruction and experiences for their students.

We will of course work closely with the Districts, the State Office of Education, and the University to provide appropriate credit for the Leonardo workshop and experiences.

We request a budget of \$20,000 with which Leonardo inservice training will be provided to teachers at 5 different sites from February to May, 1996, involving over 200 elementary and 50 secondary teachers.

The project will be managed and largely conducted by J. Andrade and M. McDonald with the participation and assistance of faculty in the Center for Integrated Science Education and with the Leonardo on Wheels staff.

#### C. Objectives:

1. To effectively utilize Leonardo on Wheels as a traveling laboratory for inservices and workshops in science, math, and technology, emphasizing experiential, hands-on learning relevant to the state's new science core curricula.
2. To empower teachers to effectively utilize Leonardo to augment and enhance classroom science activities and instruction.
3. To provide means for teachers and classes to have the Leonardo experience and philosophy even when Leonardo is not in town.
4. To serve over 200 elementary and 50 secondary teachers in 5 different sites from February to May, 1996.

#### D. Activities:

The Center for Integrated Science Education (CISE) at the University of Utah proposes a teacher enhancement program that will empower teachers with the skills, abilities, and confidence to creatively engage their colleagues and students in the innovative science education activities of Leonardo on Wheels. CISE plans to establish a network of teachers throughout the state that will continually use the components of Leonardo on Wheels as a major resource for professional development in their districts.

Leonardo on Wheels is a mobile, interactive science center developed as an outreach component of the future Utah Science/Arts Center. Leonardo on Wheels has been funded by the state of Utah and will begin traveling the region in February, 1996.

Leonardo on Wheels has been designed to provide environments and opportunities for teachers, students, and community members to explore, discover, experience and understand science, math, and technology. It will demonstrate how subjects and fields of thought are integrated and interdependent. The components of Leonardo on Wheels will reflect the forefront of scientific advances and dynamic educational experiences, thus making it an ideal resource for broad-based teacher enhancement programs.

#### Developing this program around Leonardo on Wheels has the following advantages:

- 1) it will guarantee large numbers of teachers to be serviced by a major science resource
- 2) it will annually reinforce teacher enhancement activities in the districts
- 3) it will provide access to science and technology for teachers in rural regions where state-of-the-art science facilities and training are not available
- 4) it will deliver science and technology directly to the teachers in their districts.

CISE and Leonardo on Wheels share a common vision of providing services to teachers, across a region served by both organizations, that significantly change the approach to science instruction in the elementary classroom. The proposed teacher enhancement program will accomplish these goals through the reinforcement of creative and challenging activities that will draw from a range of disciplines while advancing science content and skills.

Leonardo will be in a particular site for a minimum of 7 days. The first fully operational day will be reserved for teacher training workshops and for volunteer/docents training. We will work closely with the districts and individual schools to provide effective, practical scheduling of the workshops and of class visits. Workshops will be

grade-specific and discipline-specific, and will incorporate Leonardo's emphasis on themes, projects, connections, and hands-on activities. The teachers participating in the Leonardo workshops will be empowered to conduct their own visits and other workshops. As Leonardo's Colleagues, they will be recognized for their contributions and input. They will have close ties to the Leonardo and CISE staff and faculty. Inservice and university credit will be available.

Leonardo's schedule for February through May, 1996 will include Logan, Ogden-Brigham City, Price, Orem-Provo, Roosevelt-Duschene-Vernal, Cedar City, St. George, and Salt Lake City. The exact sites and dates will be set by August, 1995 and will be coordinated with local school districts and local community leaders. Local districts and communities can access local Eisenhower funds, Mineral Lease funds, and other resources for the inservices. Training will be developed in consultation with Brett Moulding, local science curriculum supervisors, CISE, and with Leonardo's education staff.

The content of Leonardo's inservice and training workshops will be finalized in late 1995 and implemented February through May, 1996.

#### **E. Population:**

A minimum of 200 elementary and 50 secondary teachers, in 5 different sites, will be served in the February through May, 1996 period.

#### **F. Monitoring and Evaluation:**

This first implementation of Leonardo and of its application for teacher training and empowerment is an exciting experiment with enormous potential and high expectations. Evaluation and assessment will occur in three stages. First, during the formative evaluation, the materials and activities developed will be prototyped and critiqued by the teachers and project staff. The summative stage will assess and document the overall effectiveness of the components of the project.

CISE recognizes that there are other teacher enhancement efforts involving interactive science centers and university departments. CISE staff interacts with science educators from various organizations. CISE will discuss the experiences, progress and assessment of the project with those organizations. A summary report of the project will be prepared in Summer, 1996, distributed, and criticized. Interactive workshops that demonstrate the project fundamentals will be presented at regional and national conferences. CISE has presented at the National Science Teachers Association (NSTA) conferences and intends to present at the Association of Science and Technology Center (ASTC) conferences.

