FAMILY & Community Learning

FACILITATOR GUIDE

READY JET GO!™



A multi-generation engagement program designed to activate creative and collaborative learning using PBS KIDS media and resources.



Powered by a Ready To Learn Grant

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What is PBS KIDS Family and Community Learning with READY JET GO!?



PBS KIDS Family and Community Learning (FCL) with READY JET GO! is a series of sessions that engage families in active, hands-on learning experiences. Designed for families with kids ages 5-8 (and younger/older siblings), the sessions use creative play and exploration to introduce kids and grown-ups to digital and hands-on tools to spark interest in science and engineering and develop Science Inquiry and Engineering Design practices and mindsets. Through child-centered activities and experiences, the sessions aim to foster collaboration, communication and problem-solving skills among family members.

Why is PBS KIDS Family and Community Learning important?

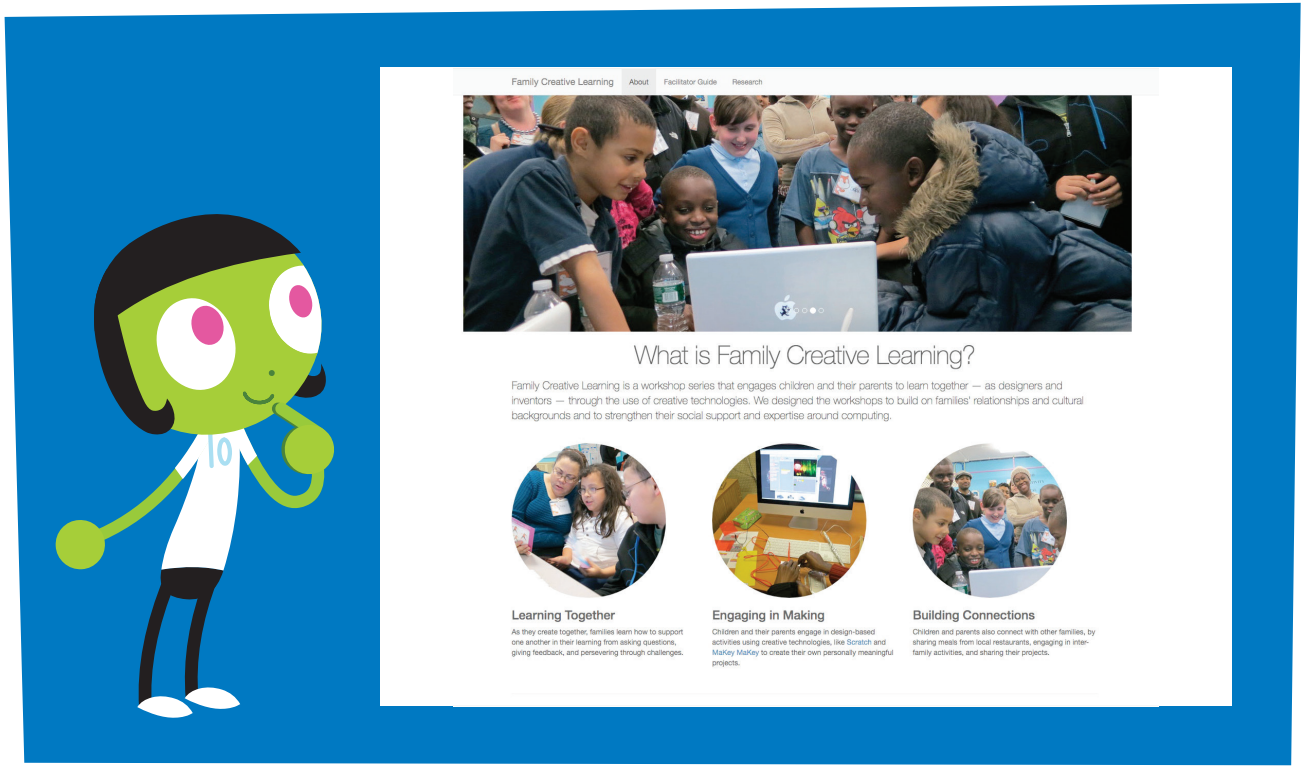
Children are innately curious and creative and want to make sense of the world around them. Early STEM (Science, Technology, Engineering and Math) education should be a direct extension of that curiosity, exploration and creativity. It should champion active engagement, giving kids the opportunity to take the initiative for their own learning, ask questions, make observations, investigate, express themselves and share their ideas as they grow and learn. The grown-ups in kids' lives have an important supporting role to play in the development of these skills and practices. With that said, it can be difficult for some adults to imagine young children engaging in STEM subjects. Some may assume these subjects can wait for school when children are older. Adults' own experiences of school STEM might not have been positive because of the way the subjects were taught.



PBS KIDS Family and Community Learning is a way to demystify early STEM as families engage in fun, creative and interest-driven learning. As families explore and learn together, facilitators support the experience by modeling, discussing and pointing out science concepts and inquiry skills being used while providing experiences, tools and strategies that grown-ups can use to support their children's learning, in this Family and Community Learning experience and beyond.

Where did PBS KIDS Family and Community Learning come from?

The FCL program has been designed and developed as an integral component of the 2015-2020 Corporation for Public Broadcasting (CPB) and Public Broadcasting Service (PBS) Ready To Learn (RTL) Initiative for implementation by local public media stations and their community partners. The model was inspired and built upon the Family Creative Learning work led by Ricarose Roque at the MIT Media Lab. Ricarose's work explores ways to engage families in multi-generational content creation and invention utilizing media and technology. To learn more about the original Family Creative Learning work, please visit [http://family.media.mit.edu/.](http://family.media.mit.edu/)



About this Guide

What is it?

This guide is a self-contained curriculum for a family learning program inspired by READY JET GO! It includes instructions to lead a hands-on, child-centered series of four two-hour workshops for families with young children around the theme of Earth and space science. This guide provides clear implementation guidelines and suggests language to support your background knowledge of Earth and space science. This guide also provides facilitation and implementation tips. Each session begins with a facilitator checklist of all the necessary materials, as well as links for PBS KIDS content and media to support each topic.

ACTIVITY	MATERIALS
Eat Have food and paper goods set out and tables ready with tablecloths for when families arrive. Have materials organized and ready for families to easily pick up upon entering.	❑ Family Space Journals ❑ name tags ❑ sign-in sheet and pens ❑ pencils ❑ table tent for session 1 ❑ tablecloth (reusable, if possible) ❑ paper goods (made from recycled materials when possible): napkins, plates, utensils, cups ❑ aluminum foil ❑ trash bags, trash can
Explore Have a computer and projector set up and ready to show the video to the group. If available, make sure tablets have the Space Scouts app downloaded.	❑ READY JET GO! video clip from episode **Mindy Turns 5, Part 2** ❑ tablets ❑ paper ❑ colored pencils, markers, crayons



Who is it for?

This guide is for any individual or organization interested in leading a hands-on, educational workshop or series of workshops for families with young children. FCL has been a popular model across the country with public media stations and their partners, libraries, community centers, schools and education-focused nonprofits.

