



2019

Explore Science: Earth & Space

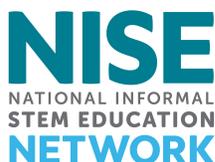
Planning, Partnership, and Program Guide

www.nisenet.org/earthspacekit

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www.nisenet.org



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Introduction

Welcome to Explore Science: Earth & Space! The National Informal STEM Education Network (NISE Net) has assembled a new set of engaging, hands-on Earth and space science experiences with connections to science, technology, and society. We have developed this guide to help you plan successful Earth and space-themed events, develop and cultivate local partnerships, and explore ways to use the kit materials in your programs throughout the year. In addition, this guide highlights professional development opportunities within this project, and can point you and your colleagues toward additional, non-NISE Net resources related to the topics of Earth and space science.

NISE Network

The National Informal STEM Education Network (NISE Net) is a community of educators and scientists dedicated to supporting learning about science, technology, engineering, and math (STEM) across the United States. The Network creates resources and coordinates activities on a national and regional level, while Network partners coordinate and implement project activities locally. We achieve our reach and impact through the participation of over 600 partner organizations in Network activities, including museums, universities, and other organizations that provide informal learning opportunities for public audiences. Through the diversity of our partner organizations, the Network has broad geographic and demographic reach across the country. NISE Network partners engage public audiences in learning about current science, technology, math, and engineering in all 50 states and several territories. Together, Network partners engage over 11 million people each year in high-quality STEM learning!

Our products are created through an iterative, collaborative process that involves scientists, informal science educators, and targeted public audiences. The nisenet.org website is an online digital library of public educational products and tools designed for educators and scientists.

Explore Science: Earth & Space Toolkit

Three hundred and fifty (350) Explore Science: Earth & Space toolkits were awarded to successful applicants from eligible organizations across the country, and consist of hands-on activities, professional development materials, and marketing and promotional resources. The activities work best for family audiences, with a range of experiences appropriate for participants ages four through adult.

The Explore Science: Earth & Space toolkit materials have been designed to engage participants in Earth and space phenomena, encourage reflection around science as a way of knowing, and promote visitors to identify as science learners. Through the lens of Earth and space science, the hands-on activities in this toolkit will allow learners to understand science as a process and as something that people *just like them* do.

The activities can be used throughout the year during any number of STEM-themed annual events and celestial events (see the Year-Round section in the timeline), but an important event that we wanted to be sure to provide resources around in this year's kit is the 50th anniversary of NASA's Apollo Moon landing. Several materials in the kit—for example, the Hide & Seek Moon activity, and the Breakfast Moon book—directly relate to this special event. This guide also includes a section on planning a public Moon celebration event, and you can find a continuously updated list of additional resources at <http://www.nisenet.org/moon50>.

In addition to the physical toolkits, all digital materials will be made available online for free download in February 2019 at <http://www.nisenet.org/earthspacekit>.

Requirements

Explore Science: Earth & Space physical 2019 toolkit recipients are required to:

1. **Host an event in March – May 2019:**

Host at least one public engagement event using your toolkit. Public events can be stand-alone events OR you can incorporate your event into an existing STEM event.

2. **Report on the use of the toolkit:**

Physical toolkit recipients are required to complete a short online report describing their experiences with the toolkit. Partner feedback is a valuable tool when improving our educational materials and professional development resources based on community needs. Successful applicants will be provided with a link to the final report. Reports will include optional evaluation questions to capture the impacts of the project activities on the public. Required reports must be submitted online by **June 15, 2019**.

In addition to the required report, we encourage you to participate in partner surveys conducted by project evaluators.

Additional opportunities (not required but encouraged):

- **Attending Professional Development online workshops for informal science educators:** The NISE Network will offer a variety of free one-hour online workshops featuring a variety of topics. All online workshops will be recorded and archived. More information will be available through the NISE Network newsletter at <http://www.nisenet.org/newsletter>.
- **Collaborating with local experts:** We encourage you to collaborate with both local scientists (Earth and space science professionals) and local enthusiasts (e.g., amateur astronomy clubs).
- **Collaborating locally to reach underserved audiences:** Partnerships with K-12 schools, afterschool programs, local chapters of national youth-serving organizations, libraries, and local community groups can help your event reach underserved audiences. Tips for collaboration can be found at <http://www.nisenet.org/collaboration-guide>.

How to Participate

Host your events and use the materials! And then tell us how it went. Even if you weren't awarded a physical toolkit, you can still download and use the digital materials to engage public audiences in Earth and space science. If you download the materials, you're not required to fill out a report, but we'd still love to hear from you.

Hosting an Earth and Space Public Engagement Event

STEM Events in March – May 2019

Explore Science: Earth & Space toolkit recipients are required to host at least one public engagement event between March and May 2019. Events can be stand-alone events or you can incorporate your event into existing Earth and space-themed STEM events such as:

- World Water Day, March 22, 2019: <http://worldwaterday.org>
- Earth Hour, March 30, 2019: <https://www.earthhour.org>
- Global Astronomy Month, April: <http://www.gam-awb.org/>
- Yuri's Night, April 12, 2019: <https://yurisnight.net>
- Earth Day, April 22, 2019: <http://www.earthday.org>
- National Environmental Education Week, week of Earth Day:
<https://www.neefusa.org/greening-stem/environmental-education-week>
- Astronomy Day (Spring), May 11, 2019:
<https://www.astroleague.org/al/astroday/astrodayform.html>
- Astronomy Week (Spring), May 6-12, 2019:
<https://www.astroleague.org/al/astroday/astrodayform.html>

More STEM events throughout the year: <http://www.nisenet.org/seasons>

Examples of Celestial Events in March – May 2019

Explore Science: Earth & Space toolkits can serve as a great centerpiece during regularly scheduled day or nighttime programming to celebrate celestial events like meteor showers, eclipses, full moons, planetary events, and more. Look for dates and descriptions using these resources:

- <http://earthsky.org/tonight>
- <https://in-the-sky.org/newscal.php>
- <https://nightsky.jpl.nasa.gov/planner.cfm>
- <https://stardate.org/nightsky>
- <http://www.timeanddate.com/astronomy>
- <http://www.skyandtelescope.com/observing/sky-at-a-glance/>

Planning Timeline

One to three months before your event

- Make contact with the individuals and institutions that might be interested in organizing an Earth & Space event in your community. Please see the sections in this guide on collaborating and finding local experts.
- Schedule a kickoff meeting to organize your event. Include both museum staff and collaborating experts. Topics for the agenda include:
 - What are your goals for holding an Explore Science: Earth & Space event?
 - Who is your target audience?
 - What kinds of events and activities would reach this audience and meet your goals?
 - Who will lead the planning of the event? Who else will be involved?
 - How will you communicate with your collaborators?
 - What dates will you hold your event?
 - Do you need funding to support the event? If so, where will it come from?
- Choose a date and add your event to your institutional calendars. Be sure to keep celestial events and annual STEM events in mind when choosing an event date.
- Plan your event. Your planning process might include creating:
 - A brief description of the event (type of activities, dates, times, location, collaborators)
 - A budget (and local fundraising plan, if necessary)
 - An outline of the event goals (and a plan for evaluating how well the event meets the goals)
 - A list of tasks and notes of who is responsible for each task
 - A schedule with the major milestones for preparation
 - A marketing strategy
- Become familiar with the materials in the Explore Science: Earth & Space toolkit.
- Begin promoting your event. Coordinate efforts between your own institution and your collaborators.
- Talk with collaborators about potential sources of staff and volunteers for the event.
- Choose a date and location for your training session(s) for staff, volunteers, and collaborators, and invite all appropriate event participants. You may want to hold a training session roughly a week in advance and offer another session immediately before your event for volunteers who may attend that day.
- Let volunteers and collaborators know in advance about available training materials, such as online activity training videos and online workshop opportunities. A summary email including a list of all resources can be a valuable reference for participants leading up to and immediately before the event.

At least one month before your event

- Review your plans with your facility manager and/or health and safety officer. Many facilities have guidelines or restrictions that could affect the logistics of your event or the demonstrations and activities you can include. You might ask about:

- Restrictions related to use of water, open flames, chemicals, or hanging or suspended objects if you are hoping to include any of these in your events
- Parking for visitors and your volunteers/collaborators
- Cleaning and sanitation service schedules
- Security needs
- Outdoor activity needs

- Ensure you have adequate staff and volunteers for your event.
- Draft an activity floor plan. Keep in mind that some activities need water, some can be messy, some work best in a dimmer space, and some are better with a place for visitors to sit down.

A few weeks before your event

- Continue to promote your event.
- Consider creating signs or handouts listing the activities you're offering, as well as their times and locations.
- Create additional tabletop signs for activities that you may offer in addition to the activities contained in the toolkit.
- Do a test run of the activities.
- Prepare for staff and volunteer training session(s).
- Make final preparations for your event (staffing, supplies, floor plan, schedule, and evaluation). Some activities may require advance preparation so be sure to allow enough time to prepare materials prior to your event.

The week of your event

- Hold staff/volunteer training session(s).
- Continue to promote your event.
- Hold your Explore Science: Earth & Space event!

After your event

- Debrief on your event with your planning team. Identify elements of your event that were successful, as well as things you might want to change next time.
- Fill out your online Explore Science: Earth & Space event report form. Reports are due by June 15, 2019.
- Document your event for your future use. Save copies of programs, posters, and any newspaper or media coverage of your event.
- Thank your collaborators, sponsors, and volunteers.
- Discuss future plans with collaborators and colleagues. Choose an event date for next year and get the date on relevant community and organizational calendars.

Year-Round

- Incorporate Explore Science: Earth & Space toolkit activities into other events. See "Using Your Kit All Year Long" for details regarding additional formats, audiences, and events where Explore Science: Earth & Space can be applied.

Using Your Kit All Year Long

We encourage you to use your toolkit all year long, during celestial events, STEM events, and other programming for public audiences (such as scout programs, camps, afterschool clubs, science festivals, etc.). Events like those described above may be a better way to engage large and diverse groups of museum visitors. Camps, afterschool programming, field trips, and similar program formats are a great way to engage learners more deeply. Here are just some examples of how you might use and adapt toolkit materials to these different kinds of formats.

