



NASA/NSTA Symposium: 21st Century Explorer — Today's Knowledge for Tomorrow's Explorer Thursday, March 27, 2008

1:30 PM – 1:55 PM

Welcome, Introductions, Goals for the Symposium

Al Byers, Assistant Executive Director of Government Partnerships and e-Learning, NSTA

Flavio Mendez, Symposia and Web Seminars Director, NSTA

- About NSTA Symposia
- Agenda/Goals/Forms/Logistics/Introductions

Dr. Charles W. Lloyd, Project Manager, Human Research Program (HRP) Non-exercise Physiological Countermeasure Project and the HRP Education and Outreach Project, NASA JSC

Jaqueline Cortez, Business Specialist/Education and Outreach Lead, HRP Education and Outreach Project, NASA JSC

Lisa Neasbitt, Educator, HRP Education and Outreach Project, NASA JSC

Sylvia Luna, Bilingual Educator, HRP Education and Outreach Project, NASA JSC

Amanda Smith, Educational Administrator, HRP Education and Outreach Project, NASA JSC

Michael Baker, Astronaut, ISS Program Manager for International and Crew Operations, NASA JSC

1:55 PM – 2:15 PM

21st Century Explorer Project Overview Presentation

Dr. Charles W. Lloyd and Jaqueline M. Cortez

Learning Outcomes:

After participating in the presentation,

- Participants will identify one way the U.S. Space Exploration Policy and the Human Research Program fits into the strategic education plan.
- Participants will identify two ways NASA 21st Century Explorer Project strategies can be implemented into already existing programs on their campus.

2:15 PM – 2:45 PM

International Cooperation in Space: Shuttle, Mir and ISS

Captain Michael A. Baker

Learning Outcomes:

After participating in the presentation,

- Participants will be exposed to ISS and shuttle missions that Captain Baker has flown, and be able to identify 2 of the 4 shuttle missions.
- Participants will comprehend and recall the cooperative nature of the ISS program by identifying three international partners.
- Participants will list two International Partners and their involvement in the ISS program.

2:45 PM – 3:00 PM

Break

3:00 PM – 4:15 PM

Designing a Crew Exploration Vehicle (CEV)

Lisa A. Neasbitt and Sylvia Luna



Learning Outcomes:

After participating in this activity,

- Participants will list five design indicators that make up their model CEV for future space exploration.
- Participants will construct a model CEV from plans developed, and will reproduce a simple sketch of the vehicle.
- Participants will present a model CEV and make two recommendations from their design to the Constellation program at NASA.

4:15 PM – 4:45 PM

Human Space Flight Challenges

Dr. Charles W. Lloyd

Learning Outcomes:

After participating in the presentation,

- Participants will interpret the bodily fluid shift during reduced gravity exposure by recalling three places on the body that show fluid volume differences.
- Participants will compare the human body on Earth to the human body in spaceflight listing three differences between them.

4:45 PM – 5:25 PM

Get A Leg Up

Lisa A. Neasbitt and Sylvia Luna

Learning Outcomes:

After participating in this activity,

- Participants will explain differences in the circumference of the leg before and during the spaceflight simulation and be able to list three places measured on the leg.
- Participants will interpret the changes in the human body observed during spaceflight, and describe these changes.
- Participants will compare changes in their bodies during the spaceflight simulation to group results and identify the patterns of fluid shift.
- Participants will be able to interpret fluid shift in humans during the spaceflight simulation and display these changes graphically.

5:25 PM – 5:40 PM

Next Steps for NASA 21st Century Explorer on YOUR Campus

Jaqueline M. Cortez and Amanda Smith

Learning Outcomes:

After participating in the presentation,

- Participants will brainstorm ideas for implementation on their home campus and additional campuses in their educational authority.

5:40 PM – 6:00 PM

Final Words

- Post-assessment form
- Evaluation form/Survey/Credit info
- NSTA Web Seminars
- Drawing of door prizes

National Science Education Standards Addressed: Content Standards, K-4

Science as Inquiry

As a result of activities in grades K-4, all students should develop

- Abilities Necessary to do Scientific Inquiry
 - Emphasizes the students asking questions that they can answer with scientific knowledge, combined with their own observations.
 - Planning and conducting a simple investigation to answer questions.
 - Employ simple equipment and tools to gather data and extend the senses.
 - Use data to construct a reasonable explanation.
 - Develops the ability to communicate, critique, and analyze their work and the work of other students.

- Understandings about Scientific Inquiry
 - Using all different kinds of investigations depending on the questions they are trying to answer.
 - Simple instruments, such as magnifiers, thermometers, and rulers, provide more information than scientist to obtain using only their senses.
 - Scientists develop explanations using observations and what they already know about the world.
 - Scientist review and ask questions about the results of the other scientists work.

Content Standard C:

Life Science

As a result of activities in grades K-4, all students should develop

- The Characteristics of Organisms
 - The behavior of individual organisms is influenced by internal cues and external cues.
 - Each plant or animal has different structures that serve different functions in growth, survival and reproduction.

- Organisms and their Environment
 - Humans depend on their natural and constructed environments.

Content Standard E:

Science and Technology

As a result of activities in grades K-4, all students should develop

- Abilities of Technological Design
 - Make proposals to build something or get something to work better; they should be able to describe and communicate their ideas, Students should recognize that designing a solution might have constraints, such as cost, materials, time, space, or safety.
 - Develop the ability to explain a problem in their own words and identify a specific task and solution related to the problem.
 - Develop the ability to work individually and collaboratively and too use suitable tools, techniques, and quantitative measure when appropriate.
 - Abilities should include oral, written and pictorial communication of the design process and product.