While this guide provides step-by-step instructions and suggested language, we understand that every community and facilitation team is different, so we encourage you to remix, adapt and adjust aspects of this guide to meet the needs of your community. Use this guide for both planning and reflection. Let it serve as an artifact of your own learning and influence future iterations of FCL and other family engagement efforts.

The guide is licensed under a Creative Commons Attribution – ShareAlike 4.0 International License and we encourage you to work with other stakeholders within your community (including participating families) to adapt the experience and to make it your own.

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Facilitator Role



You as the facilitator play an important role in helping parents and children engage in the workshops. Your role has two main goals:

1) create and support safe and comfortable social learning environments where people participate freely, and

2) deliver information in a clear way as you use your facilitation skills to meet the workshop objectives.

What is a social learning environment?

Albert Bandura, the psychologist who developed the Social Learning Theory, stated,

> "Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions, this coded information serves as a guide for action."

The Social Learning Theory framework is an evidence-based model for group learning which allows individuals to learn from one another through modeling, behavioral rehearsal and group sharing.

Social learning is a critical component of Family and Community Learning with READY JET GO! The curriculum for this FCL was developed to include modeling, group sharing and reflection sessions to make the workshops effective. The READY JET GO! FCL is highly participatory, where mutual support by parents will help build participants' confidence around Earth and space science. Families will practice Earth and space science together through a social learning environment that is applicable to their own lives and transferable to learning experiences outside of the workshop setting.

The facilitator role: The social learning environment

- To create an environment that supports social learning, as the facilitator you want to encourage participation, not only in the workshops but at home as well. Throughout the workshops, encourage families to use the tools and learned strategies from the FCL at home. One way to help promote family engagement in the home is by encouraging families to commit to the take-home projects that are included in the FCL guide at the end of each session. Invite families to showcase their projects each week to celebrate their family engagement in the home.

- Workshops include reflection sessions during the Share portion of each session, so families can review what they have learned and reflect on how to continue implementing tools and strategies at home. Encourage families to discuss best practices, identify ways to overcome challenges and provide support to one another. It is important to encourage parents to share their experiences and ideas with one another. Their thoughts and input are all valuable. As a facilitator, your goal is to provide a safe and comfortable space for everyone to participate.

- Tips for conducting the reflection sessions:

  - This social learning environment allows parents to engage in active learning with other parents. Encourage families to use the reflection section as a tool to record what strategies they have learned and would like to "borrow" from other parents.

  - Starting in session 2, you can ask parents if anyone was able to try last week's take-home activity. Use focused questions to learn more detail about the experience. Be mindful that parents will have different comfort levels with speaking in a group, sharing experiences and talking about the take-home projects. You might begin by asking for a parent volunteer who had a positive experience with the take-home project. Hearing the positive attempts may encourage others to try, and it will set the tone for the group and for parent engagement at home. But you can also ask parents to share "unsuccessful" attempts, reinforcing the fact that all attempts are an important part of STEM learning.

- If you will be working with families whose home language is a language other than English, talk to your organization about strategies to support them. And talk with the families themselves about their wants and needs.

The facilitator role: Information delivery

1) Encourage parents to share and collaborate and learn from one another. Try to keep conversations flowing so no one dominates (not even you!). You want all families to bring and share their opinions, thoughts and ideas.

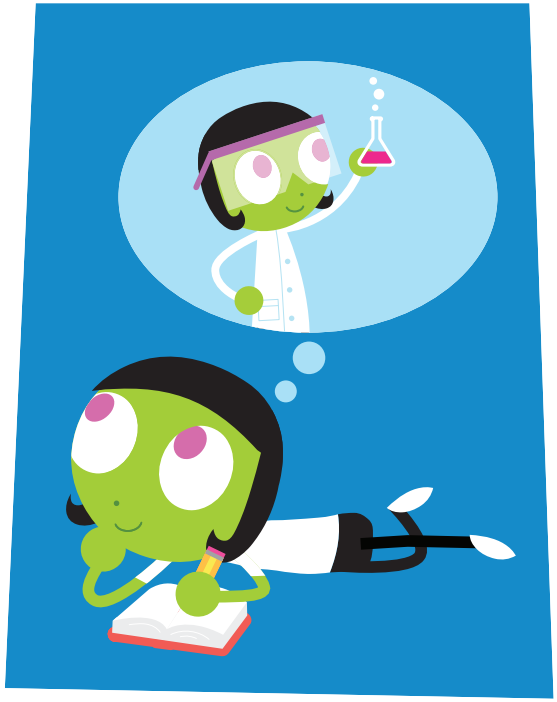
2) Be sure the information you are delivering is clear. Check in with parents often to see that concepts are being understood. This guide provides sample language in blue text that you can use to help make the concepts clear.

3) Use positive reinforcement to support families' ideas. For example, walk around the room to engage parents and validate their comments.

4) Prepare to navigate challenging situations such as when:
   - A parent tries to divert the conversation or spends time on a tangent.
     - "In order to get through all the exciting things/everything we have planned for today, we need to keep going…"
     - "Perhaps we can come back to this topic at the end or see me after the workshop..."
     - "In the interest of time, we must keep going…"
     - "I appreciate how excited you are to share with us. Thank you! Let's see if anyone else has something to add."
   - Parents are hesitant to participate.
     - "How might you adapt this to work for you?"
     - "From this activity, what looks like the most interesting part for you to do at home?"
   - Parents might feel that they are not doing enough.
     - "Sometimes we feel we should be doing so much more. Remember that even smalladditions to your routine at home can make a big difference!"

Learning Goals

PBS KIDS Family and Community Learning is a way to introduce and explore STEM concepts as families engage in a fun, creative and interest-driven learning environment. As families explore, create and learn together, they will begin to develop new skills, habits and perspectives that will serve them as they continue to grow and support one another as lifelong learners.



Here are the specific learning goals for each participant group:

Children

- Positively influence children's perceptions and understanding of science, technology and engineering as well as their perceptions of themselves as scientists, engineers and learners
- Increase children's exposure to and engagement with developmentally appropriate Science Inquiry and Engineering Design practices

Grown-ups (parents and other caregivers)

- Positively influence grown-ups' perceptions and understanding of Science Inquiry, Engineering Design, creativity, technology and literacy, as well as their perceptions of themselves and their children as scientists, engineers and learners
- Build capacity for grown-ups to support their children's STEM learning by providing them with strategies, skills, vocabulary and experiences that can easily be transferred beyond the sessions and into the home and community
- Positively influence grown-ups' understanding of how media and technology can be used to support learning

Facilitators

- Build capacity for facilitators to support the learning of both grown-ups and kids through the use of PBS KIDS resources, tools and face-to-face experiences

Public media stations and partners

- Build capacity for public media stations and partners to support educators, families and kids within their communities
- Strengthen the relationships between stations or partners and the communities they serve



Courtesy of Louisiana Public Broadcasting

Science and Engineering Practices and Processes

Drawn from the PBS KIDS Learning Framework, each lesson in this facilitator guide taps into a number of Science and Engineering Practices. These practices are integral to children's development of the skills, thinking and language of Scientific Inquiry and Engineering Design. By engaging in these practices while immersed in meaningful and relevant science content, like the Earth and space science concepts of READY JET GO!, children better learn how to explore and investigate in science and they deepen their understandings. For engineering, the practices focus on identifying real-world problems and designing solutions to the problem. These practices engage children in observing, comparing and contrasting, identifying patterns, measuring, predicting, checking, recording and reporting.



