NISE Net Online Workshop

NGSS & the Explore Science Toolkit - Connecting Your Toolkit to Field Trips and K-12 Programs

March 20, 2018

Welcome! **Today's presenters are:**

Lindsay Bartolone, M.S., Science Education
Linda Shore, Ed.D. CEO, Astronomical Society of the Pacific

As we wait to get started with today's discussion, please:

- **Update your display name.** Include your first & last names, institution and location.
- **Introduce yourself**! Type your name and institution into the Chat Box
- **Describe an experience.** In the chat box, describe an experience at your museum that is very popular with field trips.
- **Questions?** Feel free to type your questions into the Chat Box at any time throughout the online workshop or use the raise your hand function in the participants list and we'll unmute your microphone

nisenet.org/events/online-workshop

Supporting Schools with NASA Exhibits & Activities

How your museum can support the NGSS

Image credit: University of Hawaii Institute for Astronomy / Rob Ratkowski

… we are also born engineers

Image credit: MHV/Wikimedia Commons

Scientists seek to understand the natural world

Engineers seek to improve the manufactured world

Scientists ask questions, conduct experiments, and develop explanations

Engineers identify problems, conduct experiments, and design solutions

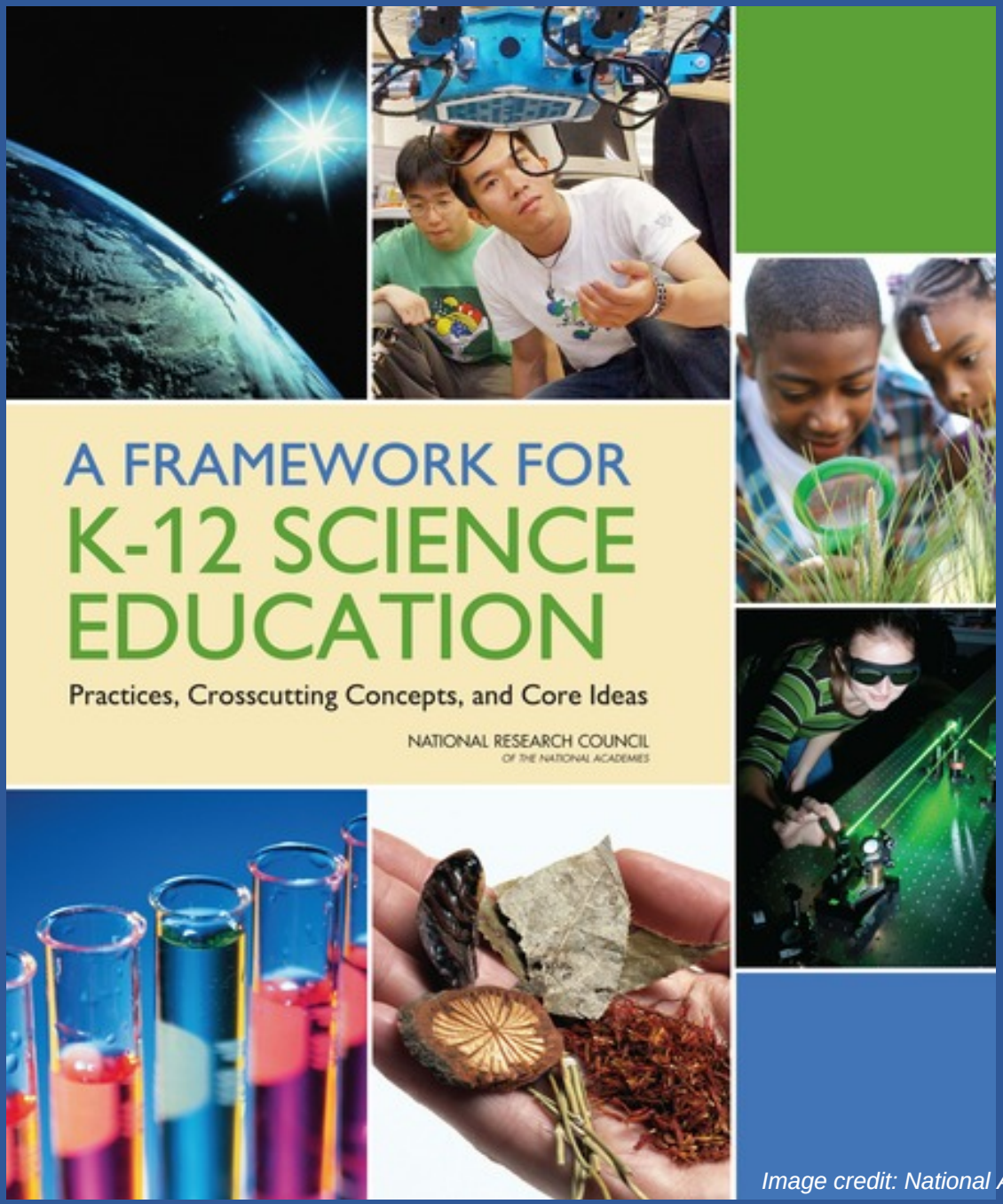


Image credit: National Academies Press

DIMENSION 1
Scientific and Engineering Practices

1. Asking questions (science) and defining problems (engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (science) and designing solutions (engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