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We love to hear stories about how you've used NISE Network activities! To share your success with us, please contact your regional hub leader: <http://www.nisenet.org/contact>

Camps and Afterschool Programs

The sequential, longer format (45-90 minutes each) typical of a camp or afterschool program can encourage participants to immerse themselves in the activity and contextual information and ideas. This allows them the opportunity to develop a richer understanding of the concepts and connections provided by the activity materials and facilitation. Camps and workshops can begin with an overview of Earth and Space content and then, depending on time, you can plan to theme each week or cover the content more broadly. More intensive programming does have more constraints, however, and will require more resources for planning, promotion, preparation, and delivery. They work best in a separate space, require a specific start and end time, and often can accommodate fewer participants.

The following are some example daily themes and suggested activities you could use during a summer camp program or elementary afterschool program.

Mad About Mars

This collection of activities encourages participants to consider many interesting features of our nearest planetary neighbor, including dry ice polar caps and the planet's potential for life. Activities like Exploring the Solar System: Craters and Sublimation Bubbles (from NISE Network's *Let's Do Chemistry* kit) allow participants to interact with the physical properties of Mars, while Exploring the Solar System: Mars Rovers, Exploring Earth: Rising Sea, and Exploring the Universe: Imagining Life engage participants in the processes and tools that scientists use to learn about planetary bodies. Exploring the Solar System: Pocket Solar System can serve as an introductory activity, to give participants context for Mars' location in our solar system. In a summer camp setting, this topic pairs well with dramatic play activities related to human space exploration.

Exploring the Solar System: Mars Rovers

Players acting as "Mission Control" and a "Rover" must work together to navigate a large obstacle course. **> 20 minutes, Active, Indoor/Outdoor**

Scale it up: Engage campers who are waiting for a turn in re-arranging the felt squares to create a new course for the rover.

<http://www.nisenet.org/catalog/exploring-solar-system-mars-rovers>

Exploring the Solar System: Craters

Simulate the formation of meteorite craters, and then study the craters using special tools. > **20 minutes, Exciting, Outdoor**. Scale it up: Replace the materials with a large flat under-bed style box, flour, and cocoa powder. Bring the fun outdoors, and be ready to get messy! Use a sturdy stepstool to drop items into the “planetary surface” from different heights.

<http://www.nisenet.org/catalog/exploring-solar-system-craters-2018>

Exploring the Solar System: Pocket Solar System

Participants make a scale model of the distances between objects in our solar system. > **20 minutes, Exciting, Indoor/Outdoor**. Get creative: Have participants draw the named objects on their receipt paper rather than using stickers.

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

Exploring the Universe: Imagining Life

Imagine and draw an extreme environment, then invent a living thing that could thrive in it. < **20 minutes, Calming, Indoor**. Get creative: Use recycled materials to engage participants in constructing “habitats” for the organisms featured on the extremophile cards.

<http://www.nisenet.org/catalog/exploring-universe-imagining-life>

Exploring Earth: Rising Sea

Use topographical mapping techniques to track changes in sea level. < **20 minutes, Calming, Indoor**. Make connections: Invite campers to create landforms using oil-based modeling clay, and to add small toys to represent houses, people, animals, farms, etc. Engage in discussions about planning for large weather events and the changing climate.

<http://www.nisenet.org/catalog/exploring-earth-rising-sea>

Sublimation Bubbles

Use water to observe dry ice sublimating into gaseous carbon dioxide, and then capture the gas in soapy bubbles. > **20 minutes, Exciting, Indoor**.

<http://www.nisenet.org/catalog/sublimation-bubbles>

Invent, Build, and Blast Off!

This collection of activities encourages participants to design tools, experiment with variables, and practice their creative problem solving. Exploring the Universe: Pack a Space Telescope, Rocket Reactions, and Exploring the Solar System: Stomp Rockets allow for building, crafting, and iterative design, and can spark conversations about everything from aerodynamics to effective teamwork. Exploring the Universe: Orbiting Objects and Exploring Earth: Static Electricity can serve as a break between building and crafting activities, and give participants the opportunity to consider challenges and constraints that engineers face when building and deploying spacecraft. In a summer camp setting, this topic pairs well with other engineering and design activities, such as building Rube Goldberg machines.

Exploring the Universe: Pack a Space Telescope

Design, build, pack, and deploy model space telescopes. > **20 minutes, Exciting, Indoor**

Get creative: Provide campers with a variety of craft supplies and invite them to work in pairs or groups to design a space telescope. Encourage conversation about the many designs that NASA engineers imagined before choosing the final form.

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

Exploring the Universe: Orbiting Objects

Experiment with different sized and weighted balls on a stretchy fabric gravity well. < **20 minutes, Exciting, Indoor.** Dig deeper: If using as a drop-in activity, challenge participants who have already witnessed the activity to explain the phenomena to newcomers.

<http://www.nisenet.org/catalog/exploring-universe-orbiting-objects>

Exploring the Solar System: Stomp Rockets

Build and launch their own air rockets to help imagine the challenges and triumphs of engineering spacecraft and launching them into a specific region of the space above our planet. > **20 minutes, Active, Indoor/Outdoor.** Get creative: Spend time decorating rockets, and experimenting with differently shaped fins and nose cones.

<http://www.nisenet.org/catalog/exploring-solar-system-stomp-rockets>

Exploring the Universe: Static Electricity

Make your own electroscope to detect static electricity. > **20 minutes, Precise, Indoor.** Get creative: Use recycled materials to construct many versions of the basic electroscope outlined in the toolkit materials. Explore a variety of ways to produce static electricity.

Rocket Reactions

Experiment with a mix of fuel for a baking soda & vinegar "rockets." < **20 minutes, Exciting, Indoor.**

<http://nisenet.org/catalog/rocket-reactions>

The Marvelous Moon

This collection of activities celebrates Earth's one and only moon. In a summer camp setting, this topic is a perfect way to celebrate the 50th anniversary of the Apollo missions! Round out the day by interviewing someone who witnessed the first Moon landing, or by constructing an imaginary lunar landscape to explore. For more resources and ideas to celebrate the 50th anniversary of the Apollo 11 moon landing and other missions visit, <http://nisenet.org/moon50>.

Exploring the Solar System: Big Sun, Small Moon

A hands-on activity that explores the concept of apparent size and allows visitors to experience this phenomena using familiar objects—a tennis ball and a beach ball. < 20 minutes, Active, Indoor/Outdoor.

Scale it up: Provide participants with various sizes of smaller balls, and invite them to spread out around the room. Discuss: "How far away do you think you will have to be before your ball looks the same size as this beach ball? Will your friend have to be the same distance away?"

<http://www.nisenet.org/catalog/exploring-solar-system-big-sun-small-moon>

Exploring the Solar System: Hide and Seek Moon

Binoculars, a hidden object Moon poster, and the *Moon Rope* storybook let participants discover how some tools can make distant objects appear closer and brighter and learn about how cultures around the world have viewed the Moon. > **20 minutes. Calming. Indoor**

Make Connections: Begin this activity by reading *Moon Rope* aloud together and discussing cultural connections to the Moon.

<http://www.nisenet.org/catalog/exploring-solar-system-hide-and-see-moon>

Exploring the Solar System: Solar Eclipse

Participants investigate the positions of the Sun, Earth, and Moon to create shadows and learn about solar eclipses. < **20 minutes, Calming, Outdoor.**

Dig deeper: Look at an astronomical calendar to predict when the next solar eclipse will be visible from your location.

<http://www.nisenet.org/catalog/exploring-solar-system-solar-eclipse>

Exploring the Universe: Objects in Motion

Participants in this activity use "orbiting" clay balls to make simple, functioning models of interacting objects in space. **< 20 minutes, Exciting, Indoor/Outdoor.**

Dig deeper: Challenge campers to weigh the dough as they use it and model real space objects using the Exploring Ratios info sheet.

<http://www.nisenet.org/catalog/exploring-universe-objects-motion-2018>

Exploring the Solar System: Craters

Simulate the formation of meteorite craters, and then study the craters using special tools. **> 20 minutes, Exciting, Outdoor.** Scale it up: Replace the materials with a large flat under-bed style box, flour, and cocoa powder. Bring the fun outdoors, and be ready to get messy! Use a sturdy stepstool to drop items into the "planetary surface" from different heights.

<http://www.nisenet.org/catalog/exploring-solar-system-craters-2018>

Exploring Nano & Society: Space Elevator

An open-ended conversational experience in which visitors imagine and draw what a space elevator might look like, what support systems would surround it, and what other technologies it might enable. **< 20 minutes, Calming, Indoor.**

<http://www.nisenet.org/catalog/exploring-nano-society-space-elevator>

Solar Splendor

This collection of activities focuses on using real tools to safely observe our Sun and the way it behaves and interacts with Earth so we can develop a better understanding of other stars throughout the galaxy. In a summer camp setting, this topic pairs well with an outdoors setting and other outdoor activities.

Exploring the Solar System: Magnetic Fields

This activity shows participants how scientists can use tools to study the invisible magnetic fields of Earth, the Sun, and other objects in the universe. **< 20 minutes, Exciting, Indoor** Dig deeper: Pair this with a longer, free exploration of magnets and materials with magnetic properties.

Exploring the Solar System: Observe the Sun

Participants use a real solar scope to safely observe the Sun outdoors. **< 20 minutes, Exciting, Outdoor.** Dig deeper: Track the Sun's motion throughout the day, or trace the Sun and any notable features at the same time each day throughout the week.

Exploring Earth: Temperature Mapping

In this activity, participants use an infrared thermometer to test out the temperature of different materials under a heat lamp to learn about how different types of land cover reflect or absorb energy. **< 20 minutes, Calming, Indoor.** Make connections: Use an infrared thermometer to measure the temperature of objects and spaces within your facility. Compare the asphalt of a parking lot to the mulch around trees. Compare a sunny windowsill to a shady reading corner. Get messy: Add ice cubes to the first portion of the activity involving the liquid crystal sheet to observe how the cold ice changes the colors compared to a warm hand.

Exploring the Universe: Exoplanet Transits

Participants simulate one of the methods scientists use to discover planets orbiting distant stars, seeing what they can learn about a hidden object by studying its shadow. **< 20 minutes, Calming, Indoor.** Get creative: Build a larger shadow theater and challenge campers to explore the question, “*What can we learn from limited information?*” by playing shadow charades. Dig deeper: Set up a digital light meter and use graphing software to measure the dimming caused by objects passing in front of a light bulb.