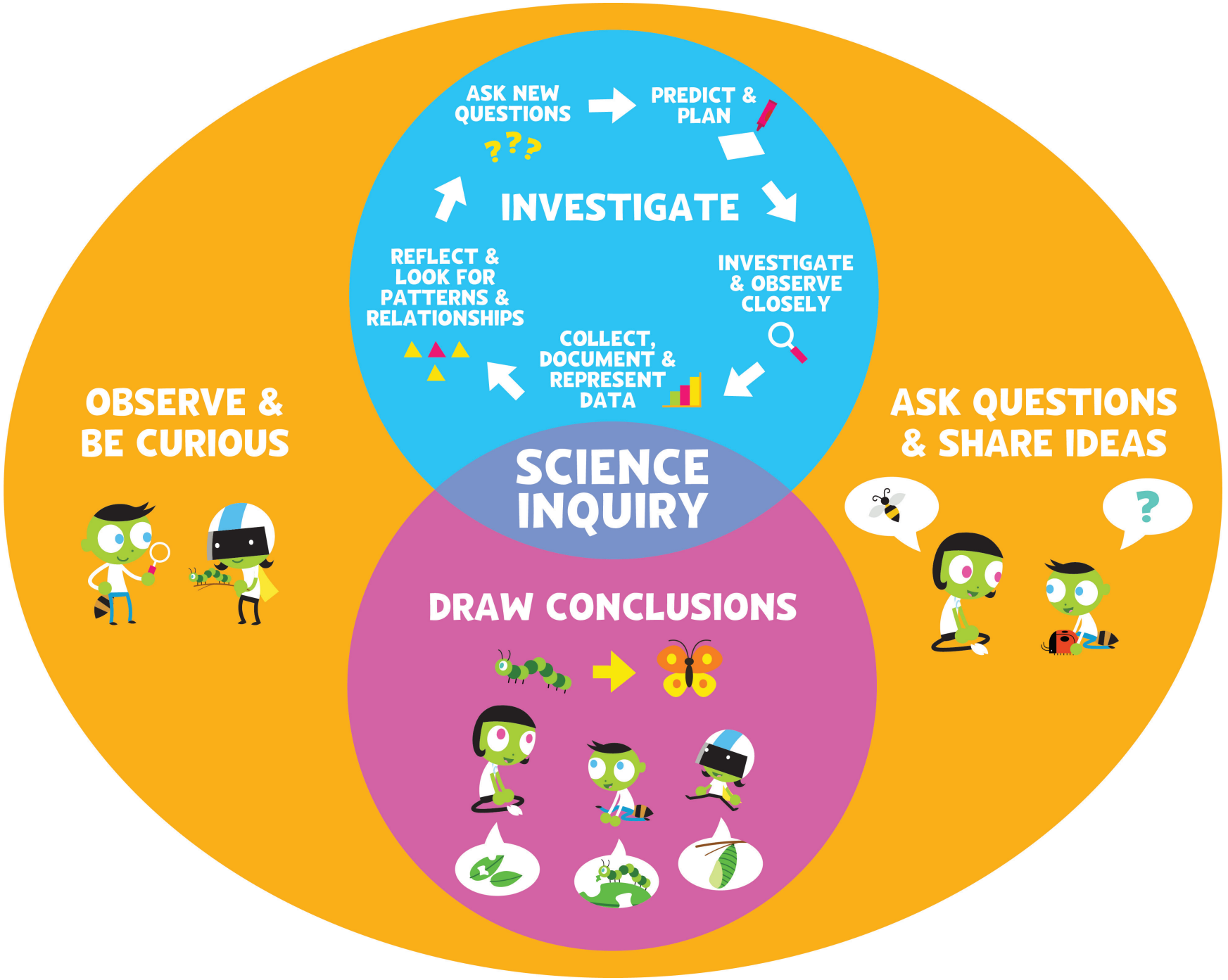
Though all children can engage in these practices, the way in which they approach them and the depth in which they can participate in each varies with age and experience. Younger children are likely to ask simpler questions, build simpler models and provide less abstract and detailed explanations than older children. It is also important to remember that children may engage in these practices in different ways at different times. There is no one "scientific method" but rather multiple entry points and ways in which to engage in the inquiry and design processes. Children might observe something in their everyday environment and ask a question which leads to an investigation. Or they may be looking at and evaluating a peer's investigative data which may lead them to a new related question and investigation. No matter what draws them in, a critical part of the process is when children collect evidence and record observations and data, describe and reflect on the observations/data and draw conclusions about the collected evidence.

Science Inquiry

When kids engage in Science Inquiry, they activate many science practices often at the same time. This is not a linear, step-by-step process like tying your shoes so children can enter into the process at different points. The Science Inquiry process is about asking questions, making observations, making predictions, planning and carrying out investigations, collecting and analyzing data, and based on the evidence collected, constructing and sharing explanations, and determining if those explanations need to be rethought and tested again.

Science Inquiry often begins with **observing or noticing**. One thing ALL scientists do, is they notice and make lots of observations. They **use their five senses** to notice and learn about the objects, materials and events in the world around them. Every experience children have can create opportunities **to wonder and ask questions about the world around them, investigate, and make connections** to what they already know, experiences they've had and resources that can support their learning.




ASK NEW QUESTIONS
PREDICT & PLAN
INVESTIGATE
INVESTIGATE & OBSERVE CLOSELY
COLLECT, DOCUMENT & REPRESENT DATA
REFLECT & LOOK FOR PATTERNS & RELATIONSHIPS
SCIENCE INQUIRY
OBSERVE & BE CURIOUS
ASK QUESTIONS & SHARE IDEAS
DRAW CONCLUSIONS

Engineering Design Process

Children are natural engineers. Their early design and building skills can be seen in their play as they use simple tools and a variety of materials to create and build creations ranging from block towers to sand castles. Children use simple tools and technology every day when they use a pencil to write, a spoon to eat and a computer to gain and share information.

The PBS KIDS Science Learning Framework demonstrates that as children learn more about the world and can identify simple problems to solve, they can start to engage in the Engineering Design Process. This iterative process involves defining a problem or need, imagining, planning, creating and testing solutions to the problem, and working to improve upon the designed solution.

Collaboration and communication are integral to this process. New or improved tools and technologies are the result of this process, and children at all ages can and should be using a variety of both high- and low-tech tools and technologies when engaged in scientific investigations and Engineering Design.