DIMENSION 2
Crosscutting Concepts

Patterns – organization and classification

Cause and effect – mechanism and explanation

Scale, proportion, and quantity - recognize what is relevant

Systems and system models – define the system under study

Energy and matter - flows, cycles and conservation

Structure and function – determine properties of things

Stability and change – determine rate of change or evolution

DIMENSION 3

Disciplinary Core Ideas – Key Features

- **Disciplinary significance**
- **Explanatory power**
- **Generative**
- **Relevant to peoples' lives**
- **Usable from k to 12**

Disciplinary Core Idea
EARTH AND SPACE SCIENCES

- **ESS1 EARTH'S PLACE IN THE UNIVERSE**
  What is the universe and Earth's place in it?

- **ESS2 EARTH'S SYSTEMS**
  How and why is Earth constantly changing?

- **ESS3 EARTH AND HUMAN ACTIVITY**
  How do Earth's surface processes and human activities affect each other?

Image credit: NASA

NEXT GENERATION SCIENCE STANDARDS

Image credit: National Academies Press

NGSS PERFORMANCE EXPECTATION

Space Systems: Stars and the Solar System

PRACTICE: Analyzing & Interpreting Data

CROSSCUTTING THEME: Patterns

Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

DISCIPLINARY CORE IDEA: ESS 1B (Earth In The Solar System)