**G. Budget:**

<i>Personnel:</i>	
J. Andrade, P.I.	--
M. McDonald, Project Manager	\$10,000*
R. Gerson, Curriculum Asst.	\$3,000*
J. Biggs, Leonardo Lab Manager	\$3,000*
M. Steadman, Secretary & Graphics	\$2,000*
<i>Travel:</i>	\$500
<i>Supplies:</i>	\$1,250
<i>Other - Photocopying, Telephone, etc.:</i>	\$250
<i>Total Direct Costs:</i>	\$20,000
<i>Indirect Costs (5% max):</i>	\$1,000
<i>Total Costs:</i>	<b>\$21,000</b>

**Budget Justification:**

J. Andrade will volunteer his services. As Co-Director of CISE, Joe's University duties include inservice and related activities in the public education community. Mary McDonald, Manager of CISE and Editor of its *EXPLORE!* Newsletter will serve as Project Manager and Coordinator. Rachel Gerson will assist Mary and James in workshop materials and content development. James Biggs directs CISE's Leonardo Laboratory (391 Chipeta Way, Suite G, University of Utah Research Park,.) and will help develop workshop materials and activities. Mindy Steadman will provide text and graphics support and help with content developments.

Travel is to help compensate for private vehicle travel to rural Utah sites.

**H. Staff:**

The project will be directed by Dr. Joe Andrade, Co-Director of CISE, and a member of the Utah Science Center Authority. Dr. Andrade chairs the Program Planning Committee of the Leonardo on Wheels Project. He has been instrumental in organizing university faculty, administration, and students in courses and projects that facilitate innovative technologies and methods for the enhancement of science education. Dr. Andrade conducts science courses for pre-service teachers, ten-hour workshops for in-service teachers, and a science exhibits course, all at the University of Utah.

Two project managers from CISE will be directly responsible for training and organizing the project. Mary McDonald, Manager of CISE, edits the "EXPLORE!" newsletter and serves on the program planning committee for Leonardo on Wheels. She has participated both as a student and teaching assistant in science exhibit courses. Recently, CISE and the Utah Girl Scout Council were selected to be a National Science Partnership site to foster increased female participation in the sciences. As part of that project, Mary will involve the Girl Scouts in the development and presentation of innovative exhibit projects for Leonardo on Wheels. Her expertise is in science content development.

Rachel Gerson recently joined CISE. She has a Masters of Arts, Education from Stanford University with a specialization in curriculum and teacher education. Her experience in teaching and curriculum development will be valuable to this project. She has worked closely with Dr. Mike Atkin, professor at Stanford, in informal science education and programs for teacher outreach. Rachel has teaching experience on the Zuni Indian Reservation in New Mexico and the Keystone Science School in Colorado.

James Biggs manages CISE's unique Leonardo Laboratory, where activities and materials for interactive hands-on science are being developed.

Sandy Zicus (no funds requested in this grant) is the Leonardo Project's docent/volunteer planner/coordinator and will serve as part of the team, as will Karlene Johnson, the Leonardo Project Director. Sandy has extensive experience with teacher and



volunteer training in New Hampshire. Karlene managed a traveling science center in New Zealand for two years, the New Zealand Science Roadshow, and has teaching experience.

The CISE Executive Committee is composed of faculty from the Colleges of Education, Engineering, and Science and lends its full support to this project. These faculty will be involved as their schedules and expertise permit. CISE is preparing both a regional and national board of science educators, scientists, and evaluators to serve in the advisory and assessment capacity for this project.

**I. Assurance Statement:**

Funds awarded will be used to supplement available no-Federal funds, thereby increasing the level of funds available for program activities.

**J. Cooperative Agreements:**

We are just beginning to discuss and develop cooperative agreements and support from districts and local communities. Such agreement and support will be in place by late Summer, 1995.

**Mary L. McDonald**

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**Home Address:**

1414 Federal Way  
Salt Lake City, Utah 84102  
Phone: (801) 355-2628

**Education**

1980-1982 Pennsylvania State College  
1991-1995 Bachelor of Science in University Studies\*, University of Utah

The Bachelor of Science in University Studies was titled "Interdisciplinary Science" and was completed through the College of Engineering. This degree is a self-designed course of study made available through the University Studies Program. Major emphasis is placed on the foundation courses in biology, chemistry, physics, and earth science with additional courses in science education.

**Experience**

1993-1994 Instructor in after-school science program for elementary students.  
1993-1995 Teaching Assistant in Science Exhibits Project Class at University of Utah.  
1994-1995 Presenter at National Science Teachers Association and Utah Science Teachers Association Conferences.  
1995 National Science Partnership Program Director with the Utah Girl Scout Council.  
1991-Present Manager, Center for Integrated Science Education.

**Publications**

M. McDonald, K. Thorimbert; *Developing a Science Education Industry in Utah*, Report to the State Centers of Excellence.