- **DEFINE A PROBLEM:** The first step in the ED process is to define a simple problem that can be solved through the design of a new or improved tool or technology. **Asking questions, making observations and gathering information are helpful in thinking about problems, and it's important to clearly understand the problem before beginning to design a solution.**
- **IMAGINE AND PLAN:** There is rarely one right answer or one way to solve a problem, which is why it's so important for children to be creative problem solvers. With lots of possible ways to go about creating or building a project, it's important to think about possible solutions and create a plan to provide guidance for the team before everyone starts designing a new or improved product or tool. **Designs can be conveyed through sketches, drawings or physical models in order to share ideas for a problem's solutions with other people.**
- **CREATE:** This is the step where you get to put a plan into action. Help students follow it to build and create a new or improved product or tool.
- **TEST AND IMPROVE:** Because there is always more than one possible solution to a problem, it's useful to compare and test designs. Testing the design as you go is important for identifying what works and what doesn't work and figuring out how it might work better.
- **COMMUNICATE:** Engineering is a collaborative process in which ideas can be exchanged and shared with others while defining a problem and working to design, test and revise a solution.

Crosscutting Concepts

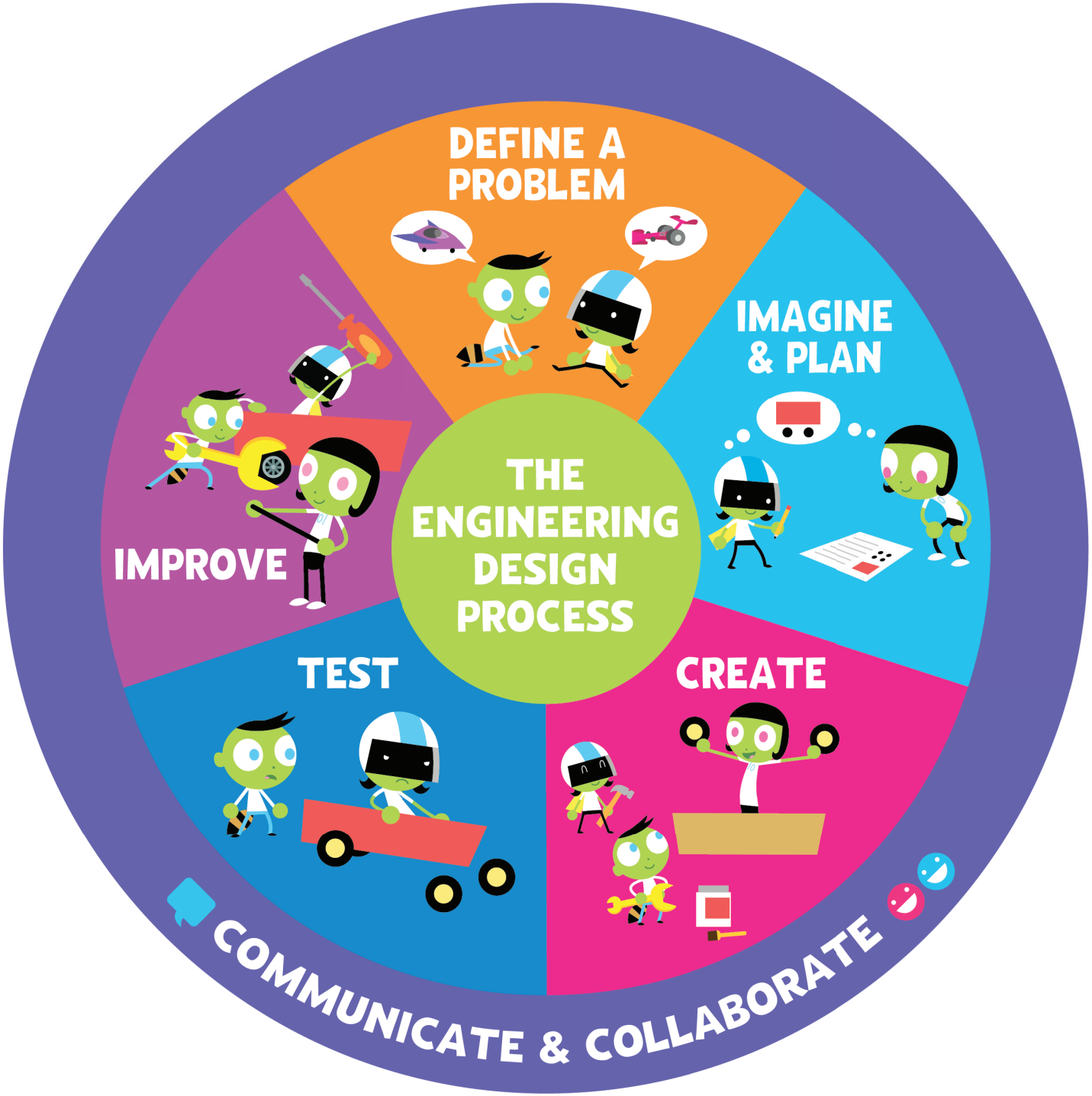
Crosscutting concepts are themes that emerge across all domains of science, including Earth and space science, as well as in other subject areas including literacy, math and social studies. With READY JET GO!, crosscutting concepts that are most appropriate for the target ages 5 to 8, include, but are not limited to:

- cause and effect
- structure and function
- proportion and quantity
- the movement of the Sun and Moon
- rainstorms washing away soil
- using earth materials to make specific structures

Introduce embedded concepts to help guide children as they connect ideas across the science domains and better understand the core ideas of science and engineering. The READY JET GO! Family and Community Learning workshop series provides authentic learning experiences that highlight the language of and ideas behind each concept.



Courtesy of Louisiana Public Broadcasting


DEFINE A PROBLEM
IMAGINE & PLAN
CREATE
TEST
IMPROVE
THE ENGINEERING DESIGN PROCESS
COMMUNICATE & COLLABORATE

About READY JET GO! Episodes & Space Scouts App

What is READY JET GO!?



READY JET GO! is a PBS KIDS animated media property designed to help kids 5 to 8 learn about space, Earth science and technology. The show follows an alien boy named Jet Propulsion who shares children's natural sense of wonder and curiosity about space as he goes on adventures with his friends to explore and learn more about space and planet Earth. The series, which airs weekdays on PBS KIDS, is also available anytime online and through the free PBS KIDS video app. Episodes, online games and more can be found online at pbskids.org/readyjetgo.

What is the READY JET GO! Space Scouts app?



READY JET GO! Space Scouts is designed for children ages 5 to 8. Players participate in Space Scout games to earn badges and learn about what it takes to become a Space Scout. The app contains five games that foster scientific and engineering skills as well as an open play "lab" for children to use their imagination to make their own creations; it features play areas across several planets.

Specific Apps and Games Mentioned in this Guide

Base Builder (part of the Space Scouts app)



When exploring new places and planets, a good shelter is critical. Space Scouts learn that because each planet's environment is unique, they need to build structures to protect astronauts from a variety of environmental hazards and challenges—like earthquakes on Earth, dust storms on Mars and asteroids in the asteroid belt! Players define the problem then design solutions using just the tools and materials provided. They test their designs and evaluate how well their designs work, making improvements as needed. Through this game, players also explore how people depend on different technologies and that life would be very different without them!

