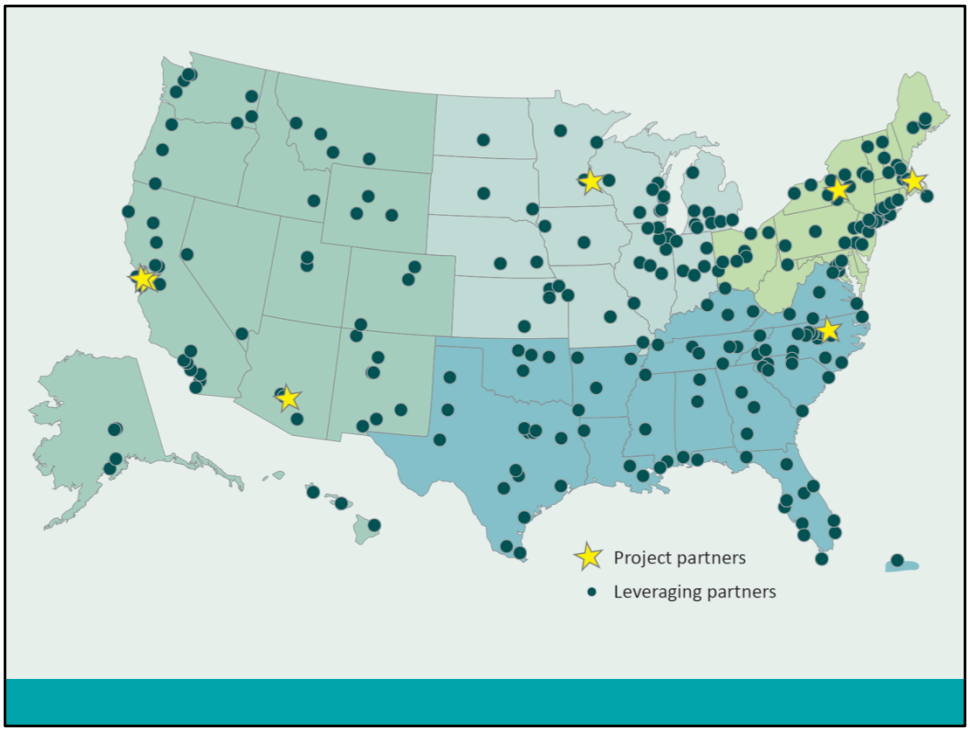
[This slide presentation provides an overview of the Explore Science: Earth and Space Toolkit, and can be used to introduce staff and volunteers to the project and its educational materials. You can customize this training presentation to fit your organization and programming.]

Welcome to the Explore Science: Earth & Space event training! In this presentation, we're going to go through quite a bit of information related to our local event and the national Explore Science: Earth & Space project.

This training has three parts:
1. Quick introduction to the Explore Science: Earth & Space project and toolkit
2. Overview of the toolkit and the individual activities
3. Tips and training resources to help you lead the activities successfully

We'll have time at the end for questions, but feel free to ask for clarification throughout.

The Explore Science: Earth & Space project represents an effort by the National Informal STEM Education Network (NISE Network) in collaboration with NASA to engage museum visitors in Earth and space science hands-on activities and experiences with connections to science, technology, and society.



This year, the NISE Network shared 250 physical Explore Science: Earth & Space toolkits. Institutions (including, children's museums, science centers, NASA Visitor Centers, nature centers, natural history museums, and more!) all across the country are hosting events and engaging visitors through year-round programming!

Here are a few details about our event, today.

Our Event

- Background
- Who's here
- Orientation
- Safety
- Policies
- Schedule
- Future events

[This is for information specifically about your institution

Background

(Your institution's) mission and goals for this event

Who's here

Introduce collaborators, guest speakers, volunteer groups, and other educators and facilitators.