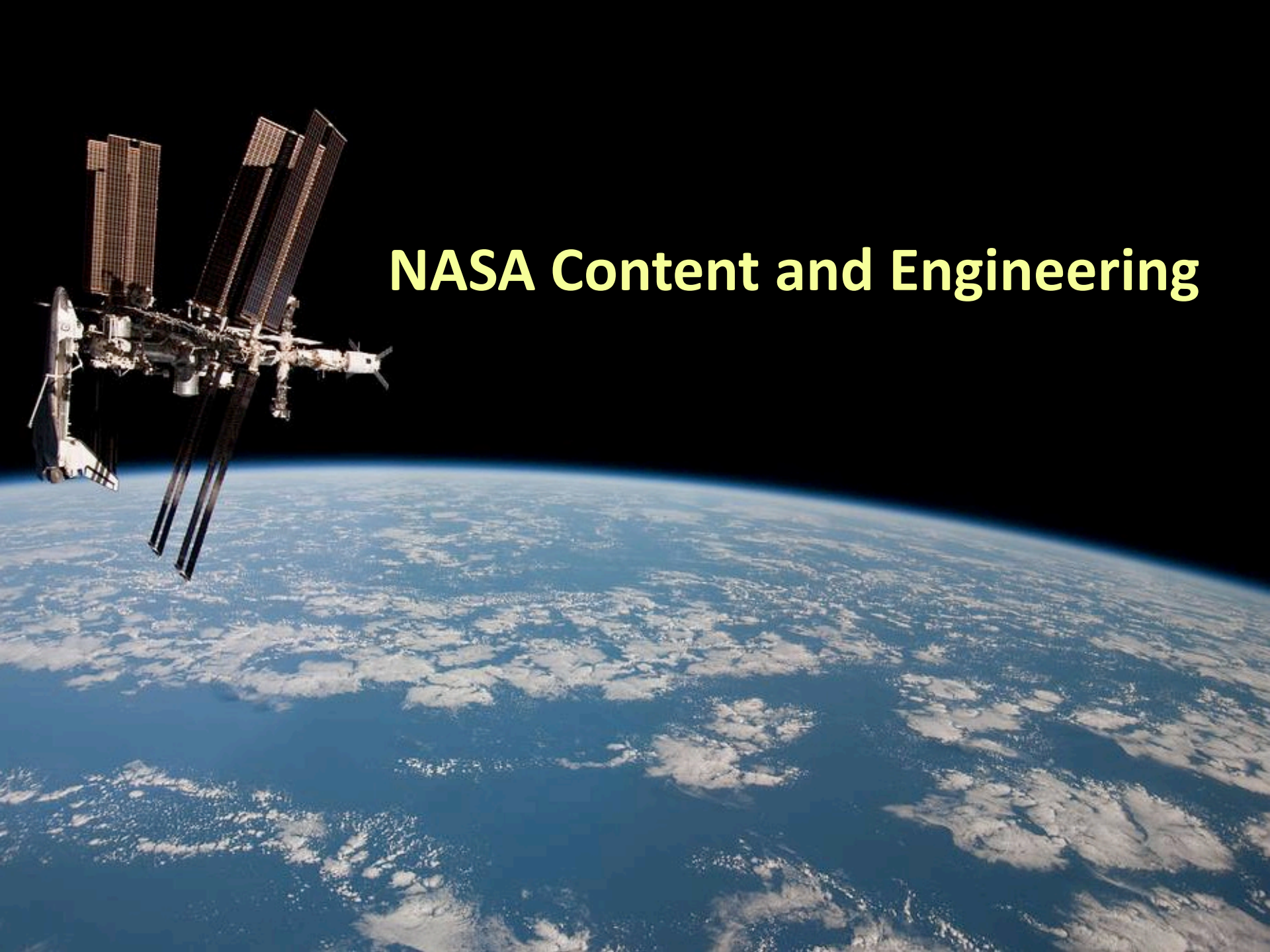

NASA Content and Engineering

Image credit: Rico Shen, Smart City Expo 2015: ASUS Citizen Maker Space/Wikimedia Commons

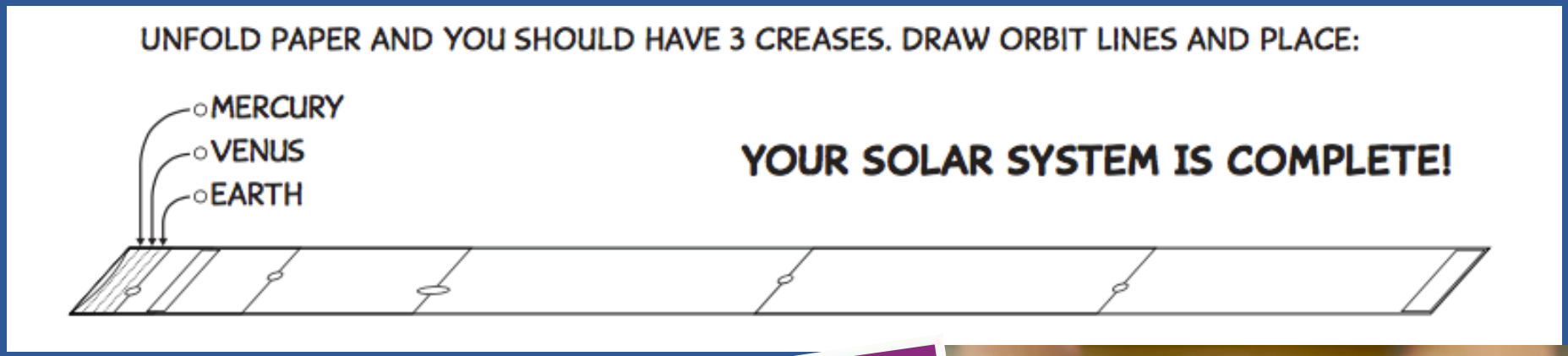
Image credit: Rodney L Honeycutt/Wikimedia Commons

