



NASA/NSTA Symposium: Stars, Planets, Life, and the Universe Thursday, April 6, 2006

8:30 AM – 9:00 AM

Welcome, Introductions, Goals for the Symposium

Al Byers, Assistant Executive Director of Government Partnerships and e-Learning, NSTA
Peg Steffen, NASA Explorer Schools Program Manager, NASA
John Entwistle, NASA Explorer Schools Technology Services Coordinator, NASA
Mark Bosveld, NASA Explorer Schools Director, NSTA
Jodie Rozzell, NASA Explorer Schools Administration Program Manager, NSTA
LaTeicia Durham, NASA Explorer Schools Logistics and Communications Assistant, NSTA

Presenters:

Flavio Mendez, Symposia and Web Seminars Program Manager, NSTA

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

Dr. Matt Bobrowsky, Office of Public Outreach, Space Telescope Science Institute

Edna DeVore, Director of Education and Public Outreach, SETI Institute

Dr. Natalie Batalha, Assistant Professor of Physics and Astronomy, San Jose State University

Pamela Harman, Education and Outreach Manager, SETI Institute

Dr. Dana Backman, SOFIA Education and Public Outreach, USRA & SETI Institute

9:00 AM – 9:25 AM

Beginning Session: Plan for the Day and KWL

Pamela Harman, SETI Institute

9:25 AM – 10:20 AM

Scientific Models: Engage and Explore

Edna DeVore, SETI Institute

Learning Outcomes:

After participating in the presentation,

- Participants will construct models of the solar system, the galaxy, and the universe.
- Participants will analyze constructed models to compare scale and distance.

10:20 AM – 10:35 AM

Break

10:35 AM – 11:25 AM

Scientific Models: Explanation and Q&A

Matt Bobrowsky, STScI

Learning Outcomes:

After participating in the activity,

- Participants will name different types of models that scientists use.
- Participants will explain why models are useful to both students and scientists.

11:25 AM – 12:10 PM

Lunch

12:10 PM – 12:25 PM

Fun with the Solar System

Flavio Mendez, NSTA

Learning Outcomes:

After participating in the presentation,

- Participants will describe how to play the Solar System Trading Cards game.
- Participants will list three ways of using the Solar System Trading Cards in the classroom.

12:25 PM – 1:20 PM

The Electromagnetic Spectrum: Engage and Explore

Edna DeVore, SETI Institute

Learning Outcomes:

After participating in the activity,

- Participants will describe the electromagnetic spectrum and demonstrate how to sense two portions (visible and infrared) of the spectrum.
- Participants will be able to describe how filters work to select portions of the spectrum.

1:20 PM – 2:10 PM

The Electromagnetic Spectrum: Explanation and Q&A

Dana Backman, USRA & SETI Institute

Learning Outcomes:

After participating in the presentation,

- Participants will list different types of visible and invisible light waves.
- Participants will describe how the different types of electromagnetic waves are useful in astronomy and other sciences, as well as in day-to-day life.

2:10 PM – 3:05 PM

What Makes a Planet Habitable? Engage and Explore

Pamela Harman, SETI Institute

Learning Outcomes:

After participating in the presentation,

- Participants will assess the possibility of life elsewhere in the solar system.
- Participants will describe how organisms living under extreme conditions serve as analogs for extra-terrestrial life.

3:05 PM – 3:25 PM

Break

3:25 PM – 4:15 PM

Finding Habitable Planets: Explain and Q&A

Natalie Batalha, SJSU

Learning Outcomes:

After participating in the presentation,

- Participants will describe the conditions for habitability.
- Participants will explain how we might go about finding habitable planets around other stars.

4:15 PM – 4:30 PM

KWL Wrap-up

Pamela Harman, SETI Institute

4:30 PM – 5:00 PM

Final Words

- Post-assessment form
- Evaluation form/Survey
- NSTA Web Seminars
- Raffle of door prizes

**National Science Education Standards Addressed:
Content Standards, 5-8**

Content Standard A:

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

- Abilities Necessary to do Scientific Inquiry
 - DEVELOP DESCRIPTIONS, EXPLANATIONS, PREDICTIONS, AND MODELS USING EVIDENCE. Students should base their explanation on what they observed, and as they develop cognitive skills, they should be able to differentiate explanation from description-- providing causes for effects and establishing relationships based on evidence and logical argument. This standard requires a subject matter knowledge base so the students can effectively conduct investigations, because developing explanations establishes connections between the content of science and the contexts within which students develop new knowledge.
- Understandings about Scientific Inquiry
 - Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.

Content Standard B:

Physical Science

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

- Transfer of Energy
 - Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object--emitted by or scattered from it--must enter the eye.
 - The sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.

Content Standard C:

Life Science

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

- Diversity and Adaptations of Organisms
 - Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Content Standard D:

Earth and Space Science

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

- Earth in the Solar System
 - The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.

Content Standards, 9-12

Content Standard A:

As a result of activities in grades 9-12, all students should develop

- Abilities Necessary to do Scientific Inquiry
 - FORMULATE AND REVISE SCIENTIFIC EXPLANATIONS AND MODELS USING LOGIC AND EVIDENCE. Student inquiries should culminate in formulating an explanation or model. Models should be physical, conceptual, and mathematical. In the process of answering the questions, the students should engage in discussions and arguments that result in the revision of their explanations. These discussions should be based on scientific knowledge, the use of logic, and evidence from their investigation.
- Understandings about Scientific Inquiry
 - Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.

Content Standard B:

Physical Science

As a result of their activities in grades 9-12, all students should develop an understanding of

- Interactions of Energy and Matter
 - Electromagnetic waves result when a charged object is accelerated or decelerated. Electromagnetic waves include radio waves (the longest wavelength), microwaves, infrared radiation (radiant heat), visible light, ultraviolet radiation, x-rays, and gamma rays. The energy of electromagnetic waves is carried in packets whose magnitude is inversely proportional to the wavelength.



Content Standard, K-12

Unifying Concepts and Processes

As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

- Systems, order and organization
- Evidence, models and explanation