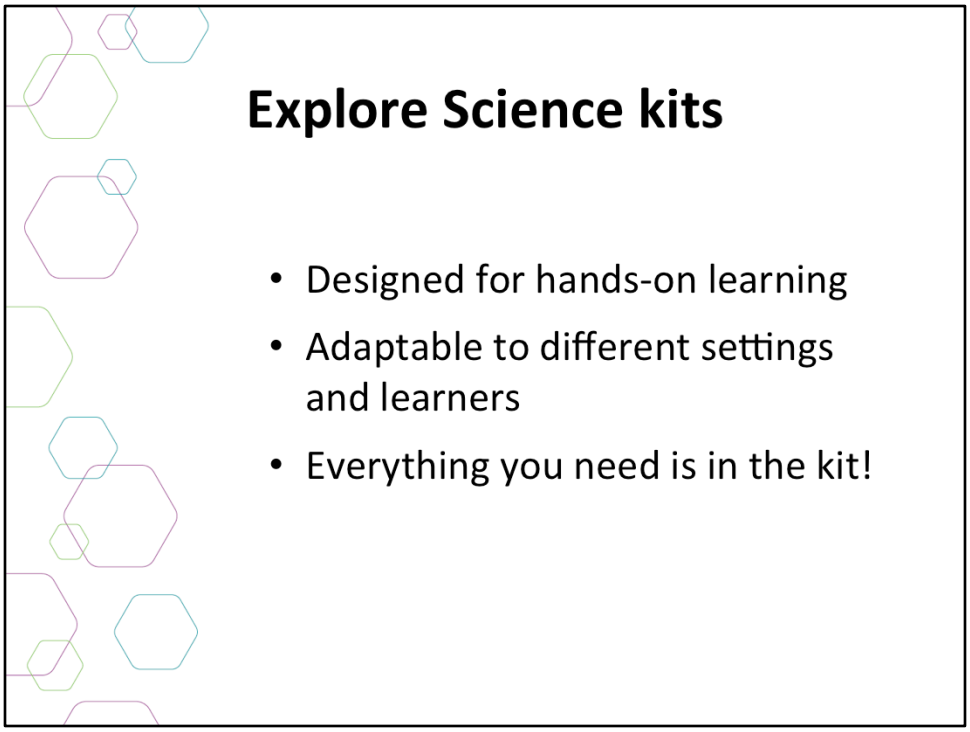
Orientation, Safety, and Policies

Where are restrooms, lunchrooms, and other places?
Where are the emergency exits?
Who should be contacted in case of emergency?
What do volunteers do if they have a problem? Who should be contacted?
Does your institution have procedures for fire alarms, lost children, and other emergencies?

Schedule

Highlight the schedule for the day.
Are there special presentations? If so, where will they be held and at what time?
When does the event begin and end?

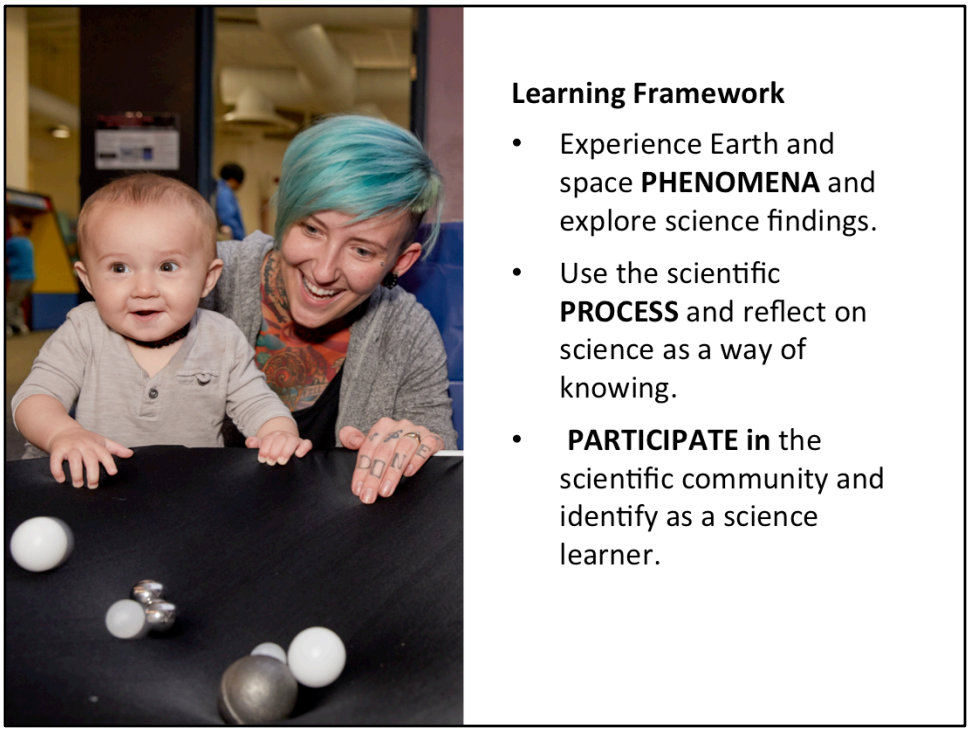
Now, we'll quickly review the Explore Science: Earth & Space Toolkit.