<http://www.nisenet.org/catalog/exploring-universe-exoplanet-transits-2018>

Exploring Earth: Bear’s Shadow

Participants move a flashlight around an object to make and experiment with shadows. **< 20 minutes, Calming, Indoor.** Make connections: Trace campers’ shadows outdoors throughout the day. Notice how the placement and length of their shadows change.

<http://www.nisenet.org/catalog/exploring-earth-bears-shadow>

Earth’s Water Systems

This collection of activities encourages participants to think about the many ways water on Earth moves, changes, and supports life. In a summer camp setting, this topic pairs well with a field trip to the swimming pool or a local body of water.

Exploring Earth: Paper Mountains

Make unique mountain models from crumpled paper and watch how water moves across them. **> 20 minutes, Calming, Indoor.** Scale it up: Replace the copy paper with butcher or easel pad paper. Invite a few participants to work together on one “landscape”, each choosing one mountain ridge to observe. Dig deeper: Choose a valley on the paper, and challenge participants to experiment to find all of the mountain ranges from which water will flow into that valley.

<http://www.nisenet.org/catalog/exploring-earth-paper-mountains-2018>

Exploring Earth: Investigating Clouds

Create a cloud in a bottle and explore it with laser light. **< 20 minutes, Exciting, Indoor/Outdoor.** Dig deeper: Make observations of the sky over multiple days. Log observations in the GLOBE Observer app.

<http://www.nisenet.org/catalog/exploring-earth-investigating-clouds>

Exploring Earth: Rising Sea

Use topographical mapping techniques to track changes in sea level. **< 20 minutes, Calming, Indoor.** Make Connections: Invite campers to create landforms using oil-based modeling clay, and to add small toys to represent houses, people, animals, farms, etc. Engage in discussions about planning for large weather events and the changing climate.

<http://www.nisenet.org/catalog/exploring-earth-rising-sea>

Exploring Earth: Land Cover

Experiment with different materials to see how plants and other ground cover affects water runoff. **< 20 minutes, Calming, Indoor/Outdoor.** Scale it up: Replace the materials with a large flat under-bed style box, soil, water, and various plant matter. Discover what arrangement of plants, soil, gravel, etc. offers the best protection against runoff and erosion.

Systems Scramble

A game meant to promote conversation about how systems work, and how we can work together to better understand systems and work toward creating a more sustainable future.

> 20 minutes, Active, Indoor/ Outdoor.

<http://www.nisenet.org/catalog/systems-scramble>

Deep Space Discoveries

This collection of activities encourages participants to wonder about phenomena and processes beyond Earth orbit. The activities support discussion about what humans have already learned about these distant wonders, and the many questions that scientists are still seeking answers for. In a summer camp setting, this topic nicely complements a visit to a planetarium, or a nighttime stargazing event.

Exploring the Universe: Filtered Light

Participants discover how colored filters can help reveal more about an image. **< 20 minutes, Calming, Indoor.** Get creative: Invite campers to write secret messages to each other using the activity materials.

<http://www.nisenet.org/catalog/exploring-universe-filtered-light-2018>

Exploring the Universe: Ice Orbs

Participants investigate a frozen sphere, trying to learn about objects hidden inside, just as planetary scientists at NASA are investigating "icy worlds" in the outer solar system. **> 20 minutes, Exciting, Indoor/Outdoor.** Get creative: After exploring the orbs for a little while, darken the room to invite more imagination and immersion.

<http://www.nisenet.org/catalog/exploring-universe-ice-orbs>

Exploring the Universe: Expanding Universe

Work together to make predictions and use a model to demonstrate how the universe is expanding. **> 20 minutes, Exciting, Indoor.** Make connections: Bake raisin bread to demonstrate this common analogy in person!

Exploring the Universe: Space Guess Quest

Play a fun card game (similar to Guess Who™) to sort and classify objects in the universe. **< 20 minutes, Exciting, Indoor.** Dig deeper: Invite each campers to choose a space object and become an expert on that object's features and "fun facts".

Exploring Size: Get in Order

Participants compete to organize themselves from largest to smallest, based on the card that each is holding. **> 20 minutes, Active, Indoor/Outdoor.**

http://www.nisenet.org/sites/default/files/unmanaged/ExSci_GetInOrder.pdf

Additional Resources

The Explore Science: Earth & Space digital toolkit also includes some afterschool modules from *Engineering is Elementary*. These materials are better suited to older, middle school aged audiences and can also be downloaded directly.

Worlds Apart: Engineering Remote Sensing Devices

An engineering and science unit in which youth are introduced to engineering and the Engineering Design Process as the group works together to engineer a solution to a remote sensing engineering challenge. The unit is set in a real-world context of scientists exploring a newly discovered moon. As part of the unit, the youth learn how mirrors are used to see around objects, how light is filtered to provide specific information about minerals, and how LiDAR is used to determine topography. Youth work with teammates to use these technologies to engineer a remote sensing device that is able to gather information about the surface of a model Mystery Moon. Near the end of their design process, youth invite parents, family, and other guests to join them in a showcase of what they have learned.

<https://www.eie.org/engineering-everywhere/curriculum-units/worlds-apart>

Testing the Waters: Engineering a Water Reuse Process

A middle school engineering and science unit in which youth are introduced to engineering and the Engineering Design Process as the group works together to engineer a solution to an engineering challenge focused on the design of a water filtration process for grey water. The unit is set in a real-world context of scientists developing grey water filtration systems for extreme environments. As part of the unit, the youth explore water quality, different types of filter materials and how they can be combined to filter different types of grey water. Youth work with teammates to use these technologies to engineer a process for reusing water in extreme environments. Near the end of their design process, youth invite parents, family, and other guests to join them in a showcase of what they have learned.

<https://www.eie.org/engineering-everywhere/curriculum-units/testing-waters>

A Universe of Stoies 2019 Summer Learning Program

In the summer of 2019, many libraries across the country will celebrate space exploration in their summer reading programs. The slogan “A Universe of Stories” was chosen by library professionals to help inspire children of all ages to dream big, believe in themselves, and create their own story.

The Collaborative Summer Library Program (CSLP) (<https://www.cslpreads.org>) is a consortium of states working together to provide high-quality summer reading program materials for children, teens, and adults at the lowest cost possible for their public libraries. CSLP actively shares innovative and age appropriate ideas, resources, and programs for four age groups, from babies to adults. State libraries and systems join CSLP to empower libraries to foster community. CSLP reaches 16,000 libraries through these state libraries and systems. The theme for summer 2019 is “A Universe of Stories.”

CSLP and the STAR Library Network (*STAR Net*) are partnering to share science- and technology-related activities and resources to libraries across the nation.

Are you interested in partnering with your local library? Find hands-on activities and other library program resources on *STAR Net*'s STEM Activity Clearinghouse:

<http://clearinghouse.starnetlibraries.org/143-universe-of-stories>

Earth & Space Fieldtrip

Many of the activities in the Explore Science: Earth & Space toolkits can be adapted to work well in a classroom workshop or fieldtrip setting. Again, the longer engagement period encourages a deeper dive into the ideas and concepts related to the activities. Similar to camps and afterschool programs, these classes can be resource-intensive to plan, prepare for, promote, and deliver. Compared to other programming formats, they will likely require gathering more materials. They also require the facilitator to have a good understanding of Earth and Space content and how it connects to exhibitions elsewhere in the museum and to content the group may be studying outside of the visit. The number of participants is limited by available space and facilitators. Below you can find an example fieldtrip suitable for grades 1-2, with a specific adaption for grade 3.

Observing Earth and Space Fieldtrip: Lesson Plan

Overview

This field trip lesson is designed to provide a broad overview of the ways in which NASA scientists study the Earth and outer space. Through a series of three activities, students discover facts about the size and scale of our solar system, practice making observations and predictions, and imagine the many ways that scientists use tools to answer questions about Earth and space. Grades 1 & 2.

Next Generation Science Standards Addressed

NGSS 1-ESS1: Space Systems: Patterns and Cycles

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

NGSS 2-ESS2: Earth's Systems: Processes that Shape the Earth

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.

NGSS 3-PS2: Forces and Interactions

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

NGSS K-2-ETS1: Engineering Design

K-2-ETS1-1. Ask questions, make observations and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Vocabulary

Apparent size, Sounding rocket, Watershed, Erosion, Observation, Prediction, Mission, Communication, Tools, Launch, Engineering, Pattern

Learning Objectives

- *Earth is a constantly changing and dynamic system.*
- *The shape of the land and the pull of gravity both influence how water moves over Earth.*
- *NASA scientists use observations to make predictions about the future of our planet.*
- *Some rockets carry science tools—not scientists—into space!*
- *Sounding rockets take quick, low-flying trips into space.*
- *Scientists use many different kinds of spacecraft to make new discoveries*
- *The further away an object is, the smaller it appears.*

Materials

- *Various multi-sized small balls (e.g. tennis ball, ping pong ball, golf ball, marble)*
- *Beach ball*
- *Air pump*
- *Plastic 2-liter bottle (plus additional for backup)*
- *Flexible tubing with tornado-maker attachment*
- *Rigid PVC pipe (rocket rolling guides)*
- *Colored copy paper*
- *Scissors*
- *Clear tape*
- *Copy paper, or large easel pad paper*
- *Washable markers*
- *Dropper bottles*
- *Microfiber towel*
- *Bowls for water*
- *Sounding Rockets target poster, available on nisenet.org*
- *Make your own Sounding Rocket instructions sheet, available on nisenet.org*
- *Communication and science tool stickers and info sheet, available on nisenet.org*
- *Activity and facilitator guides for all activities, available on nisenet.org*

Classroom Set-Up

Arrange carpet squares around chalkboard

- *Prepare stations at tables with materials for Exploring Earth: Paper Mountains*
- *Arrange cafeteria trays with all materials needed for Exploring the Solar System: Stomp Rockets*
- *Prepare various sized balls by the chalkboard for Exploring the Solar System: Big Sun, Small Moon*

Program Facilitation Guide

INTRODUCTION: *Today we are going to explore Earth and space, and how scientists learn about them. What do you know about the Earth? What do you know about space? How did you learn those things? Scientists learn in lots of different ways - by asking questions, using their senses, using other tools, communicating with each other - and they always pay close attention to what they're observing.*

ACTIVITIES

EXPLORING THE SOLAR SYSTEM: BIG SUN, SMALL MOON: *We'll start by making observations with our eyes, and exploring one of the ways they can play tricks on us! Lead students through the **Exploring the Solar System: Big Sun, Small Moon** activity.*

<http://www.nisenet.org/catalog/exploring-solar-system-big-sun-small-moon>

To modify **Exploring the Solar System: Big Sun, Small Moon** for the classroom, provide students many sizes of smaller balls, and invite them to spread out around the room. Discuss: *"How far away do you think you will have to be before your ball looks the same size as this beach ball? Will your friend have to be the same distance away?"*

Alternative for 3rd grade

EXPLORING THE SOLAR SYSTEM: POCKET SOLAR SYSTEM: *We'll start by mapping out our Solar System to get a sense of the shape and structure of the system around us and what we might like to know more about. Lead students through the Exploring the Solar System - Pocket Solar System activity.*

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

This is an activity where students create a map of the Solar System using a long strip of paper. In this model, the distances between solar system objects are to scale, but the sizes of objects are not.