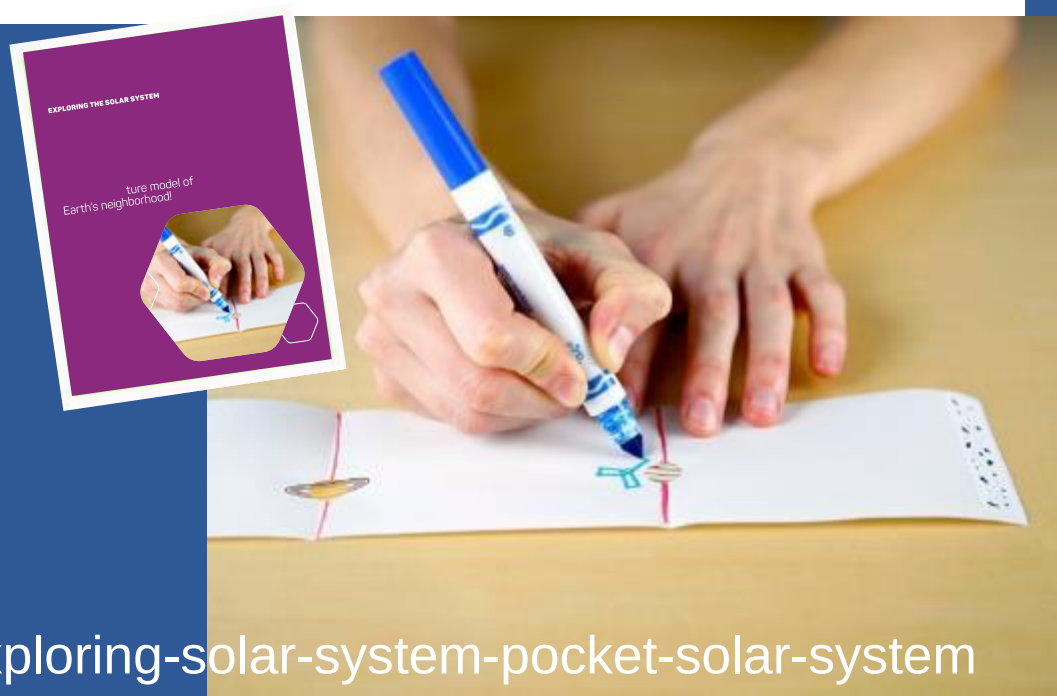
Reverse Engineering

Designing problems through deconstruction

Image credit: Homeschool Projects/Flickr

POCKET SOLAR SYSTEM





http://www.nisenet.org/catalog/exploring-solar-system-pocket-solar-system

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PACK A SPACE TELESCOPE

http://www.nisenet.org/catalog/exploring-universe-pack-space-telescope-2018

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Why should Informal Education Institutions support NGSS?

- Life Long, Life Wide learning is needed to achieve the vision in the Framework

Image Credit Stevens (no date) from https://www.nap.edu/read/12190/chapter/5#29

Why should Informal Education Institutions support NGSS?

Teachers may need connect field trip visits to NGSS

1ST & 2ND GRADE

Image Credit: NASA Wallops Flight Facility

Sun-Earth Connections

VA: Earth/Space Science 1.6, Matter 2.3
MD: Science 2nd 2.D.2
NGSS: K-PS3-1, 1-ESS1-2

Why is the Sun so important to life on Earth? Well, let's find out! We will cover what the sun is made of, how it is a source of energy and light that warms the land, air and water and its position in the solar system and how we see it change in the sky. Students will also get to see experiments that show how the sun changes the state of water. - 45 min

Moon Mania

MD: Science 2.2.D.1
NGSS: 1-ESS1-1

Why does the moon change shape every night? In this program students will learn how the moon was formed, why it changes shape, or phase, and what NASA is doing to study it and why. Astronauts want to return to the moon someday soon, so we will find out what it will take for them to get there and find also investigate what they want to do when they arrive. -45 min

Our Moving Solar System

VA: Earth/Space Systems 1.6, Force, Motion, and Energy 1.2, Scientific Investigation 1.1
MD: Science 1st 2.D, 2.2.D
NGSS: 1-ESS1-1, 1-ESS1-2

Did you know the solar system is constantly moving? In this program we will describe changes over time in the properties, location and motion of celestial objects. Students will be able to identify, and if possible, record observable properties of the sun, moon and stars. We will also find out why and how the moon phases occur. -45 min

Why should Informal Education Institutions support NGSS?

Youth from non-dominant communities benefit from efforts to connect their learning across settings