The Explore Science: Earth & Space toolkit materials have been designed to engage visitors in Earth and space phenomena, to help visitors reflect on science as a way of knowing, and to encourage them to identify as science learners.

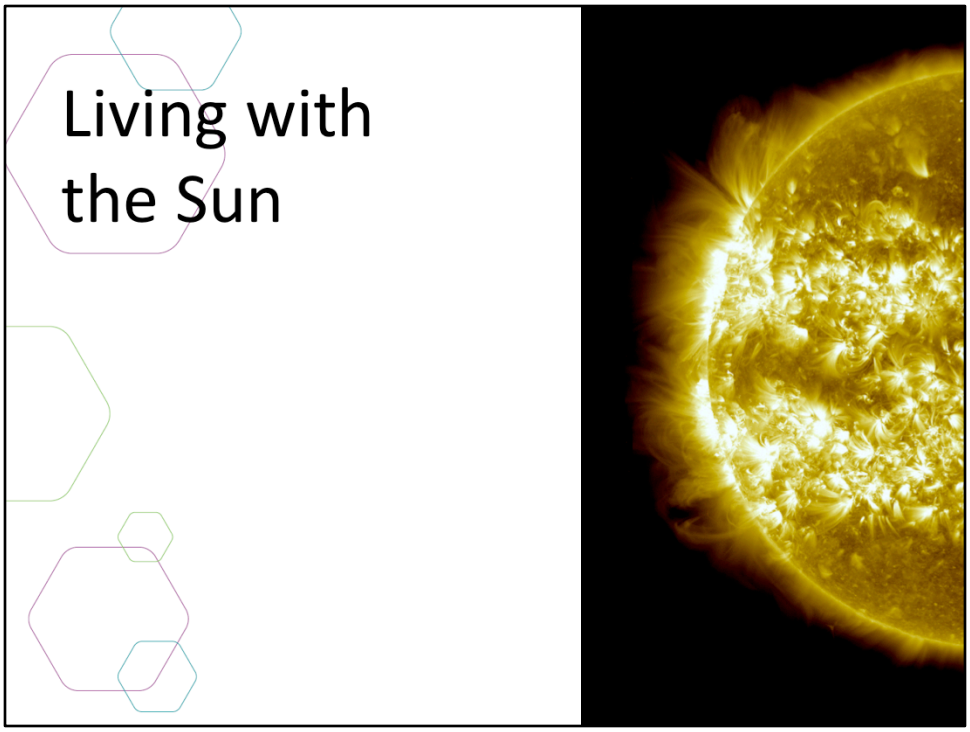
The toolkits focus on hands-on space and earth science activities. They are adaptable to different settings and different kinds of learners.

Each toolkit includes everything you need for all the activities, with supplies for about 100 people.



The Toolkit activities were developed around a learning framework that has three main parts: PHENOMENA, PROCESS, and PARTICIPATE.

- Experience Earth and space **PHENOMENA** and explore science findings.
- Use the scientific **PROCESS** and reflect on science as a way of knowing.
- **PARTICIPATE in** the scientific community and identify as a science learner.