To modify Exploring the Solar System - Pocket Solar System for the classroom, have students draw the named objects on their receipt paper rather than using stickers. Discuss: *"Our map shows the relative distance between objects in the solar system. It doesn't show the relative size of the Sun and its planets." "After making your map, what are you curious about? If you could send a spacecraft to explore any one of these places, which would you choose? Why?"*

EXPLORING EARTH: PAPER MOUNTAINS: *There are lots of interesting worlds to explore in our Solar System. One of the ways that scientists learn about other worlds is by studying our own - Earth! Learning about processes on Earth can give us clues about how those same processes might happen farther out in the solar system, or even in solar systems around other stars. Lead students through the **Exploring Earth: Paper Mountains** activity.*

<http://www.nisenet.org/catalog/exploring-earth-paper-mountains-2018>

To modify **Exploring Earth: Paper Mountains** for the classroom, try replacing the copy paper with larger-sized paper (e.g. butcher or easel pad paper). Invite a few participants to work together on one "landscape", each choosing one mountain ridge to observe. Participants may also draw buildings, farms, plants, and more on their landscape. Discuss: *"How might your life be different if you knew exactly what the weather would be like tomorrow? Next week? Next year? Can you think of anyone for whom weather has an even bigger effect on their life than it does on yours?"*

*EXPLORING THE SOLAR SYSTEM: STOMP ROCKETS: Sometimes, NASA scientists need to send their tools way up high to get the best information. One way they do this is by launching a sounding rocket - a rocket used especially for conducting research and answering science questions. Lead students through the **Exploring the Solar System: Stomp Rockets** activity:*

<http://www.nisenet.org/catalog/exploring-solar-system-stomp-rockets-2018>

To modify **Exploring the Solar System: Stomp Rockets** for the classroom, provide students with a mission planning worksheet (attached). Encourage them to think through their design, their mission, and the tools their rocket will carry before they build their rocket. Discuss: *“If you could learn more about anything on Earth or in space, what would you want to learn about? How could these tools help you learn more? Can they see more than your eyes can see, or hear very soft sounds?”*

WRAP-UP: *Thank you for participating in today’s activities. You may even have more questions about Earth and space than you had before doing these activities. That’s fine! There is always more to learn - just like us, scientists learn something new every day, and have lots of questions for which they are always hoping to find an answer. Hopefully you have learned a little bit about how scientists learn more about Earth and space by asking questions, using tools, and working together.*

Earth & Space Birthday Party

The expectations and interest level of a birthday party audience at a children's or science museum can vary widely. Some families are eager to explore science content and draw on the expertise of the facilitator, while others are happy to enjoy the company of family and friends, and engage lightly in the planned activities. You can plan for either scenario by choosing an activity that is easy to scale up or down based on the party attendees' level of engagement. An activity should be fun for participants to complete even if they minimally interact with the science content, and should also allow for deeper exploration and extended learning should the participants wish it. Example Earth & Space toolkit activities that are easy to adjust for birthday party audiences include:

- Exploring the Solar System: Stomp Rockets: <http://www.nisenet.org/catalog/exploring-solar-system-stomp-rockets-2018>
- Exploring the Solar System: Craters: <http://www.nisenet.org/catalog/exploring-solar-system-craters-2018>

If arrival time is staggered for the birthday party you are hosting, it can be helpful to offer a drop-in activity for some children to participate in as they wait for others. Here are some example Earth & Space toolkit activities that can serve this purpose:

- Exploring Earth: Paper Mountains: <http://www.nisenet.org/catalog/exploring-earth-paper-mountains-2018> (Hint: Try using large-format easel paper to engage many participants in exploring one landscape.)
- *Exploring the Universe: Imagining Life*: <http://www.nisenet.org/catalog/exploring-universe-imagining-life>
- *Exploring the Universe: Orbiting Objects*: <http://www.nisenet.org/catalog/exploring-universe-orbiting-objects>

Or try setting out a large sheet of paper and markers and invite guests to create their own Earth and space themed poster. This can serve later as the target for Stomp Rockets, or a memorable gift for the birthday child.

Other things to think about:

- Party host should be more knowledgeable about content than the activity requires (read all accompanying documents!) so that they can tailor the information they share to the guests' interests.
- Marketing matters. Often, the adults who booked the birthday party are the ones in the room who are most invested in the science content. It is important to set clear expectations during the event booking process about the level of science engagement being offered. For example, will children explore the materials freely or be led through a step-by-step process? Will the facilitator deliver a brief, engaging lecture or ask families to work together at activity stations?
- Have a few "tricks" up your sleeve for when you need to draw participants' attention. A short "get up and move" activity can ease a transition from one activity to the next, as can an impressive demonstration like, Exploring Earth: Investigating Clouds: <http://www.nisenet.org/catalog/exploring-earth-investigating-clouds>

Collaborations & Partnerships

Why collaborate? To achieve something you can't do on your own! Collaboration occurs when organizations and individuals make a commitment to work together and contribute resources and expertise to achieve a common, long-term goal.

There are a many reasons to collaborate, but they can be boiled down to just a few:

1. To share resources, expertise, and connections
2. To build upon existing strengths
3. To reach new audiences

Communities face a variety of challenging and complex problems that can be addressed through collaborative public, private, and nonprofit partnerships. Many of these challenges simply cannot be addressed effectively by one organization acting alone, and require the diverse resources and expertise of government agencies, community-based organizations, state and national organizations, businesses, schools, and individuals. When surveying case studies of local communities who have successfully addressed complex problems, collaborative strategic partnerships are almost always a key ingredient in these success stories. Partnerships can ultimately improve the health and welfare of children, families, and communities.

Key Characteristics of Successful Partnerships

Building a successful collaboration requires commitment, planning and foresight. The following is a summary of key characteristics of successful partnerships.

Be patient! Collaboration takes time.

- Start small; developing a relationship and building trust takes time
- Communicating takes time: your organizations have different cultures and terminology
- Always keep the long-term relationship in mind while working on shorter-term projects
- Start early; your partner's schedule will vary from your own, so be sure to include enough lead time so that you both can be prepared for the work of the collaboration

Be clear about your goals and expectations.

- What: Decide on your common goals; be sure your partnership is mutually beneficial
- How: Agree upon activities to meet your shared goals and missions
- Who: Clarify your roles and responsibilities for all project activities
- Where: Decide upon the locations of activities
- When: Agree upon a timeline and key dates, and check in regularly

Get to know each other. Each partner has a lot to learn and a lot to offer.

- Familiarize yourself with your partner organization through websites, newsletters, events, and other opportunities
- The more you understand about each other's purpose, activities, audiences, and culture, the easier your partnership will be
- Individuals come to a partnership with different strengths and experiences; every group needs dreamers, developers, and doers

Communication is critical!

- Strive to achieve a flexible, trusting atmosphere; be open and honest while still being tactful and supportive
- Things may not always go smoothly, so don't hesitate to pick up the phone and have an honest conversation to work things out

- Involve more than one contact person at each organization at different levels to ensure a deeper relationship that can survive changing circumstances and turnover

Stay focused on your goals. And don't forget to celebrate your successes!

- Reflect on the original goals of your partnership and project, and consider how you want to improve, change course, or evolve the relationship
- As you work together, keep your long-term relationship in mind; by leveraging your combined resources and strengths, you can each do much more for your community

Tips for Collaborating with a Variety of Organizations

Collaborating with existing organizations on STEM activities is an effective way for museums, planetariums, and university outreach programs to connect their audiences with science experts and Earth and Space enthusiasts in a way that regular programming may not. The following profiles are intended to provide a brief introduction to a few types of organizations that may partner well with a museum.

Girl Scouts

About: Girl Scouting builds girls of courage, confidence, and character, who make the world a better place. Founded in 1912, Girl Scouts is a leading development organization for girls from coast to coast and across the globe.

Audience and Geographic Reach: There are 3.2 million Girl Scouts, including 2.3 million girl members and 890,000 adult members working primarily as volunteers through over 100 local Girl Scout Councils. Units are organized into Troops and regional Councils. Girls progress through Daisies (grades K-1), Brownies (grades 2-3), Juniors (grades 4-5), Cadettes (grades 6-8), Seniors (grades 9-10), Ambassadors (grades 10-12), and then to Adults.

Earth and Space Focus: Girl Scout Badge programs have been recently refreshed to better reflect girls' interests and to focus on twenty-first-century skills; several badge categories make special use of STEM activities including Earth and space science. New Girl Scout Space Science badges have recently been released for kindergarten-5th grade girls. (In late 2019, new Space Science badges will be released for 6th-12th grade girls.) Each badge encourages girls to learn more about space science through a combination of astronomical observation and hands-on activities. We have shared descriptions of the newly available badges in the physical 2019 Explore Science: Earth and Space toolkit. Activities from the Explore Science: Earth and Space toolkit can aid you in creating programming to satisfy Girl Scout Space Science badge requirements.

Tips for Collaboration: The Girl Scouts offers many ways to engage with their organization:

Join - Become an official member of the organization to familiarize yourself with the structure and local units in your area.

Volunteer - Girl Scouts relies on volunteers to achieve its mission.

Badges - Learn how you can help Girl Scouts earn badges through partnerships and programming with a local troop and regional council. Many museums offer special programming to help local groups fulfill their badge requirements, such as camp-ins and special events.

Gather the Community - The observing component of each badge encourages troops to reach out to their local astronomy club. Museums and visitor centers can serve as a convener of organizations, partnering with both a local Girl Scout troop and an local Astronomy club to host an observing event.

Apollo Anniversary! Each of the new 2018 Space Science badges requires that girls complete an activity related to the Moon. Work together with troop leaders to create an anniversary celebration around these activities.