Jet's Rocket Ship Creator (online game)



Jet guides players as they create a rocket ship that travels to various destinations in space. Players discover the effects of different energy and propulsion types. They explore forces and motion by controlling the direction and strength of the rocket propulsion system. Through this game, players go through the Engineering Design Process to create, test and improve their rocket ships. The game can be found at https://pbskids.org/readyjetgo/games/jets-rocket-ship-creator.

Rover Maker (part of the Space Scouts app)

Rover Maker challenges players to create a variety of rovers to handle a series of challenging terrains and environmental conditions. Each challenge requires the player to modify the rover, using different energy sources, wheels and custom-built chassis to cross new terrain. Players test rovers over a variety of courses hosted on Earth, the Moon, Mars and Europa, where differences in terrain, sunlight and weather offer unique challenges. Players solve problems by focusing on Engineering Design Process steps: ask questions, imagine, plan, create, test and improve.



Mission Earth (online game)

Mindy and Sunspot are on a mission! With the help of friends, Mindy and Sunspot observe and take photographs of special things on planet Earth to send to Bortron 7. Players learn to use their senses and scientific tools to make and record observations. They learn about specific features of Earth's environment including its weather, different types of water, landforms, adaptations of living things to their environments, and the ways that animals, plants and their habitats are connected to each other. The game can be found at https://pbskids.org/readyjetgo/games/mission-earth.



The Session Structure

Each two-hour session is divided into four equally important parts: **Eat, Explore, Make** and **Share**. Each session is designed to match the needs and build on the strengths of young learners.

EAT

Sharing a communal meal is an opportunity for families to connect with one another. Building a community and creating a comfortable, safe and warm atmosphere is a vital component of the sessions. This can be an open time where families share thoughts about the Science Inquiry and Engineering Design Process or talk about take-home activities or other learnings at home.

Sean's TIP



Consider finding ways to get food donated by local food vendors and creating in-kind partnerships.

Providing the meal makes it more feasible for families to attend together. When possible, ask families about their favorite local food options. Be sure to ask about food allergies and other dietary restrictions during recruitment.

EXPLORE

In each session, families engage in hands-on explorations and discussions tied to the day's themes and goals. We recommend separate groups for grown-ups and kids to promote age-appropriate discussions of the topics. This exercise further supports the development of inter-family connections. Next, families regroup and collaborate with other families to engage with the tools and resources designed to support collaborative guided play and learning.

MAKE

At each session, families work together, engaging in the engineering process to design a new or improved solution to a problem. They engage in a hands-on project that explores Earth and space science and develop science and Engineering Design practices. These low-cost activities are easy to replicate at home.

SHARE

Sharing is a vital part of the experience. Families can learn a lot from one another and the facilitation team as they share their experiences, ask questions, provide feedback to one another and reflect on their experiences. This sharing helps them make connections, inspires new ideas and helps build confidence among participants.

Session At-A-Glance

	Eat	Explore	Make	Share
Session 1	• **GREET** • **INTRODUCE**	• **GATHER** Parents and children separate • **WATCH** **Clip:** Mindy Turns 5 Part 2 (2:45 mins.) • **DIGITAL PLAY** **Space Scouts App:** Base Builder	• **ACTIVITY** Spacesuit Designer	• **FAMILY SPACE JOURNAL** • **PREVIEW EXTENSION MATERIALS** **Activity:** Paper astronaut helmet **Book:** *A Big Mooncake for Little Star*
Session 2	• **GREET** • **REVIEW AND PREVIEW**	• **GATHER** Parents and children separate • **WATCH** **Clip:** Lone Star 2: Rocket Kids! (2:10 mins.) • **DIGITAL PLAY** **Online game:** Jet's Rocket Ship Creator	• **ACTIVITY** Rocket Launcher	• **FAMILY SPACE JOURNAL** • **PREVIEW EXTENSION MATERIALS** **Activity:** Paper straw rockets **Book:** *If You Decide to Go to the Moon*
Session 3	• **GREET** • **REVIEW AND PREVIEW**	• **GATHER** Parents and children separate • **WATCH** **Clip:** Try and Try Again (5:00 mins.) • **DIGITAL PLAY** **Space Scouts App:** Rover Maker	• **ACTIVITY** Rover Engineer	• **FAMILY SPACE JOURNAL** • **PREVIEW EXTENSION MATERIALS** **Activity:** Create a Map **Book:** *Be a Maker*
Session 4	• **GREET** • **REVIEW AND PREVIEW**	• **GATHER** All together • **WATCH** **Clip:** Who Messed Up the Tree House? (2:10 mins.) • **DIGITAL PLAY** **Online game:** Mission Earth	• **ACTIVITY** Planet Earth Protector	• **FAMILY SPACE JOURNAL** **Book:** *One Plastic Bag: Isatou Ceesay and the Recycling Women of the Gambia* • **GRADUATION**

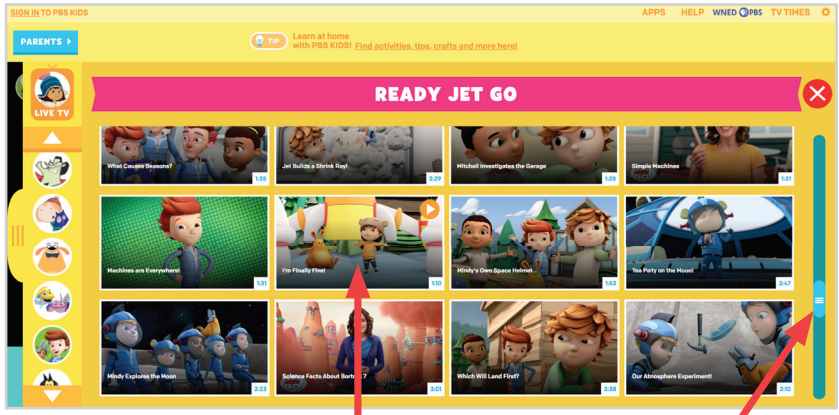
How to Find a Clip

pbskids.org



Click on READY JET GO!

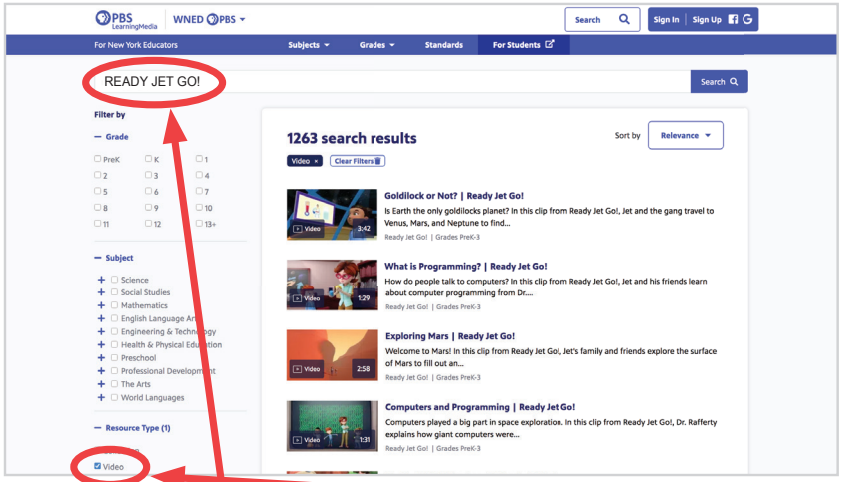
Then click on the tab



Select the episode

Scroll to search

pbslearningmedia.org



Type READY JET GO! in the search bar

Then click on “Video” in the Resource Type section

Session 1: What is Space?