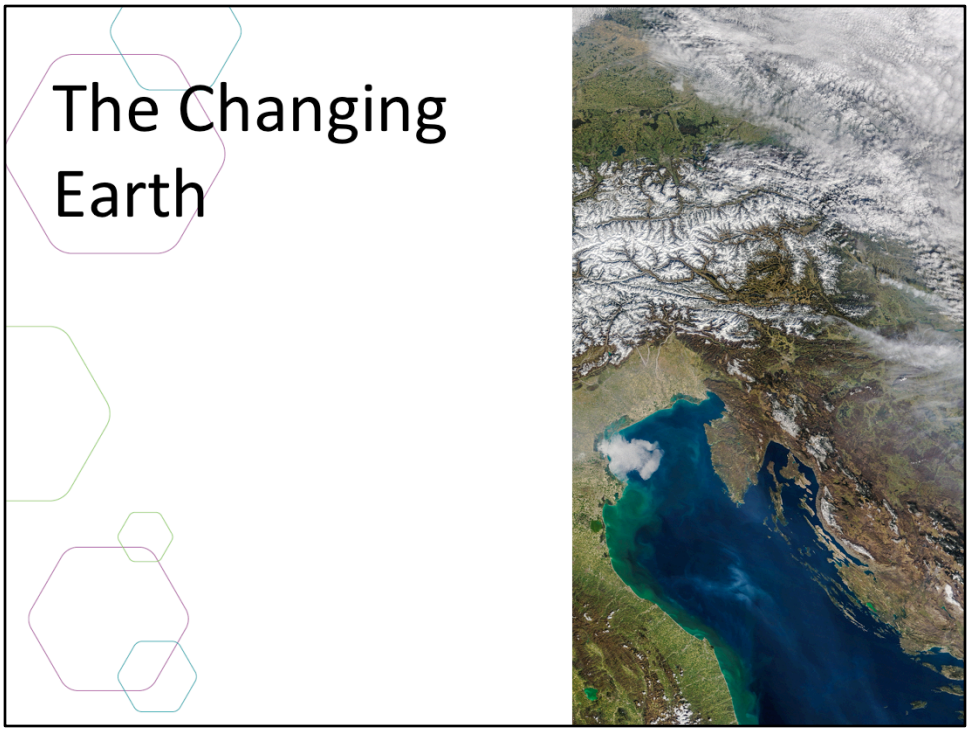


The toolkit also covers a range of content from NASA's Science Mission Directorate, including:

Living with the Sun

Some of the BIG questions NASA scientists are asking include:

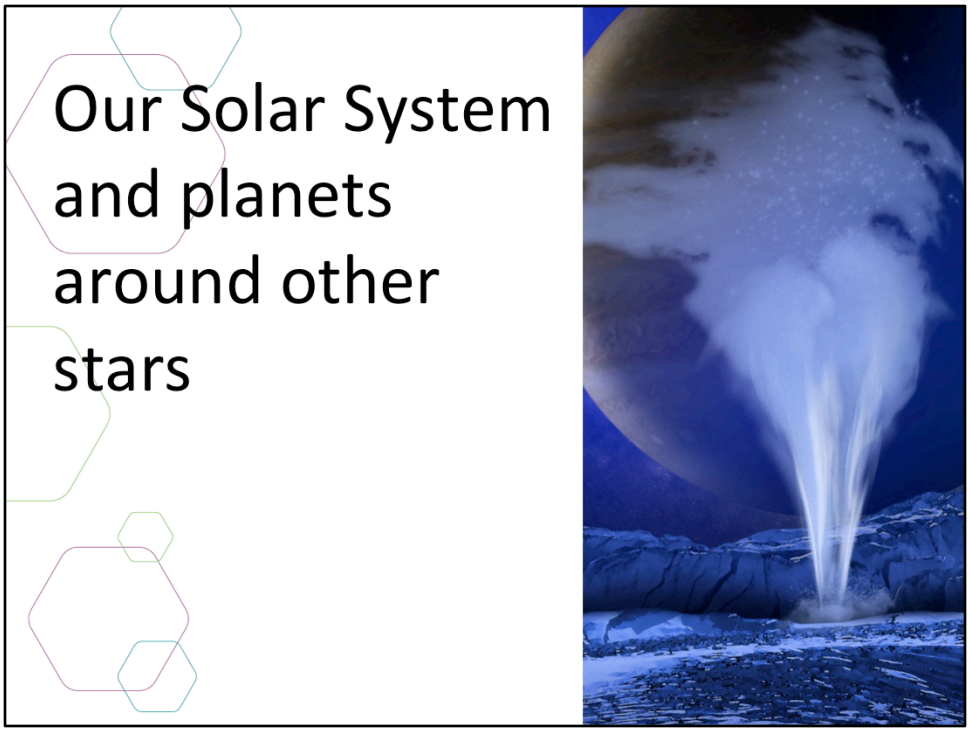
1. What causes the Sun to vary?
2. How do Earth and the solar system respond?
3. What are the impacts on humanity?



The Changing Earth

Some of the BIG questions NASA scientists are asking include:

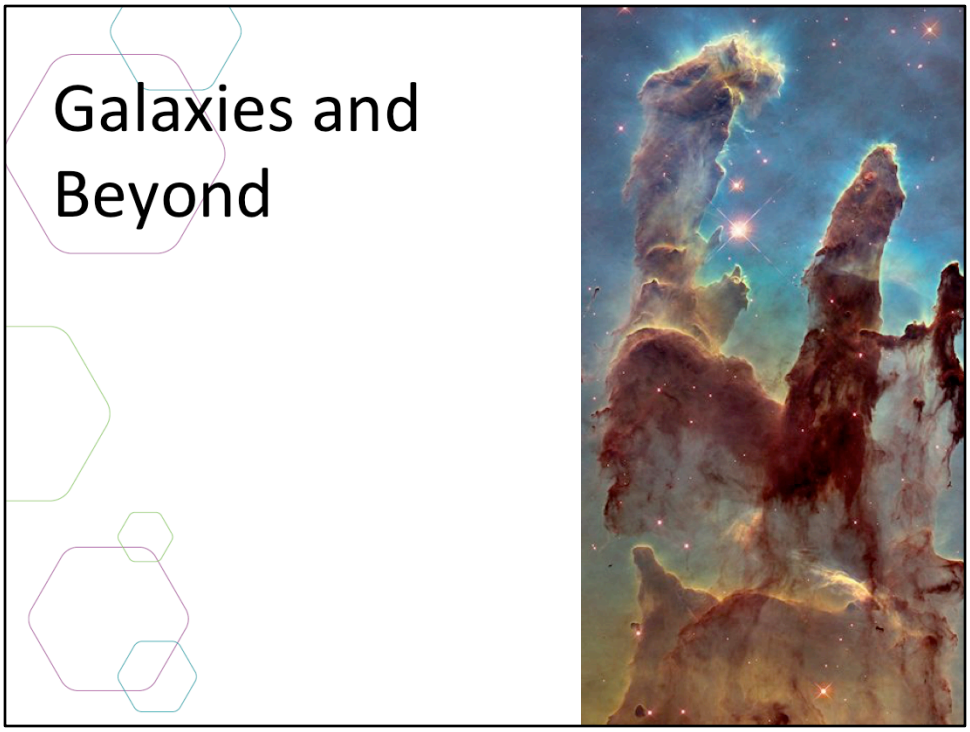
1. How is the Earth changing?
2. What cause changes on Earth?
3. How will the Earth change in the future?



Our Solar System and Planets around other Stars

Some of the BIG questions NASA scientists are asking include:

1. How did the solar system form and evolve?
2. Why did life evolve on Earth?
3. Could life exist elsewhere?



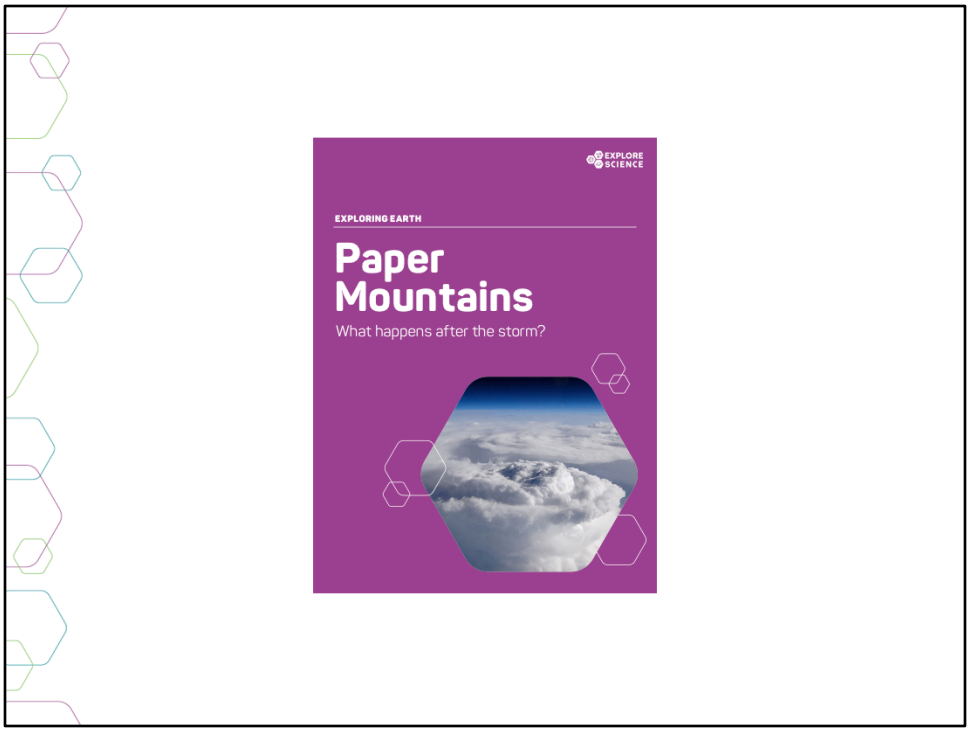
Galaxies and Beyond

Some of the BIG questions NASA scientists are asking include:

1. How does the universe work?
2. How did we get here?
3. Are we alone?

The Explore Science: Earth & Space toolkit includes 10 hands-on activities. Each activity comes in a box and includes all the physical materials you'll need plus the activity and facilitator guides and additional information sheets.