Astronomy Department at a Local College or University

About: The primary responsibility of an Astronomy Department is to provide educational opportunities to undergraduate and graduate students enrolled at the college or university. The Department may have an additional mission to conduct cutting-edge astronomy research.

Resources: Astronomy faculty and staff can bring a wealth of knowledge about Earth and space concepts to a partnership. For the purposes of a single event, they may enjoy giving a brief presentation about emerging science and technology, or being available for visitors to “Ask a Scientist” questions they may have about the science behind the interactive activities. In the context of a longer partnership, a faculty member in Astronomy can provide invaluable insight as a science advisor on museum/planetarium projects such as creating exhibitions or planning future celestial and STEM events.

Tips for Initiating Collaboration: When approaching a partnership with your local Astronomy Department, communicate the value that a partnership will bring to students involved with the Department. Collaborating could provide faculty and graduate students a chance to share stories about their research with the general public - which can satisfy the Broader Impacts requirement of any grant from the National Science Foundation. Additionally, experiences in STEM outreach can help to motivate undergraduates in their studies. Sharing Earth and Space activities with visitor groups may give students an opportunity to teach material that they have learned in class, and a chance to discuss with visitors what excites them about their studies.

Apollo Anniversary! Faculty and students in your local Astronomy department may have worked with rock samples from the Moon landings, or have access to photographs, models, maps, etc. that would otherwise be hard to find.

Amateur Astronomy Club

About: Amateur astronomy clubs can be found across the United States. These clubs are made up of people with a passion for observing the skies, exploring space science concepts, and sharing it all with their communities.

Resources: Each club is different, so their resources and knowledge will be as well. Some clubs have many dedicated volunteers and lots of experience working with the public, while others have very few members and lots of technical expertise. A group may focus their efforts on a specific discipline, like astrophotography or sunspot observing. Get to know your local amateur astronomy club to determine what resources they are excited to bring to a partnership with your organization.

Tips for Initiating Collaboration: You can easily find a club by searching the NSAS Night Sky Network website at nightskynetwork.org. Just put in your local address in the “clubs and events” section to see who is near you! Get in touch with them by clicking on the club name and then on the contact link for that club. Be sure to communicate with the club well in advance of your event. Many clubs depend on only a handful of volunteers for outreach events, and so will need to be sure their members are available before committing. Set clear expectations about event responsibilities, and be prepared to be flexible with your own plans - clubs often have favorite hands-on activities and preferred telescope viewing procedures that they would like to use when working with public audiences.

Apollo Anniversary! Invite your local amateur astronomy club to help your visitors observe features on the Moon through real telescopes and binoculars. Club members often know facts and anecdotes that participants will find especially interesting.

Learn more about partnerships and collaborations by downloading the *Museum and Community Partnerships Collaboration Guide* from [nisenet.org](http://www.nisenet.org): <http://www.nisenet.org/collaboration-guide>

Finding Local Experts

We strongly encourage you to collaborate with local experts consisting of Earth and space science professionals as well as science enthusiasts in your area. Volunteer experts are a key ingredient to many successful public engagement efforts. It is up to your organization to choose your local collaborators. Your regional hub leader can assist you in finding local partners in your geographic area. The toolkit includes training and orientation materials to help prepare your event volunteers and staff for using the activities. Volunteer networks focused on astronomy and space include:

The Solar System Ambassadors Program (SSA)

This is a public outreach program designed to work with motivated volunteers across the nation. These volunteers communicate the excitement of the NASA Jet Propulsion Lab's (JPL) space exploration missions and information about recent discoveries to people in their local communities. For 2016, there are 700 ambassadors in 50 states, Washington DC, Puerto Rico, US Virgin Islands, and Guam. Volunteer ambassadors bring the excitement of space to the public. Ambassadors are space enthusiasts from various walks of life who are interested in providing greater service and inspiration to the community at large.

<http://solarsystem.nasa.gov/ssa/home.cfm>

The Night Sky Network

This is a nationwide coalition of amateur astronomy clubs bringing the science, technology, and inspiration of NASA's missions to the general public. Night Sky Network members share their time and telescopes to provide unique astronomy experiences at science museums, observatories, classrooms, and under the real night sky.

<http://nightsky.jpl.nasa.gov/index.cfm>

AAS Astronomy Ambassadors

The American Astronomical Society (AAS), in partnership with the Astronomical Society of the Pacific (ASP), members of the Center for Astronomy Education (CAE), and other organizations active in science education and public outreach (EPO), has launched a series of professional development workshops and a community of practice designed to help improve early-career astronomers' ability to effectively communicate with students and the public. Called Astronomy Ambassadors, the program provides mentoring and training experiences for young astronomers, from advanced undergraduates to new faculty. It also provides access to resources and a network of contacts within the astronomy EPO community.

<http://aas.org/outreach/roster-aas-astronomy-ambassadors>

Colleges and Universities

Many colleges and universities have astronomy and Earth science departments. Others may have clubs or local chapters of professional societies. Once you connect with a faculty or staff member they should be able to also suggest undergraduate and graduate students who could volunteer at your event.

Finding Additional Volunteers

In addition to finding subject matter experts, you will probably need to recruit other volunteers to help with your event. Potential sources of volunteers may include:

- College students, classes, or clubs with community service requirements
- High school science clubs, or students suggested by local high school science teachers
- Local chapters of professional science and engineering groups that are often associated with local colleges, such as:
 - National Action Council for Minorities in Engineering: <http://www.nacme.org>
 - National Society of Black Engineers (NSBE): <http://www.nsbe.org/home.aspx>
 - National Organization of Gay and Lesbian Scientists and Technical Professionals: <http://www.noglstp.org>
 - Society for Advancement of Chicanos and Native Americans in Science (SACNAS): <http://sacnas.org>
 - Society of Asian Scientists and Engineers: <http://www.saseconnect.org>
 - MAES – Latinos in Science and Engineering: <http://mymaes.org>
 - Society of Hispanic Professional Engineers: <http://shpe.org>
 - Society of Women Engineers (SWE): <http://societyofwomenengineers.swe.org>
- Drama and theater students
- Local industry staff and retirees

Regional Hub Leaders

The NISE Network community within the United States is organized around four "regional hubs" based on geographic proximity. Regional hubs facilitate partner interaction in the Network, help museum educators connect with scientists and each other, and provide support to institutions in their region. To find your region and contact your regional hub leader, please see below.

Regional hub leaders will be able to help connect you with experts in your area and answer other questions about the project:

- **NORTHEAST**
Northeast: NY, VT, NH, ME, RI, CT, and MA
Mid-Atlantic: PA, NJ, MD, DC, DE, OH, and WV
Ali Jackson, ajackson@sciencenter.org
Sciencenter, Ithaca, NY
607-272-0600x144
- **SOUTHEAST**
Southeast: VA, NC, SC, KY, TN, LA, MS, AL, GA, FL, and Puerto Rico
South: TX, AR, and OK
Brad Herring, bradh@ncmls.org
Museum of Life and Science, Durham, NC
919-220-5429x360
- **MIDWEST**
ND, SD, NE, KS, MN, IA, MO, WI, IL, MI, and IN
Christina Leavell, cleavell@smm.org
Science Museum of Minnesota, St. Paul, MN
651-221-9434
- **WEST**
Southwest: CA, NV, AZ, and HI
West: AK, WA, OR, ID, MT, WY, CO, UT, and NM
Frank Kusiak, frank_kusiak@berkeley.edu
Lawrence Hall of Science, Berkeley, CA
510-643-7827

Apollo 11 Moon Landing: 50th Anniversary



During the Apollo program of the 1960s and '70s, NASA sent nine missions to the Moon. Six of them landed astronauts safely on the surface, the only times humans have visited another world. July 20, 2019 marks the 50th anniversary of the first humans landing on the Moon on July 20, 1969 as part of NASA's Apollo 11 lunar mission.

Additional information and resources including promotional materials, logos, picture and images, posters, multimedia and interactive resources and more can be found on the Moon page of the nisenet.org website at <http://www.nisenet.org/moon50>. This page will be contiguously updated, so be sure to check back often!

Credit: NASA Johnson Space Center

Special Websites for Apollo's 50th Anniversary

- NASA Apollo anniversary resources
<https://www.nasa.gov/specials/apollo50th/>
- NASA Apollo anniversary resources
<https://science.nasa.gov/toolkits/apollo-anniversary>
- Lunar Planetary Institute resources
<https://www.lpi.usra.edu/apollo50/>
- NASA Museum Alliance resources (you must register to access)
<https://informal.jpl.nasa.gov/museum/apollo-50th-resources>

NASA Moon and Apollo Program Online Resources

- NASA Science – Earth's Moon
<https://www.nasa.gov/moon>
In depth: <https://moon.nasa.gov/about/in-depth/>
- NASA Science – Solar System Explore – Earth's Moon
<https://solarsystem.nasa.gov/moons/earth-moon/overview/>
- NASA and International Moon Missions Timeline
<https://moon.nasa.gov/exploration/moon-missions/>
- NASA Apollo Program
https://www.nasa.gov/mission_pages/apollo/index.html
- NASA Apollo 11 mission
https://www.nasa.gov/mission_pages/apollo/apollo-11.html
- NASA Apollo 11 Moonwalk Montage - July 20, 1969: One Giant Leap For Mankind
https://www.nasa.gov/mission_pages/apollo/apollo11.html
- International Observe the Moon Night resources
<https://moon.nasa.gov/observe>

Submit Your Event to NASA's Space STEM Forum Apollo 11 Events Website

You can also help promote your event by submitting details to the events map. If you are already a member of NASA's Museum Alliance, you can use the event report form once you log in. Otherwise, email Amelia.J.Chapman@jpl.nasa.gov with the following information: Organization Name, Event Name, Event Date(s), Event City, Event State, URL link to event.

Online Workshops

The NISE Network will be hosting online workshops on the Moon and NASA's Apollo program in spring of 2019. For more information on these workshops you can visit: <http://www.nisenet.org/events/online-workshop>. Additionally, you can view a recorded workshop titled *Celebrating the Moon, Our Nearest Neighbor in Space* (October 2018) online here: <http://www.nisenet.org/events/online-workshop/online-workshop-celebrating-moon-our-nearest-neighbor-space-recorded>

The NASA Museum Alliance will also host online workshops related to the 50th anniversary. You can view the recorded *Preparing for the Apollo 50th Anniversaries* (July, you must register to access) online here: <https://informal.jpl.nasa.gov/museum/apollo50th>

You can find more recorded and planned workshops from the NASA Museum Alliance (you must register to access) here: <https://informal.jpl.nasa.gov/museum/apollo-50th-resources#telecons>

Planning Ahead for July 20, 2019

When planning your event, we strongly encourage you to collaborate with your local experts, professionals and astronomy enthusiasts alike. For more information on finding local experts, please refer to the *Collaborations & Partnerships* section of this guide.