Introduction from Jet

"Hello, facilitators! This is Jet Propulsion speaking. I am looking for brave families ready to explore the furthest reaches of our solar system with me and my friends. These families will need a guide to lead them on their adventure and support them as they gain new STEM experiences. That's where you come in! This guide contains everything you need to get families started on their first space adventure.

"Families will design a spacesuit that will keep an astronaut safe in space. Prepare the session materials, read the session guide and the tips from me and my friends thoroughly, then help families have fun learning! READY JET GO!"



Today's Big Idea

What is space and what problems do we need to solve to protect astronauts who travel into space? While parents get to know each other, children will explore and talk about what makes space different from Earth. Then, families will work together to build a spacesuit that will keep an astronaut safe in space.

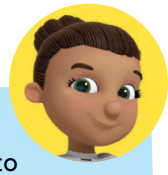
Session Learning Goals

- ❑ Investigate how people change their environments to meet their needs
- ❑ Observe and test different materials to determine which are best suited for an intended purpose
- ❑ Identify a problem and design and create a device that provides a solution to that problem (Engineering Design Process)

Getting Ready for the Day

Effective facilitators make their work look effortless and natural but prepare in advance to be successful! Make sure to read through this Materials and Preparation table at least a week in advance to allow time to collect or purchase supplies.

Sydney's TIP



Consider taking photos to capture exciting moments during sessions to present in a final day slideshow. Be sure to get caregiver's permission to photograph.

Materials and Preparation

Be sure to gather supplies in advance so you have time to organize and prepare the materials as described in the chart below.

ACTIVITY	MATERIALS
Eat Have food and paper goods set out and tables ready with tablecloths for when families arrive. Have materials organized and ready for families to easily pick up upon entering.	❑ Family Space Journals ❑ name tags ❑ sign-in sheet and pens ❑ pencils ❑ table tent for session 1 ❑ tablecloth (reusable, if possible) ❑ paper goods (made from recycled materials when possible): napkins, plates, utensils, cups ❑ aluminum foil ❑ trash bags, trash can
Explore Have a computer and projector set up and ready to show the video to the group. If available, make sure tablets have the Space Scouts app downloaded.	❑ READY JET GO! video clip from episode **Mindy Turns 5, Part 2** ❑ tablets ❑ paper ❑ colored pencils, markers, crayons

ACTIVITY	MATERIALS
Make Prepare workstations for Engineering Design activity.	❑ Family Space Journals ❑ pencils ❑ 1 stuffed animal per group ❑ various materials for spacesuit cut in easy-to-use portions, if necessary (e.g., bubble wrap, cellophane, aluminum foil, fabric) ❑ materials for spacesuit features (e.g., paper tubes, pipe cleaners, construction paper) ❑ tape, glue or faster drying alternative to glue such as Velcro® glue dots or poster putty, scissors ❑ Spacesuit Designer stickers ❑ recycled materials such as paper towel tubes, plastic cups, cereal boxes
Share Have take-home materials organized and ready for pickup.	❑ Family Space Journals ❑ pencils ❑ take-home handout ❑ take-home materials (e.g., recommended book)

RECOMMENDED BOOK TO SEND HOME WITH FAMILIES:	OTHER GREAT BOOKS ON TODAY'S THEME:
A Big Mooncake for Little Star by Grace Lin (Grade level: PreK-3)	❑ *Max Goes to the Moon* by Jeffrey Bennett (Grade level: 2-4) ❑ *The Star People: A Lakota Story* by S.D. Nelson (Grade level: PreK-3) ❑ *Sadiq and the Desert Star* by Siman Nuurali (Grade level: 1-3) ❑ *Path to the Stars: My Journey from Girl Scout to Rocket Scientist* by Sylvia Acevedo (Grade level: 5-7)

Session 1 Rundown

Eat (20 minutes)

Greet (5 minutes)

- ❑ Welcome and greet families to the first session.
- ❑ Ask families to sign in and instruct them to pick up one Family Space Journal as well as badges for each family member ("Flight Commander" name tags for adults and "Space Scout" name tags for children).
- ❑ Invite families to get food and eat.
- ❑ Place a session 1 table tent on each table. Table tents feature a daily vocabulary word and an icebreaker question to get families talking.

  Say something like:

  Welcome to the READY JET GO! Family and Community Learning series. Please sign in and pick up a Flight Commander name tag for yourself and a Space Scout name tag for each child. Also take one Family Space Journal for your whole family. Then grab a meal and find a place to settle in. I will set up a table tent on each table that has a question to get your family warmed up and thinking about what we will do today.

Jet's TIPS



Before parents arrive, try to arrange the room in a way that helps facilitate conversation and establishes a community. For example, set up tables for groups of two or three families to eat and talk together. Tables can also be pushed together to make one large table that allows families to sit across from each other and converse easily. Parents may need to spread out later during the Make section when they build their projects.

Sometimes our first instinct is to make a connection with children. Remember, it's just as important to make a connection with adults to establish rapport with families.

Mindy's TIP



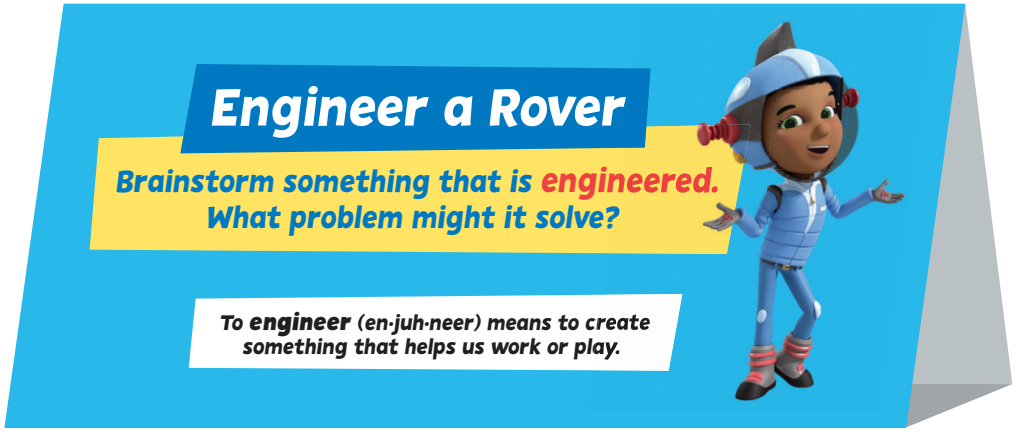
Consider starting the first session with a special space-themed treat like star-shaped cookies and decorating the room with space-themed decorations.