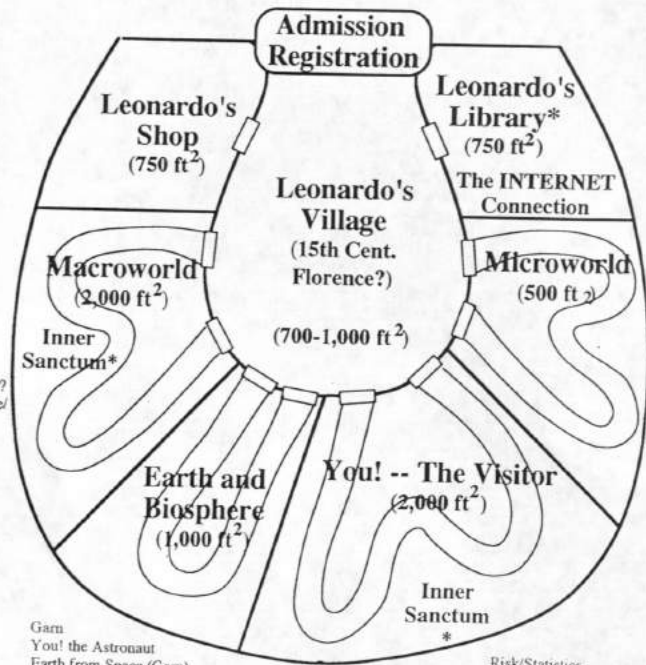
Assistant Editor to EXPLORE! Newsletter, Published five times a year and distributed to every elementary teacher in Utah.

Editor of Resource Portfolio, a joint publication of the Utah Science Teachers Association and the Utah State Office of Education.

**Memberships**

National Science Teachers Association  
Utah Science Teachers Association  
Program Planning Committee for Leonardo on Wheels

# THE LEONARDO PROJECT (~7,500 ft<sup>2</sup>)



Hawking  
Starlab  
Telescope  
Space Simulator?  
Patterns in Space/  
Powers of 10  
Gravity Well  
Lunar Leaper

Gam  
You! the Astronaut  
Earth from Space (Gam)  
Weather  
Utah the Movie  
Forces/Energy  
Earthquakes  
Minerals & Atoms  
Water  
Recycling  
Math

Risk/Statistics  
Chaos  
Heart  
Anatomy  
Imaging  
Sound and Music  
Vision and Light  
Health Performance

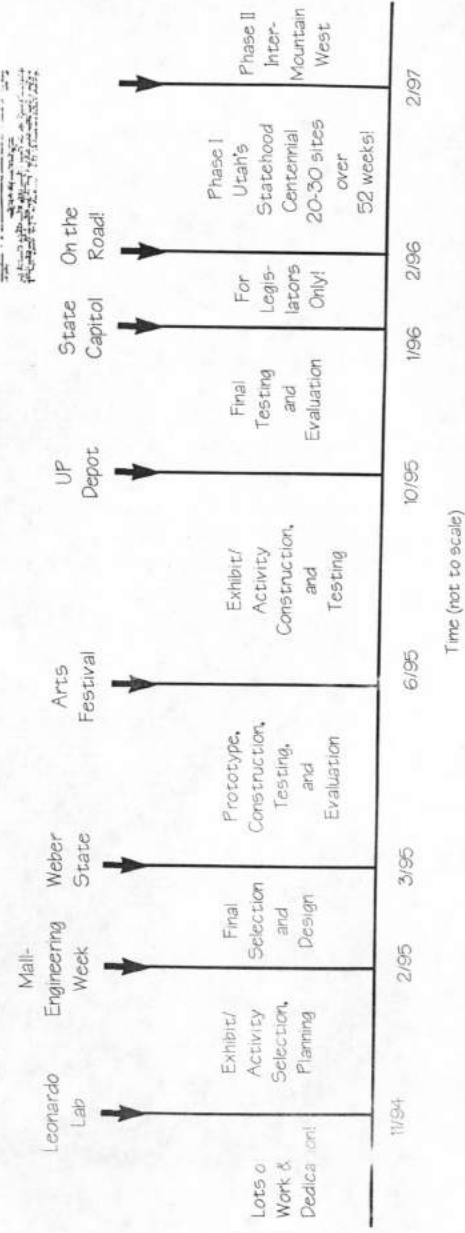
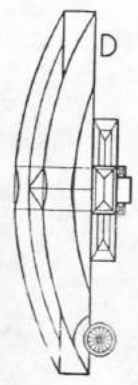
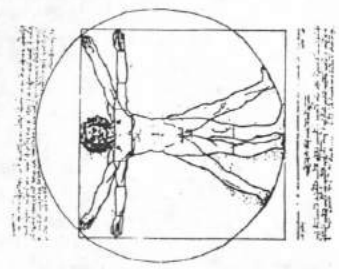
Cloud Chamber  
Nucleous  
Atoms  
Molecules  
SEM?  
Optical  
Microscope  
Micro-Cosmos

Little Leonardo's --  
Magic School Bus\*

Truck\*  
(alternative energies)

\* = Controlled/Earned Access

## The Leonardo Project The Gateway Center's Traveling Science/Arts Experience!



Time (not to scale)