[The following slides include the activities from the Explore Science: Earth & Space 2018 toolkit. You may choose to augment your kit with additional activities from the 2017 toolkit or other educational resources. The 2017 digital toolkit is available for download: http://www.nisenet.org/earthspacekit-2017. The NISE Network has a curated list of programs, media, and professional development resources in the NASA Wavelength Digital Library that directly relate to the toolkits. These resources can be viewed and downloaded from nasawavelength.org/users/nisenet.]



The Paper Mountains activity helps participants **Explore Earth**.

The activity explores the following ideas:

- 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.

These activities are about **Exploring The Universe.**

The Pack a Space Telescope activity explores the following ideas:

- Engineers design, build, and test new technologies to study the universe.
- Careful planning and design help us make new discoveries and better understand Earth and space.
- NASA teams work together to launch, guide into orbit, and operate a space telescope.

The Exoplanet Transits activity explores the following ideas:

- Scientists are searching the universe for planets orbiting distant stars.
- When a planet, or other object, moves between its star and Earth, some light from that star gets blocked from view.
- The transit method is one of the ways NASA scientists search for distant planets.

The Objects in Motion activity explores the following ideas:

- Objects in the universe interact in complex but predictable ways.
- Stars, planets, moons, and other objects in space orbit around each other because of gravity.
- NASA scientists use what we know about the laws of physics to make new predictions and discoveries.

The other five activities help participants **Explore the Solar System**.

The Stomp Rockets activity explores the following ideas:

- 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 Magnetic Fields activity explores the following ideas:

- Scientists have observed active magnetic fields throughout the solar system.
- Earth has a strong, protective magnetic field.
- The Sun's magnetic field extends out into space and sends powerful bursts of magnetic energy into the solar system.

The Mars Rovers activity explores the following ideas:

- Teams of scientists and engineers use rovers and other robotic vehicles to explore distant worlds.
- Rover missions, like those to Mars, are carefully planned here on Earth
- NASA missions require large teams of people working together.

The other five activities help participants **Explore the Solar System**.

The Craters activity explores the following ideas:

- Studying the surface of a planet or moon can reveal its history and composition.
- Impact craters form when a meteorite collides with the surface of a moon or planet (or other body in space).
- Scientists use tools to find and observe craters and learn more about the geologic processes on planets, moons, asteroids, and other worlds.

The Hide and Seek Moon activity, specifically designed for early childhood, explores the following ideas:

- Tools help scientists study objects that are very far away.
- Binoculars make distant objects appear closer and brighter.
- NASA scientists use powerful telescopes to study objects in space.

Now, we'll review some tips for leading these activities with participants

We've just taken a very quick look at all 10 activities in the Explore Science: Earth & Space toolkit.

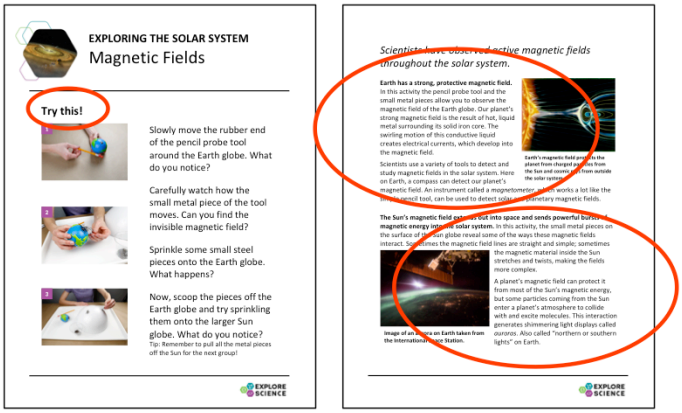
Here is an example of just one activity, Magnetic Fields. The image shows all the physical materials needed to do the activity.

Some of these materials are intended for the learners to use. These include the supplies they need to do the activity (like the Sun and Earth models, tray, and paperclips) and the colorful activity guide and sign, and any additional information sheets or other graphics. These things should all be out and accessible for learners.

It also includes some materials for you, the facilitator, to use. These include the more plain-looking facilitator guide with some notes about things like set-up and safety, and some tips to help you do a great job leading the activity, as well as any materials you'll need for advance preparation. These are just for you and are not meant to be shared with participants.