Plan on older and younger siblings not in the 5-8 age range attending sessions with their families. Preplanned activities may not be age-appropriate for these siblings, and they may become unengaged or distracted. Offer older and younger siblings age-appropriate tasks or activities to redirect their attention and help the whole family stay engaged with the session.

- Older siblings can fill roles with more responsibilities to help their younger siblings, for example serving as a recorder of ideas, scissor handler or area organizer.
- For younger siblings, provide materials for a few simple activities each day. For example, a space themed puzzle, READY JET GO! coloring sheets and crayons, black paper with star stickers and metallic markers or a simple sensory experience like Play-Doh® or Kinetic Sand®.







Introduce (15 minutes)

❑ Give a brief overview of the program, explaining how it will be conducted and what parents can expect from the sessions. Over the course of four workshops, families will explore space, share experiences with other families and have fun as a family!

Say something like:

PBS KIDS Family and Community Learning programs are a series of interactive sessions where families explore, play and learn together with PBS KIDS media and fun hands-on activities. This program is called the READY JET GO! Family and Community Learning series. We will be exploring Earth and space science over four workshops. Each workshop is 2 hours in total and has 4 parts:

- ***EAT:** You can relax, share a meal and get to know the other families at your tables.*
- ***EXPLORE:** Parents, you'll have the opportunity to talk together while your children engage in fun activities to learn about Earth and space. Then you'll come together as a family at the tables and use media, technology and activities to explore space together.*
- ***MAKE:** You will work together with other families in an engineering activity.*
- ***SHARE:** You will end the day by sharing and reflecting on today's experiences.*



Jet's TIP

Talk about your own interest in Earth and space science. If you don't have much space science experience, that's okay! Tell families you are eager to go on this space adventure together!



❑ Introduce yourself to the group, acknowledge their efforts to get there and thank them for coming. Say your name and something about yourself related to the topic of the camp.

Say something like:

My name is_____, your Senior Flight Commander for this space adventure! I'm interested in Earth and space sciences, and I'm looking forward to exploring space together and learning something new from all of you. Thank you for coming to our first session today. It's great that you are all here for this learning adventure! Together we're taking a huge leap to support your children's learning.



Courtesy of Louisiana Public Broadcasting

❑ Explain the significance of the badges.

Say something like:

During the READY JET GO! Family and Community Learning program, each of you will earn a badge at every session. Badges are stickers that match the hands-on project we complete each day. You can place the sticker wherever you like. You can earn a total of four badges. Today you will earn the Spacesuit Designer badge!



Explore (35 minutes)

Gather (10 minutes)

- ❑ Gather children and parents on separate sides of the room for this quick introduction activity.

  Say something like:

  Now we're going to start our first activity! Flight Commanders, we're going to move to one side of the room and learn a little about each other. Space Scouts, you're going to move to the other side of the room with Senior Flight Commander _____ (other facilitator's name) and share what we already know about space.

Sean's TIP



Try to reduce distractions during this split-up time for both groups by giving groups their own space. If you have access to multiple rooms at your site, take one group into a different room. If you have only one room or if the room is large, take groups to opposite corners of the room. Use the space available to you in whatever way makes sense at your site.

Parents:

- ❑ Ask parents to find a talking partner to briefly introduce themselves.
- ❑ Provide suggestions about what to share, such as the ages of their children and a special characteristic of each.

  Say something like:

  I will model how this exercise can look. For example, "Hi, my name is (your name). My child(ren)'s age(s) are _____. One special characteristic about him/her/them is that they are curious about everything. They're constantly asking questions."

- ❑ Have parents introduce their partner to the rest of the group and share one characteristic they mentioned about their child(ren).
- ❑ Ask parents to share with each other what they expect to learn in the workshops.

Jet's TIP



Consider having parents pair up with someone they don't already know to help parents get comfortable with one another.

Sydney's TIP



After parents introduce themselves, is a great opportunity to set expectations for attendance and effort for the workshop series.

- ❑ After a few minutes, ask one or two pairs to volunteer to introduce their partners and share what they talked about.
- ❑ Thank families for sharing and validate their comments.

  Say something like:

  Let's build a community here where everyone attends every workshop possible and is always ready to share and learn. You are welcome to exchange emails or phone numbers with each other.

- ❑ Transition to learning about space by watching a READY JET GO! episode as a family.

  Say something like:

  Media and technology are effective tools when families use them together to support learning. At this workshop, I'll show you ways to do that. Your family can try the ideas at home.

Children:

- ❑ Guide children to either sit in a circle or remain in their chairs, depending on the set up of your space.
- ❑ Once children are settled down, find out what they already know about space by either asking questions or going on a guided space journey.

  (Asking questions) Say something like:

  Jet and his friends spend their days exploring space. Over the next four workshops, we'll be exploring space too! But first, let's figure out what we already know about this great thing we will be exploring. What do you think space is? What do you think space is like? Where is space and what can we find there?

  (Guided space journey) Say something like:

  Close your eyes and take a deep breath. For just a little while, we're going to pretend that this room is actually a spaceship. Strap yourself tightly to your seat. Close your eyes and prepare for take off … 5, 4, 3, 2, 1, lift off! Look outside the windows at the clouds zooming past us. The spaceship is flying higher and higher into the sky. Feel the spaceship start to slow down. We are in space! Now I'm going to ask questions about where you are and what's around you. Right now just think about your answers. We will be sharing them out loud a little bit later.

You can ask the following questions:

"Look outside of your spaceship! What do you see?" "Is it dark or bright?" "Do you hear anything?" "Do you smell anything?" "What does it feel like?" "What are you wearing?" "Something just flew past us! What could it be?" "There's something big and round up ahead. What do you think it is? What color is it?"

End the guided space journey by saying:

When I count down from 3, open your eyes! Find a partner at your table and talk about what you imagined.

- ❑ Pass out pencils with erasers and a full range of colored pencils for each table.
- ❑ Children will draw their own representation of space.

  Say something like:

  What do you picture when you hear the word "space"? Do your best to draw what you are imagining. If children went on the guided space journey, you can say, "Now we're going to draw what we just imagined!"

- ❑ Move around the room to ask children questions about their drawings.

  You can ask questions like:

  "Tell me about this object you drew. What do you call it?" "That's an interesting detail to add. Why did you draw a person wearing a helmet?" "I like the color of this planet. Why did you choose that color?" "You drew some amazing things that exist in space! Are there other details you could add to your drawing?"

- ❑ After this activity, let the kids know that they will be reuniting with their families to watch a READY JET GO! episode and learn more about space.

Sean's TIP



Try to have several colored pencils for commonly used colors at each table (e.g., black, yellow) so children do not have to wait long to use them.

Jet's TIP



Get children excited about the upcoming episode by practicing a READY JET GO! chant. After you say "Ready Jet," children say "Go!" This can also be a great attention getter when the room gets loud.