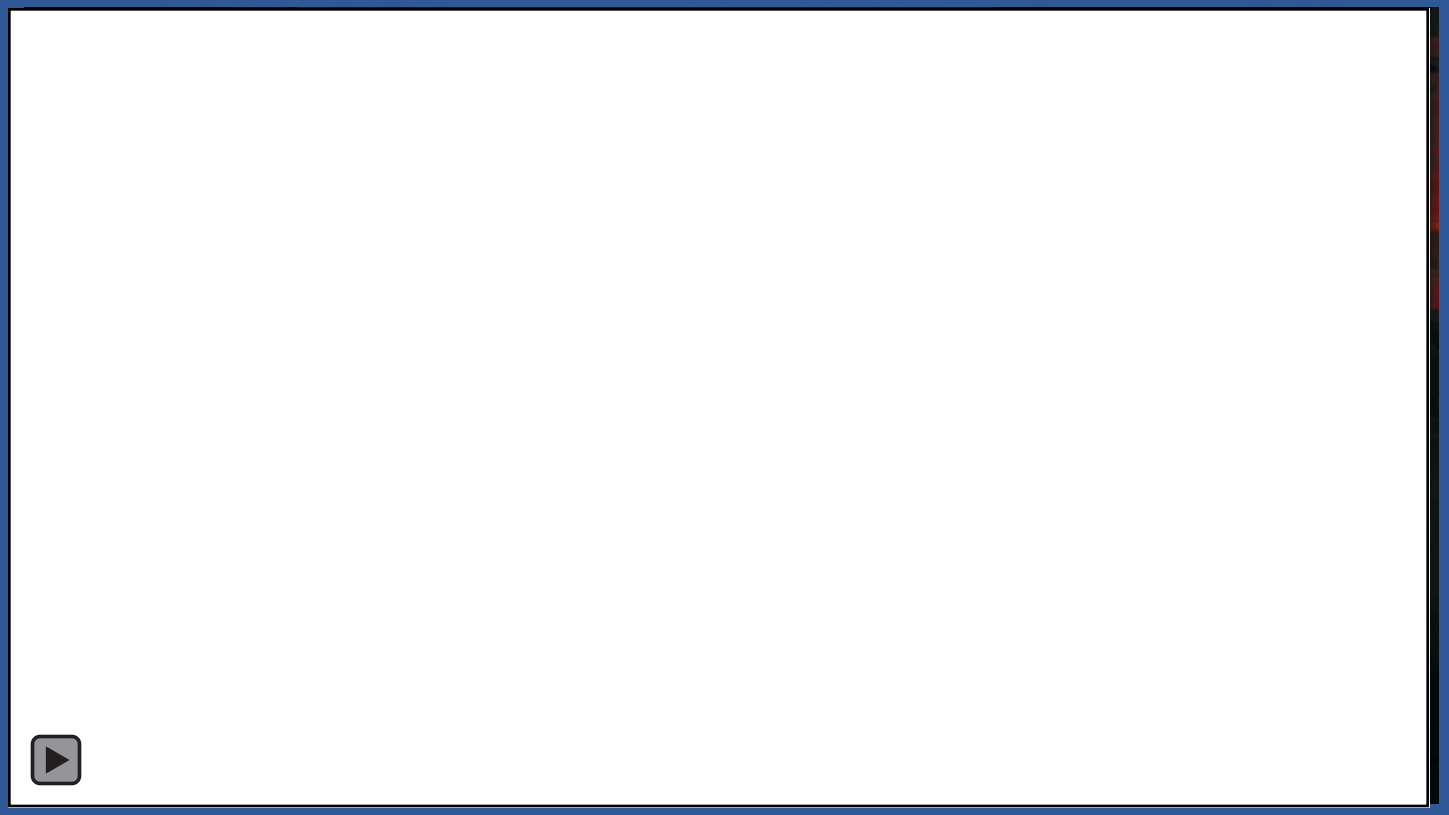
Why should Informal Education Institutions support NGSS?

- IEI play an important role in Professional Development

Why should Informal Education Institutions support NGSS?

- Both IEI and Earth and Space Science are great sources for Anchor Phenomena

Video Credit: NASA Chandra X-ray Center



Connect your Experience

How can you add to the field trip experience to highlight a science or engineering practice?

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Q & A

- What would you like to know about how to connect NGSS to Earth & Space Science experiences at your institution?
- How might NISE better support you in this work?
- What is an idea you would like to workshop with the group?

SUN EARTH UNIVERSE
SOL TIERRA UNIVERSO

An engaging and interactive museum exhibition about Earth and space science for family audiences.

Overview and How to Apply: http://www.nisenet.org/sunearthuniverse

Applications due May 1, 2018

NEW
Explore Science: Let's Do Chemistry Kit

Kit Overview document and how to apply: http://www.nisenet.org/chemistry-apply
Applications due June 1, 2018

In collaboration with the American Chemical Society, the NISE Network has assembled a set of engaging, **hands-on experienc designed to stimulate** interest, sense of relevance, and feelings self-efficacy about chemistry among public audiences.

EXPLORE SCIENCE
Let's Do Chemistry

- A total of 250 free physical kits will be awarded to successful applicants for use in hosting a public event between October and December 2018.

- A great opportunity to use the Explore Science: Let's Do Chemistry kit is during National Chemistry Week taking place October 21-27. The Kit Overview document provides more info about how to connect and collaborate with local American Chemical Society sections and chapters and chemistry professionals.

Our Next Workshops

Learn About New Project Opportunity and How to Apply for the 2018 Explore Science: Let's Do Chemistry Kit

Tuesday, April 10, 2018:
2pm-3pm Eastern/ 11am-12pm Pacific

Presenters

- David Sittenfeld, Project Co-PI, Museum of Science
- Rae Ostman, Project Co-PI, Arizona State University
- Ali Jackson, Kit Development Team, Sciencenter

Thank You

NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK

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