Finally, please note that there are both activity and content training videos for each activity, which you can watch to help you learn the activity before you do it with participants.

Activity instructions

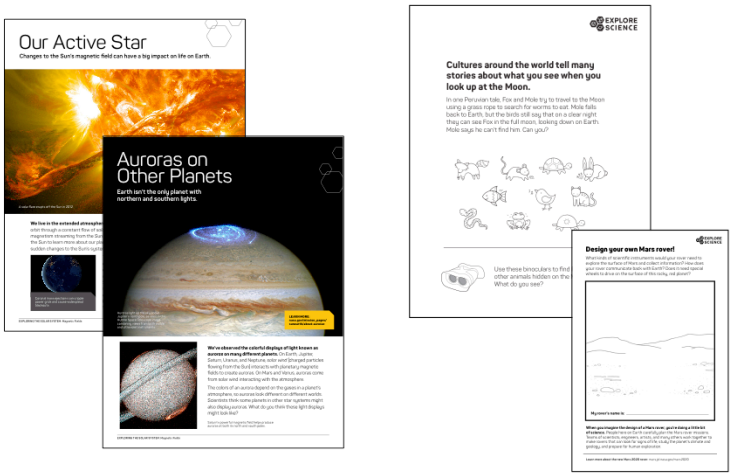


Now let's look at some of these materials a bit more closely. Here is an example of an activity guide, for the Magnetic Fields activity.

The activity guides are structured to help you lead learners through hands-on science activities.
The front side includes step-by-step instructions in the section called "Try this!"
The back side describes what learners observe—and explains why it happens. Finally, the guide relates the activity to current space or Earth related science or NASA research.
You can leave these guides out on the table both to help you explain the activity and so that learners can read them and look at the pictures.

(They're available in both English and Spanish versions.)

Info sheets and worksheets

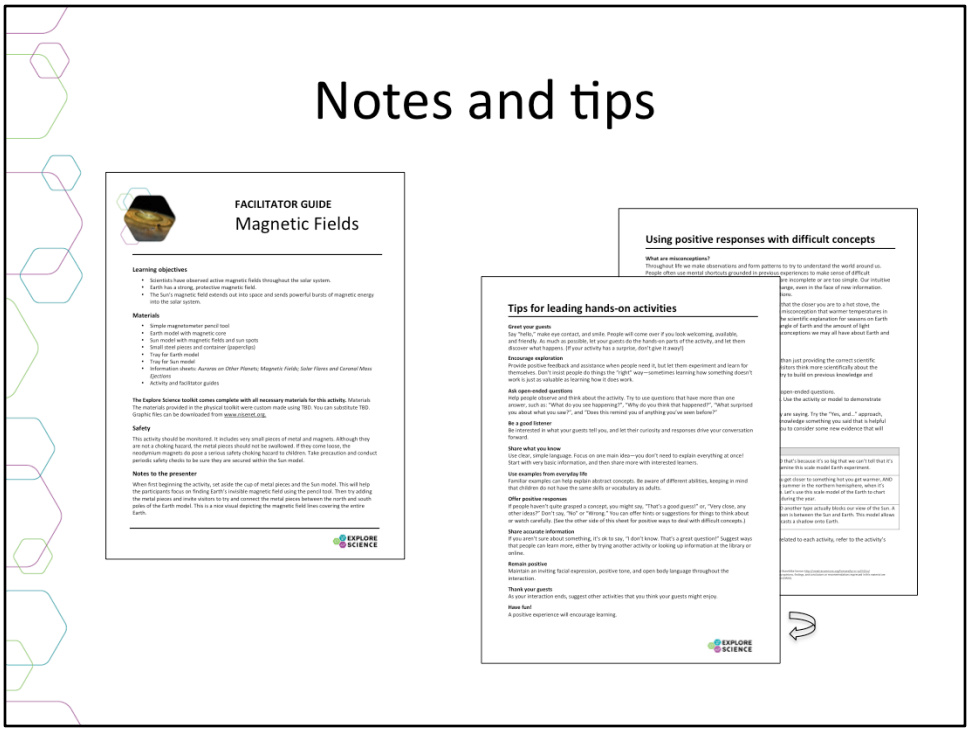


Many activities include additional information sheets or other graphic assets. Depending on your event or setting you may choose to use these more or less. They provide additional related content about the hands-on activity for participants and facilitators alike.