Explore Science: Earth & Space toolkit connections

When hosting a Moon event you may want to facilitate the following Moon-related hands-on activities and resources found in the Earth & Space toolkits:

- *Exploring Earth: Big Sun, Small Moon*
- *Exploring Earth: Rising Sea*
- *Exploring the Solar System: Pocket Solar System*
- *Exploring the Solar System: Hide and Seek Moon*
- **NEW* Moon and Apollo 11 related information sheets*

Additional materials related to the Moon include:

- *The Moon: NASA is going back and looking forward* training presentation slides and notes printout
- *The Apollo Lunar Landing Sites* video
- *NASA's SSERVI Understanding Small Worlds in the Solar System A Tactile View* braille book
- *NASA's SSERVI Getting A Feel For Lunar Craters* braille book
- *Breakfast Moon* by Meg Grower and illustrated by David Barker, published by the Astronomical Society of the Pacific

More ideas to enhance your Apollo 11 celebration

- On the evening of July 21st, 2019, the Moon will be in its Waning Gibbous phase - excellent for observing through a telescope! Collaborate with amateur astronomers to host a Moon viewing night.
- If your site already hosts sleepovers, plan one for the night of the Apollo 11 anniversary. Use telescopes or binoculars to observe the Moon, and schedule a viewing of the original footage of the Moon landing.
- Invite older docents/local community members to tell stories about experiencing the first Moon landing.

Training Staff and Volunteers

Training Resources

The Explore Science: Earth & Space toolkit includes many training resources that will help your staff and volunteers feel comfortable engaging public audiences in the topic of Earth and space science. All of the resources listed below are also available online at <http://www.nisenet.org/earthspacekit>.

- Activity overview presentation for staff and volunteers including a project orientation and details about the educational products
- Facilitator guides for each activity
- Training and content videos for all activities
- Educathalon: Facilitation training video
- Strategies for Approaching Common Misconceptions Around Difficult Scientific Concepts training videos
- Tips for leading hands-on activities
- Calendar of celestial and STEM-related events (additional opportunities to use your kit)
- An Apollo 11 50th anniversary bag (products from NASA and other projects, links, and suggested resources)

Online Workshops

In addition to the resources listed above, the NISE Network will also offer a variety of free online workshops that your staff and volunteers are welcome and encouraged to participate in. There will be multiple one-hour workshops featuring training on a variety of topics, and one four-week online training about engaging participants in Earth and space programming using the toolkit materials. All online workshops will be recorded and archived.

Upcoming online workshops:

<http://www.nisenet.org/events/online-workshop>

Recordings of past online workshops:

http://www.nisenet.org/search/product_category/online-workshops-31

Additional Professional Development Tools

The NISE Network has created a wide variety of professional development tools, guides, workshops, and training materials as resources designed for educators and scientists to improve their capacity to engage the public in current science and technology.

http://www.nisenet.org/About_Professional_Development



Preparing Guest Presentations

Expert speakers can be a wonderful addition to your event. With extra preparation and support, guest presentations can provide a great experience for both the speaker and the audience.

Here are some suggestions to help make things go smoothly:

- When inviting scientists to participate, be clear about their role and type of experience you're seeking.
- Familiarize invited guest speakers with your expected audience, including anticipated ages, level of background knowledge.
- Let speakers know about any expectations you may have related to audience involvement.
- Discuss the content and length of the planned presentation.
- Share the "Tips for guest speakers," with your presenter. You might also share some of the other training materials.
- Encourage your invited speaker to use plain language, avoiding jargon and technical terms.
- Discuss details about your facility, including room size, seating style, and audio-visual equipment.
- Ask to review a draft slideshow or notes in advance and discuss the planned presentation together.
- Schedule time before the presentation to work out any audio-visual or logistical issues.
- Prepare questions that may help stimulate audience discussion.

Tips for Leading Hands-On Activities

Greet your guests

Say “hello,” make eye contact, and smile. People will come over if you look welcoming, available, and friendly. As much as possible, let your guests do the hands-on parts of the activity, and let them discover what happens. (If your activity has a surprise, don’t give it away!)

Encourage exploration

Provide positive feedback and assistance when people need it, but let them experiment and learn for themselves. Don’t insist people do things the “right” way—sometimes learning how something doesn’t work is just as valuable as learning how it does work.

Ask open-ended questions

Help people observe and think about the activity. Try to use questions that have more than one answer, such as: “What do you see happening?”, “Why do you think that happened?”, “What surprised you about what you saw?”, and “Does this remind you of anything you’ve seen before?”

Be a good listener

Be interested in what your guests tell you, and let their curiosity and responses drive your conversation forward.

Share what you know

Use clear, simple language. Focus on one main idea—you don’t need to explain everything at once! Start with very basic information, and then share more with interested learners.

Use examples from everyday life

Familiar examples can help explain abstract concepts. Be aware of different abilities, keeping in mind that children do not have the same skills or vocabulary as adults.

Offer positive responses

If people haven’t quite grasped a concept, you might say, “That’s a good guess!” or, “Very close, any other ideas?” Don’t say “No” or “Wrong.” You can offer hints or suggestions for things to think about or watch carefully.

Share accurate information

If you aren’t sure about something, it’s ok to say, “I don’t know. That’s a great question!” Suggest ways that people can learn more, either by trying another activity or looking up information at the library or online.

Remain positive

Maintain an inviting facial expression, positive tone, and open body language throughout the interaction.

Thank your guests

As your interaction ends, suggest other activities that you think your guests might enjoy.

Have fun!

A positive experience will encourage learning.

Tips for Interacting with Pre-K Children

Young children are natural scientists. Educators can encourage scientific behaviors in pre-K age children (ages 3-5) by recognizing and encouraging these natural scientific tendencies while engaging with children in developmentally appropriate ways. Approach activities as opportunities for children to investigate their world. Exposure to a scientific phenomenon, concept, or skill is very valuable for a young child, but you shouldn't expect mastery or be too focused on very specific learning goals. You are providing the stepping stones to later scientific understanding and skills. Consider the following approaches when working with young children.

Interacting with a real phenomenon

Whenever possible, engage children with science phenomena through real experiences, photos, video, and/or models. Provide physical materials that extend children's ability to make sense of the phenomenon they are exploring.

Connect at their level

Kneel down so that you can make eye contact and interact with children at their level. Tell them your name and ask them theirs. Try to remark on something that might be personally interesting to the child (for example: *"I see a butterfly on your shirt - I love to watch the butterflies in the museum's garden!"*) before launching into the topic you want to discuss. If a child seems shy, don't force them to talk to you; let the adult caregiver take the lead in this case.

New experiences and skills

Young children are experiencing many things in their world for the first time, so leave plenty of time for them to fully enjoy novel experiences. Let them exercise and show off their newly developing skills (e.g. counting, recognizing letters and shapes). They are just developing their fine motor skills, so they may need more time for tasks that involve cutting, taping, drawing, etc. Allow for imaginative play, which is essential to young children's learning.

Non-verbal communication

Children may not yet have the vocabulary to verbally articulate a concept, so rather than asking them to do so, encourage them to demonstrate their understanding non-verbally. For example: *"On my model, this end is drooping down very low; could you show me how to move the string to make both ends balance?"*

Ask questions

Ask open-ended questions and validate children's answers by acknowledging or repeating what they say and then rephrasing it as needed. Ask questions that guide children toward comparing and making sense of observations. For example: *"How did the shadow change when you moved the light?"*

Sportscasting

Avoid non-specific praise, such as "good job!" Instead, try simply narrating (i.e. "sportscasting") the child's actions. This shows them that you are noticing and taking interest in their efforts, and allows them to verbally elaborate if they choose to. For example: *"I see that you are pouring that water very carefully."*

Learn more about working with young children

The **My Sky Tonight** program from the Astronomical Society of the Pacific provides a collection of hands-on activities and educator resources for engaging pre-K children in astronomy:

www.astrosociety.org/MySkyTonight

The **National Association for the Education of Young Children** provides guidance and resources for working with young children through Developmentally Appropriate Practice (DAP). A good starting point is their "10 Effective DAP Teaching Strategies": <https://www.naeyc.org/resources/topics/dap/10-effective-dap-teaching-strategies>

For more comprehensive guidance on engaging young children in science, we recommend the book **Preschool Pathways to Science: Facilitating Scientific Ways of Thinking, Talking, Doing, and Understanding** by Rochel Gelman Ph.D., Kimberly Brenneman Ph.D., Gay Macdonald M.A., and Moises Roman, published by Brookes Publishing and recommended by the National Science Teachers Association.

<https://products.brookespublishing.com/Preschool-Pathways-to-Science-PrePS-P573.aspx>

These recommendations are based on materials and resource developed for *My Sky Tonight* from the Astronomical Society of the Pacific. For more activities and resources for engaging young children in the science of astronomy, visit www.astrosociety.org/MySkyTonight

My Sky Tonight is based upon work supported by the Division of Research On Learning (DRL) of the National Science Foundation under Grant no. AISL #1217441. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation

Additional Resources

In addition to the materials provided in this toolkit, we also want to feature a few other sources that contain a wealth of Earth and space content:

NISE Network Activity Resources

The NISE Network has a curated list of programs, media, and professional development resources that directly relate to activities and content featured in the toolkits. This list is continuously updated to reflect new products as they become available.

<http://www.nisenet.org/earthspacekitextensions>

NASA Museum Alliance

The Museum Alliance is a community of practice comprising informal science educators at museums, science centers, planetariums, NASA Visitor Centers, Challenger Learning Centers, observatories, zoos, aquariums, parks, and nature centers who wish to share NASA information with their visitors. It is intended to bring current NASA science and technology to visitors through professional development of the museums' staff, advance notice of NASA events, and provision of materials such as visualizations, access to NASA experts, educational materials, etc.