- Evaluate their own results or solution to problems, as well as those of the other students, by considering how well a product or design met the challenge to solve a problem.

**Content Standard F:
 Science in Personal and Social Perspectives
 As a result of activities in grades K-4, all students should develop**

- Changes in Environments
 - Environments are the space, conditions, and factor that affect and individuals and a populations ability to survive.
 - Students should understand the different consequences of changing environments with small increments over a long period of time as compared with changing environments in large increments over short periods.

Content Standards, 5-8

**Science as Inquiry
 As a result of activities in grades 5-8, all students should develop**

- Abilities Necessary to do Scientific Inquiry
 - Develop the ability to refine and refocus broad and ill-defined questions.
 - Develop systematic observation, making accurate measurements, and identifying and controlling variables.
 - The use of tools and techniques, including mathematics, will be guided by the question asked and the investigation students design.
 - With practice students should become competent at communicating experimental methods, following instructions, describing observations, summarizing the results or other groups and telling students about investigations and explanations.
- Understandings about Scientific Inquiry
 - Mathematics is important in all aspects of scientific inquiry.
 - Develop the ability to refine and refocus broad and ill-defined questions.
 - Current scientific knowledge and understanding guide scientific investigations.
 - Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.
 - Scientific explanations emphasize evidence, have logically consistent arguments, and use scientific principles, models, and theories. The scientific community accepts and uses such explanations until displaced by better scientific ones. When such displacement occurs, science advances.

**Content Standard C:
 Life Science
 As a result of activities in grades 5-8, all students should develop**

- Structure and Function in Living Systems
 - Living systems at all levels of organization demonstrate the complementary nature of structure and function.
- Diversity and Adaptations of Organisms

- Biological adaptations include changes in structure, behavior, or physiology that enhance survival and reproductive success in a particular environment.

Content Standard E:

Science and Technology

As a result of activities in grades 5-8, all students should develop

- Abilities of Technological Design
 - Students should organize materials and other resources, plan their work, make good use of group collaboration where appropriate, choose suitable tools and techniques and work with appropriate measurement methods to ensure adequate accuracy.
 - Students should review and describe any completed piece of work and identify the stages of problem identification, solution design, implementation and evaluation.
 - Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance. Engineers often build in back-up systems to provide safety. Risk is part of living in a highly technological world. Reducing risk often results in new technology.
 - Technological designs have constraints. Some constraints are unavoidable, for example, properties of materials, or effects of weather and friction; other constraints limit choices in the design, for example, environmental protection, human safety, and aesthetics.

International Technology Education Association (ITEA) Standards Addressed:

Design

- Standard 8: Students will develop an understanding of the attributes of design.
 - Everyone can design solutions to a problem. (K-2)
 - Design is a creative process. (K-2)
 - The design process is a purposeful method of planning practical solutions to problems. (3-5)
 - Requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design. (3-5)
- Standard 9: Students will develop an understanding of engineering design.
 - The engineering design process includes identifying a problem, looking for ideas, developing solutions and sharing solutions with others. (K-2)
 - Expressing ideas to others verbally and through sketches and models is an important part of the design process. (K-2)
 - The engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item evaluating it and presenting the results. (3-5)
 - When designing an object, it is important to be creative and consider all ideas. (3-5)
 - Models are used to communicate and test design ideas and processes. (3-5)
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
 - Asking questions and making observations helps a person figure out how things work. (K-2)

- All products and systems are subject to failure. Many products and systems, however, can be fixed. (K-2)
- Troubleshooting is a way of finding out why something does not work so that it can be fixed. (3-5)
- The process of experimentation, which is common in science, can also be used to solve technological problems. (3-5)

Abilities for a Technological World

- Standard 11: Students will develop the abilities to apply the design process.
 - Brainstorm people’s needs and wants and pick some problems that can be solved through the design process. (K-2)
 - Build or convert an object using the design process. (K-2)
 - Investigate how things are made and how they can be improved. (K-2)
 - Identify and collect information about everyday problems that can be solved by technology and generate ideas and requirements for solving a problem. (3-5)
 - The process of designing involves presenting some possible solutions in visual form and then selecting the best solution(s) for many. (3-5)
 - Test and evaluate the solutions for the design problem. (3-5)
 - Improve the design solutions. (3-5)

National Mathematics Education Standards (NCTM) Addressed:

Data Analysis and Probability Standard:

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
 - collect data using observations, surveys, and experiments (3-5)
- Develop and evaluate inferences and predictions that are based on data
 - propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions and predictions (3-5)

National Health Education Standards (NHES) Addressed:

Standard 2: Students will analyze the influence of culture, media technology and other factors on health.

- Describe ways technology can influence personal health (3-5)

National English as a Second Language Education Standards Addressed:

Goal 2: To use English to achieve academically in all content areas.

- Standard 1: Students will use English to interact in the classroom.
 - Following oral and written directions, implicit and explicit
 - Participating in full class, group and paired discussions
 - Asking and answering questions
 - Explaining actions
 - Elaborating and extending other people’s ideas and words

- Standard 2: Students will use English to process, construct and provide subject matter information in spoken and written forms.
 - Comparing and contrasting information
 - Listening to, speaking, reading and writing about the subject matter information
 - Gathering information orally and in writing
 - Analyzing, synthesizing and inferring for information
 - Representing information visually, and interpreting information presented visually
 - Hypothesizing and predicting
 - Understanding and producing technical vocabulary and text features according to content area

- Standard 3: Students will use appropriate learning strategies to construct and apply academic knowledge.
 - Focusing attention selectively
 - Recognizing needs and seeking assistance appropriately from others
 - Imitating the behaviors of native English speakers to complete tasks successfully