Each activity in the toolkit comes with an activity training video and a science content training: https://vimeopro.com/nisenet/explore-science-earth-space. Facilitators can watch these before the event (or even last minute online!)

[*This year, we have also included a set of training videos on* ***Strategies for Approaching Difficult Scientific Concepts*** *in space and Earth science. Part one describes various strategies you can use and provides an annotated example. Part two provides a scripted example of a visitor interaction and invites you to notice which strategies are employed. Watch this as a group and discuss what you see together.*

Part 1: https://vimeo.com/243358295
*Part 2: https://vimeo.com/243361942****]***



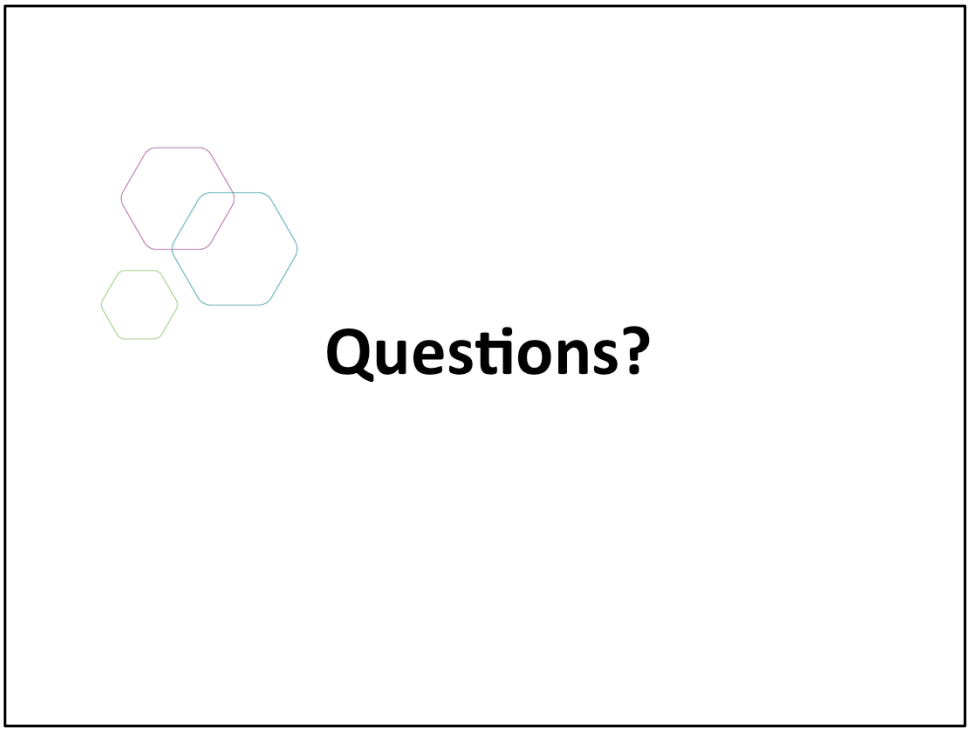
The facilitator guide is for you, the activity leader.

The first few pages list the learning objectives, activity materials, and includes important notes related to set-up, safety, presentation, difficult concepts and other aspects of the activity.

Additionally, each activity contains a useful reference sheet with tips about leading hands–on science activities and notes about how to talk to visitors about misconceptions and other difficult concepts.

Tips for leading hands-on activities include:

- Greet your guests
- Encourage exploration
- Ask open-ended questions
- Be a good listener
- Share what you know
- Offer positive responses
- Share accurate information
- Remain positive
- Thank your guests
- & HAVE FUN!



Questions?

Thank you

Space and Earth Informal STEM Education is supported by NASA under cooperative agreement number NNX16AC67A. 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).

Activity photos by Emily Maletz and Dave Burbank for the NISE Network. Activity materials screen capture by Museum of Life and Science. Living with the Sun image: composite image of 25 separate images of the Sun from the Solar Dynamics Observatory (SDO) spanning the period of April 16, 2012, to April 15, 2013, courtesy NASA Goddard Space Flight Center/SDO/AIA/S. Wiessinger. The Changing Earth image: Late winter storms dropped a fresh coating of snow across the Alps in mid-March 2016, courtesy NASA image by Jeff Schmaltz, LANCE/EOSDIS Rapid Response. Our Solar System and Planets Around Other Stars image: Artistic concept of water plumes on Jupiter's moon Europa courtesy NASA/ESA/K. Retherford/SWRI. Galaxies and Beyond image: Eagle Nebula's "Pillars of Creation" courtesy NASA.

THANK YOU!