<http://informal.jpl.nasa.gov/museum/>

Astronomical Society of the Pacific

The Astronomical Society of the Pacific (ASP) designs and delivers innovative astronomy toolkits, programs, publication, and education guides to inspire youth and adults.

<http://www.astrosociety.org/education/>

Apollo 11 Moon Landing: 50th Anniversary

In addition to the resources included in your Earth & Space toolkit there are many organizations sharing materials and resources to help you plan for the 50th anniversary of NASA's Apollo 11 Moon landing. Please refer to the Apollo 11 Moon Landing: 50th Anniversary section of this guide for links and more information. You can also find a continuously updated list of additional resources at <http://www.nisenet.org/moon50>.

Evaluating Your Event

The activities and materials included in your Explore Science: Earth & Space toolkit have been evaluated with public audiences, and reviewed by scientists and informal science educators. The NISE Network also evaluates the national impact of Explore Science: Earth & Space events. The findings from these evaluation studies are used to improve future toolkit materials, and to inform the Network of its impact on the public.

Additionally, you may want to evaluate your local Explore Science: Earth & Space event against your own event goals. Evaluating your local event has several benefits. It can help clarify your goals, provide information that you can use to improve your event next year, gain funding or sponsorship for projects, and inform your understanding of your audience and the impact of your work. If you're interested in learning more about evaluation, following is a selection of resources to help you get started.

Team-Based Inquiry

Team-Based Inquiry (TBI) is a practical approach to empowering education professionals to get the data they need, when they need it, to improve their products and practices and, ultimately, more effectively engage public and professional audiences. The TBI process involves an ongoing cycle of inquiry: question, investigate, reflect, and improve. The Team-Based Inquiry guide explains each step of the TBI process and features ways TBI is used in the NISE Network to improve educational experiences and professional practice. Resources include templates, forms, training materials, and training videos. <http://www.nisenet.org/catalog/team-based-inquiry-guide>

NISE Network program evaluation tools

Including program evaluation template:

<http://www.nisenet.org/catalog/nise-network-program-evaluation-tools-package>

NISE Network evaluation efforts

Information about NISE Net evaluation: http://www.nisenet.org/About_Evaluation_Research

Additional Resources

- **Informalscience.org**
Informal education resources:
<http://www.informalscience.org>
- **The National Science Foundation**
Guidebook on project evaluation for researchers:
http://www.nsf.gov/pubs/2002/nsf02057/nsf02057_1.pdf
- **The University of Wisconsin Extension**
Guides to planning and implementing evaluation:
<http://www.uwex.edu/ces/pdande/evaluation/evaldocs.html>
learningstore.uwex.edu/Planning-a-Program-Evaluation—P1033C0.aspx

Staying in Touch

NISE Network Monthly E-Newsletter

The NISE Network sends a monthly electronic newsletter. Subscribe here:

<http://www.nisenet.org/newsletter>

If you have subscribed to the newsletter, but you are not receiving it via email, please see our FAQ page for assistance:

<http://www.nisenet.org/faqs>

NISE Network Social Networking

In addition to the monthly *NISE Network electronic monthly newsletter*, the NISE Network has many ways to get updates and connect with other professionals in the NISE Network through social networking sites that you already use:

<http://www.nisenet.org/social>

If you are posting about your events and experiences, we encourage you to use these hashtags on your social network platforms:

#nisenet

#explorescience

NASA Social Media

Follow, share, and be a part of the conversation on popular social media sites with NASA:

<https://science.nasa.gov/get-involved/connect>

NISE Network Regional Hub Leaders

The NISE Network community within the United States is organized around four "regional hubs" based on geographic proximity. Regional hubs facilitate partner interaction in the Network, help museum educators connect with scientists and each other, and provide support to institutions in their region. To find your region and contact your regional hub leader, please see the section on regional hub leaders earlier in this guide, or visit:

<http://www.nisenet.org/contact>

NASA Museum Alliance News

Informal education professionals are invited to apply for free membership to the NASA Museum Alliance. You can receive regular news from NASA Museum Alliance by joining at:

<https://informal.jpl.nasa.gov/museum/About/Application>

NASA Education "Science WOW!" Newsletter

The "Science WOW!" message features NASA's latest science education offerings delivered "Weekly on Wednesdays."

https://www.nasa.gov/audience/foreducators/Express_Landing.html

Promotional and Marketing Materials

We've put together a collection of resources to help you promote and market your Explore Science: Earth & Space event. We've designed everything to be as easy to use as possible by creating templates, common software platforms, and simple instructions for adding your information and logos to generate attractive posters, banners, and other marketing materials.

All of the artwork and images shown on the following pages are available in electronic format on the USB thumb drive included in your toolkit, or online. We've provided Spanish and English options to help promote bilingual events. You can find materials online at:

<http://www.nisenet.org/earthspacekit>

NASA Acknowledgment of Support

The Explore Science: Earth & Space toolkits are part of the Space and Earth Informal STEM Education project, led by Arizona State University, funded by the National Aeronautics and Space Administration under cooperative agreement award numbers NNX16AC67A and 80NSSC18M0061.

Although your event might not receive direct NASA funding, if you use our kit materials or produce deliverables based on the kit materials, you should follow NASA guidelines for acknowledging NASA support.

Statement for deliverables and publications:

This material is based upon work supported by NASA under cooperative agreement award numbers NNX16AC67A and 80NSSC18M0061. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the view of the National Aeronautics and Space Administration (NASA).

Use of the NASA seal logo, program identifiers, or flags is restricted by NASA and **should not** be added to your press release or event promotional materials.

The NASA insignia logo (the blue "meatball" insignia), the retired NASA logotype (the red "worm" logo), and the NASA seal may not be used for any purpose without explicit permission. These images may not be used by persons who are not NASA employees or on products, publications or web pages that are not NASA-sponsored. These images may not be used to imply endorsement or support of any external organization, program, effort, or persons. For more information, please visit:

<http://www.nasa.gov/multimedia/guidelines>.

Sample Press Release

Your logo here



Date:
Contact:
Phone:
Email:

Explore Earth and space science at [name of your organization]!

[Insert your local Explore Science: Earth & Space location, dates, and specific activity information here].

The Explore Science: Earth & Space event at [name of your organization] is part of a nationwide celebration of educational programs designed to engage audiences in the awe-inspiring fields of Earth and space science. This exciting event is an opportunity to connect with current NASA science research and explore Earth and space phenomena.

The Explore Science: Earth & Space event will include exciting science, take-home materials, and engaging discussion about science and society. Participants will have a chance to safely observe the surface of the Sun, explore the ways our universe is expanding, build their own electroscope to detect static electricity, perform experiments with erosion, and much more! These fun activities introduce guests to the ongoing research happening at NASA in the fields of heliophysics, Earth science, planetary science, and astrophysics, and allow them hands-on interaction with Earth and space science concepts.

[Insert information about other special activities that your location may host, information about local partnerships and collaborations, and any other event-specific information.]

The Explore Science: Earth & Space project is led by Arizona State University, in collaboration with the National Aeronautics and Space Administration (NASA). Explore Science: Earth & Space toolkits are developed and distributed nationwide by the National Informal STEM Education Network (NISE Net). Throughout spring and summer of 2019, events are taking place at 350 museums and institutions throughout the country.



The National Informal STEM Education Network (NISE Network) is a national community of informal educators and scientists dedicated to fostering public awareness, engagement, and understanding of current science, technology, engineering, and math (STEM). For more information about NISE Net and to download a digital Explore Science: Earth & Space toolkit please visit: www.nisenet.org.

This material is based upon work supported by NASA under cooperative agreement award numbers NNX16AC67A and 80NSSC18M0061. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the view of the National Aeronautics and Space Administration (NASA).

Photo Release Form

Most institutions require that some kind of photo release form be signed in order for you to circulate photos from your event in any way. Whether or not this is a formal policy in your institution, you should always ask for permission before photographing participants, especially children. Getting signed releases gives you the flexibility to use your photos in newsletters, reports, and other settings.

We welcome you to share photos from your event with us by sending them to us. However, we do have the following caveat: in order to be able to use and share photos of local events, we must have a release form signed by each person in the photo. We understand that for many of our partners, it is not possible to get release forms from every person photographed or recorded. For this reason, we do not require or expect photographs of your events.

The National Informal STEM Education Network (NISE Net) photo release form is included on the next page. Fill in your organization's name in the second blank on the first line, then copy the form to use at your event. When you are asking visitors to fill out the form, be sure to explain that they can choose **not** to have their photograph or their child's photograph taken and still participate in the activity.

Here are a few tips to ensure you get a release from every person you photograph:

- If you are using a photographer for your Explore Science: Earth & Space event, be sure to explain to them that they will need to get consent before taking photographs.
- It's helpful to have the releases and pens on a clipboard or two that you can hand to the visitor.
- In larger settings, or spaces with a lot of activity, consider assigning a staff person to join the photographer and ask visitors to sign the release before the photographer takes pictures. This person can ensure that no photographs are taken without consent, and can also ask the photographer to delete any pictures from their camera of visitors who did not consent.
- Jot down a description of the person on their release form (for example, "young girl, brown hair, yellow shirt"). This can help you match releases to photos later on.
- If you are hosting an event with nametags and registration, you can ask visitors to fill out the release when they register. If they have consented to have their photo taken, give them a sticker for their nametag. Then the photographer can take photos only of people with the stickers.

If you are able to get signed releases, please share those photos with us! You may send a USB with photos along with a scan of the photo releases to the Science Museum of Minnesota at:

Christina Leavell
Science Museum of Minnesota
120 West Kellogg Boulevard
Saint Paul, MN 55102

Alternatively, you can email them to Christina Leavell at cleavell@smm.org.

Questions regarding acknowledgments or credits can be directed to cleavell@smm.org as well.

Explore Science: Earth & Space Photo Consent and Release

I, _____, hereby authorize the _____ (the "Museum"), as the agent acting for and on behalf of the NISE Network, and its partners, agents, representatives, assigns, successors in interest and licensees, to photograph, audiotape, and/or videotape me and grant the Museum and its partners the irrevocable right to use my photograph, audio recording, video recording, or any reproduction or modification thereof (the "Photograph," "Audio," and/or "Video"), in any manner or medium throughout the world an unlimited number of times in perpetuity in advertising, trade, promotion, exhibition, or any other lawful purpose.

I understand that I will not receive any monetary compensation for the permissions I am granting herein. I hereby waive any right of inspection or approval of the uses to which the Museum and the NISE Network may put the Photograph, Audio, and/or Video. I acknowledge the Museum and the NISE Network will rely on this permission and hereby release and discharge the Museum and the NISE Network from any and all claims and demands arising out of or in connection with the Photograph or the exercise of the permissions granted here, including any or all claims for libel, invasion of privacy, or emotional distress.

I understand that I cannot withdraw my consent after I sign this form and that this consent and release is binding on me and my heirs, legal representatives and assigns.

YES NO (please check one)

- I grant permission for Photographs** to be collected and used by the Museum and the NISE Network.
- I grant permission for Audio** to be collected and used by the Museum and the NISE Network.
- I grant permission for Video** to be collected and used by the Museum and the NISE Network.

Date: _____ Signature: _____

Address: _____

Phone Number: _____ Email Address: _____

If the individual named above is under 18 years of age, please complete the following:

I am the parent or legal guardian of the individual named above, and I hereby sign this Media Consent and Release on behalf of such individual in accordance with the statements above.

Name: _____ Date: _____

Signature: _____

Address: _____

Phone Number: _____

Logos

Explore Science: Earth & Space logos

You are very welcome to use the Explore Science: Earth & Space logos on your press release or event promotional materials. There are many variations and formats for the Explore Science: Earth & Space logos available for use in graphic materials. All Explore Science: Earth & Space logos are included on the USB thumb drive, and all the promotional materials are available on the website at:

<http://www.nisenet.org/earthspacekit>

You can find the logos at:

<http://www.nisenet.org/catalog/explore-science-earth-space-logos>

NISE Network logos

You can find logos and promotional materials for all the NISE Network promotional materials and logos here:

<http://nisenet.org/prmaterials>

NASA seal, logo, program identifiers

Use of the NASA seal, logo, program identifiers, or flags is restricted by NASA; please do not add the NASA logo to your press release or event promotion materials.

The NASA insignia logo (the blue “meatball” insignia), the retired NASA logotype (the red “worm” logo), and the NASA seal may not be used for any purpose without explicit permission. These images may not be used by persons who are not NASA employees, or on products, publications or web pages that are not NASA-sponsored. These images may not be used to imply endorsement or support of any external organization, program, effort, or persons. For more information, please visit <http://www.nasa.gov/multimedia/guidelines>.

Horizontal logo



Vertical logo



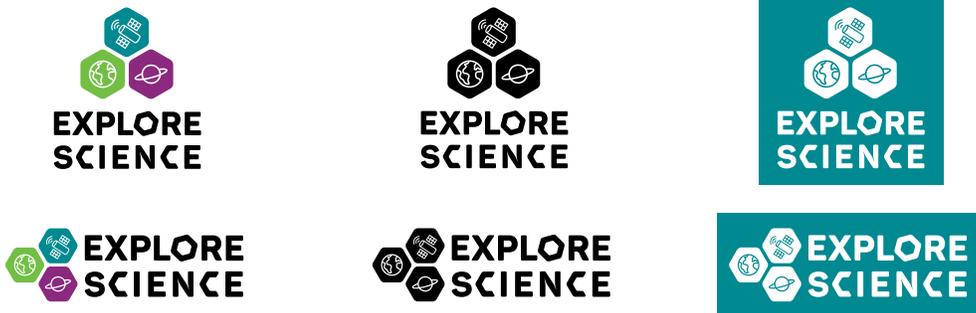
Explore Science mark



English logo versions



Logo mark versions



Bilingual logo versions



Colors

Green, teal, and purple are the primary colors of the Explore Science: Earth & Space color palette.

Color specifications

CMYK	60/00/100/00
RGB	114/191/68
PMS	360
#	72bf44

CMYK	100/11/39/15
RGB	0/137/45
PMS	7713
#	008991

CMYK	56/100/17/0
RGB	138/41/126
PMS	513
#	8a297e

Fonts

The Explore Science: Earth & Space project uses two fonts: Panton and Calibri.

PANTON LIGHT

ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890

PANTON REGULAR

ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890

PANTON EXTRA BOLD

**ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890**

PANTON FONT FAMILY

The Explore Science logo was based on the Panton typeface. Panton is used throughout Explore Science materials. The versatile font family includes ten different weights. Free download is not available, but the font can be purchased online from various sources.

CALIBRI LIGHT

ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890

CALIBRI REGULAR

ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890

CALIBRI BOLD

**ABCDEFGHIJKLMN
OPQRSTUVWXYZ &
abcdefghijklmnopqrst
vwxyz 1234567890**

CALIBRI FONT FAMILY

Calibri is also used in Explore Science materials. Calibri Regular and Bold come with the Windows operating system and also with Microsoft Word for Mac. Calibri Light can be purchased online from various sources.

Social Media

We encourage you to use these hashtags on your social networks to promote your event:

#nisenet

#explorescience

Banners

Two large Explore Science: Earth & Space banners are included in your toolkit (English and bilingual Spanish-English). You can use adhesive vinyl lettering to customize the banner with your event date, times, location, and other information.

If you would like to print additional banners with your customized event information, it's easy to do. Use the banner template on the USB thumb drive, then send your art to one of the many online banner-printing companies or take it to your local printer. A similar large vinyl banner with grommets should cost about \$100.



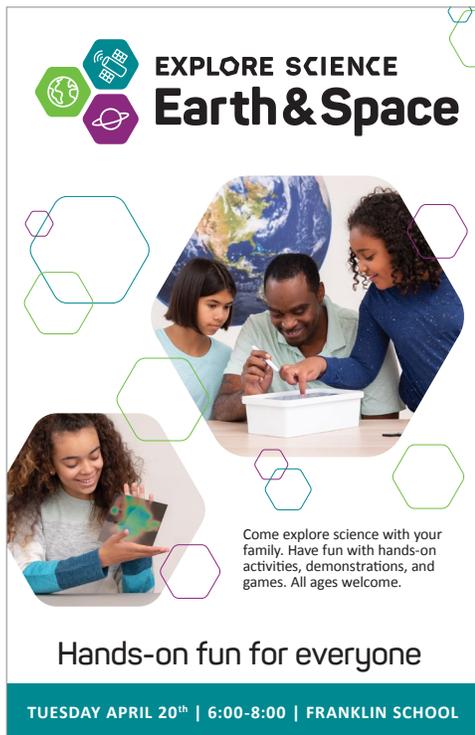
64 x 24 inches

Customizable Ads and Posters

To help you promote your event, PDF, JPEG, and Adobe Illustrator files are provided.



Each ad layout is provided in both English and bilingual format



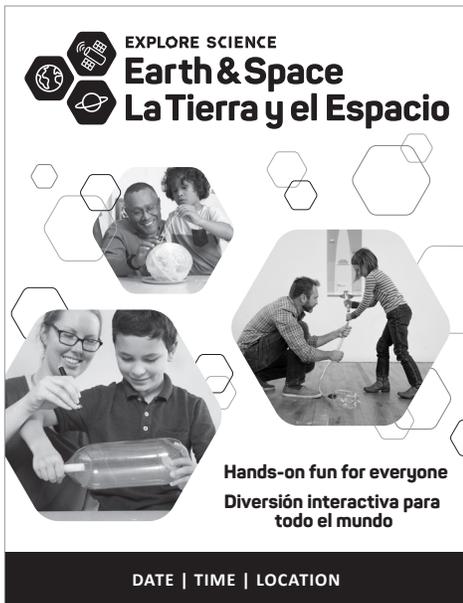
11 x 17 posters



Each poster layout is provided in both English and bilingual format

8.5 x 11 posters

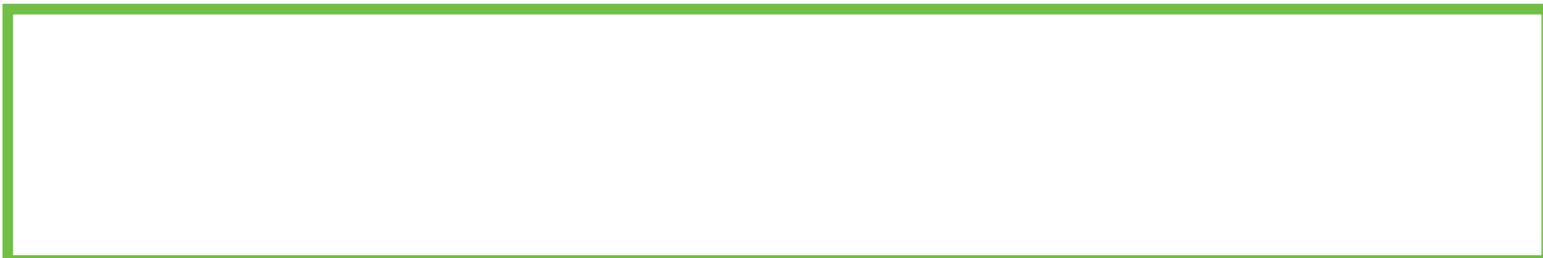
Each ad and poster is also provided in black and white





EXPLORE SCIENCE

Earth & Space





EXPLORE SCIENCE

Earth & Space





EXPLORE SCIENCE

Earth & Space



**Hands-on fun
for everyone!**



EXPLORE SCIENCE

Earth & Space



**Hands-on fun
for everyone!**

Apollo Anniversary Ads and Posters

PDF, JPEG, and Adobe Illustrator files are provided.



8 x 4 ad



8.5 x 11 poster



11 x 17 poster

The 50th Anniversary of the Apollo Program



Celebrate past, present, and future lunar exploration!



Press Photos

We have provided a selection of press photos that you can use to market your Explore Science: Earth & Space events.



ExSci_Space_Promo_2016_1027.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1031.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1066.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1069.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1079.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1093.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1099.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1102.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1122.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1133.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1136_edit.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1152.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1163_edit.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1170.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1179.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1215.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1265_edit.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1325.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1344.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1355.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1361.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1366.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1410.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1414.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1425.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1453.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1491.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1495_edit.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1592.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2016_1608.jpg
Credit: Emily Maletz



ExSci_Space_Promo_2017_Eclipse1.jpg
Credit: Science Museum of Minnesota



ExSci_Space_Promo_2017_Eclipse3.jpg
Credit: Science Museum of Minnesota



ExSci_Space_Promo_2018_0001.jpg
Credit: Science Museum of Minnesota



ExSci_Space_Promo_2018_0002.jpg
Credit: Science Museum of Minnesota



ExSci_Space_Promo_2018_0003.jpg
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