Watch (10 minutes)



- ❑ Have families gather together.
- ❑ Before showing a clip of the READY JET GO! episode **Mindy Turns 5, Part 2** (full clip, 2:45 mins.), provide some information to orient families to what they're about to watch. Also provide prompts so families can start thinking about key concepts in the next hands-on activity while they watch.

  Say something like:

  Mindy wants to have a tea party on the Moon for her birthday. But the Moon and the Earth are very different. While you watch the video, try to come up with three differences between the Moon and the Earth! After the episode, you can share what you learned.

- ❑ After the episode, ask families to volunteer sharing differences they found between Earth and the Moon. Examples include temperature, gravity and amount of oxygen.

Digital Play (15 minutes)

- ❑ Have families gather together.
- ❑ Put families into groups.

  Say something like:

  We'll continue to share and reflect in small groups of two or more families. This is important so you can meet the other families in the session, begin building a parent engagement community and continue to learn from one another.

- ❑ Provide tablets with the Space Scouts app already downloaded.
- ❑ Families take 10 minutes to play the Base Builder game on the Space Scouts app and talk in their family groups about what the game is teaching their children.

  Say something like:

  Now we're going to play a READY JET GO! game called Base Builder. Take a few minutes to explore the features. Then talk at your table with other families about what you think this game is teaching children. What do you think this game tells us about how engineers design and build things to help protect astronauts?

- ❑ While the parents talk to each other, walk around the room and encourage them to continue sharing.
- ❑ After the families play with the app, the facilitator can take a moment to make the connection between digital media, technology and learning and explain how to put them into practice at home to promote learning skills in children.

  Say something like:

  This game allows us to explore the different environmental challenges of Earth, Moon and Mars environments while practicing important steps from the Engineering Design Process. This game is a great example of how we can effectively involve our children in STEM (i.e., science, technology, engineering, math) learning using media and technology.

Jet's TIP



If you want to be intentional about pairing families into new groups, you can randomly assign pairs by placing matching cards inside a bag and asking the Flight Commander of a family unit to take a card and pair with another family unit that draws the same card.

Make (40 minutes)



Courtesy of KET

❑ Transition to the Make activity.

Say something like:

We have a problem! Because Earth is different from space, astronauts need special suits to keep them safe when they leave Earth to explore space. We need your help to design and build a spacesuit that will protect an astronaut while he or she explores space!

Blast off (10 minutes)

❑ Give families the assignment to build a spacesuit for a stuffed animal.

❑ Ask families to brainstorm how their spacesuit will protect an astronaut (i.e., the problem their spacesuit will solve). This is the first step of the Engineering Design Process. Families can use what they learned in the episode and their own background knowledge to help them brainstorm. Try offering information or solutions only if families get stuck.

Say something like:

Each family will work together as engineers to build a spacesuit for a stuffed animal. First, talk at your table about what problem your spacesuit will solve. For example, your spacesuit can protect an astronaut who is standing on the surface of chilly Mars from getting too cold. Or it can keep the astronaut who's on a spacewalk close to the blazing sun from getting too hot. This is the first step of the Engineering Design Process, which is made up of the steps engineers use to build something that solves a problem. Use what we learned from the READY JET GO! episode, the Base Builder game and what you already know about space to identify the problem you want to solve.

What is the Engineering Design Process? Engineering is a process of identifying and developing solutions to problems. The Engineering Design Process is a series of steps that engineers use to identify a problem to solve. An engineer makes observations and gathers information in order to clearly understand the problem and then, designs and creates solutions. For more information, take a look at the Engineering Design Process graphic and explanation in this guide.

Activity (30 minutes)

- ❑ Families will use their Family Space Journal to imagine and plan a design for a spacesuit.

  Say something like:

  You talked about what it means to design a solution to a problem earlier in the session. This is the next step of the Engineering Design Process, to imagine and plan, where you will design your astronaut's spacesuit. There are lots of possible ways to go about designing and creating your astronaut's spacesuit. Sketch, draw and share ideas!

- ❑ Introduce the selection of building materials to families.

  Say something like:

  On this table are the materials you have to work with. Flight Commanders and Space Scouts, brainstorm together which materials would be best to use for your design and why. Once your design is ready, collect your materials and begin creating!

- ❑ Make sure families have completed designing the astronaut spacesuit.

- ❑ Then, instruct families to gather their building materials and begin building.

- ❑ Walk around the room to provide assistance.



Courtesy of KET

- ❑ Validate family work.
- ❑ Ask questions about how they might test and/or improve their design.

  Say something like:

  "Great design! Can you describe how your spacesuit solves the problem you identified and keeps astronauts protected?" "You picked some great materials here! Do you think these materials will resist tearing?"

- ❑ Flight Commanders and Space Scouts receive a **Spacesuit Designer badge!**

  Say something like:

  By building this spacesuit together, you're taking steps with your children to think about and apply Engineering Design practices. You will continue using Engineering Design practices together in future sessions.





Courtesy of Louisiana Public Broadcasting

Share (35 minutes)

- ❑ Ask families to share their spacesuit with the whole group.

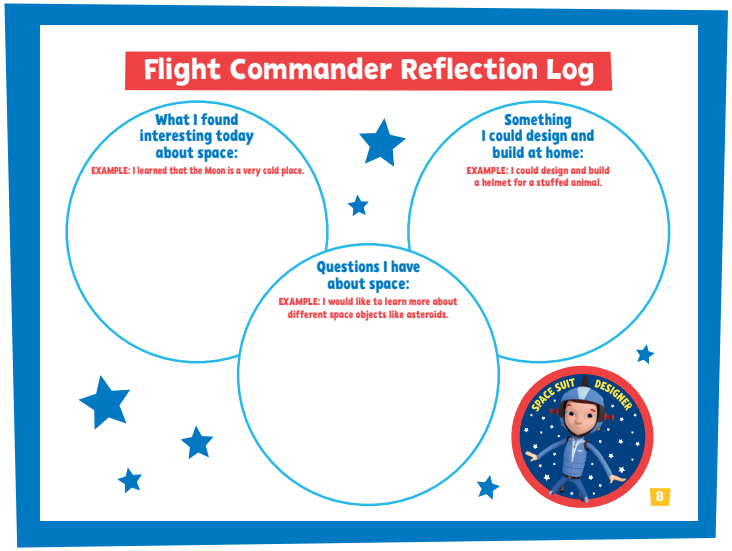
Sean's TIP



Take-home activities are not mandatory "homework" but opportunities for parents who are looking for more ways to connect with their child on an exciting STEM project. If families are unable to complete the activity, be understanding and supportive, and continue to reinforce the importance of parents' direct participation.

Family Space Journal (30 minutes)

- ❑ Prompt children and parents to reflect on today's workshop with their own families. Ask families to jot down answers to the questions in their Family Space Journals.
- ❑ Walk around the room to ensure that each family understands the instructions and to answer any questions.
  - "What I found interesting today about space:"
  - "Questions I have about space:"
  - "Something I could design and build at home:"
- ❑ Ask family Flight Commanders to share thoughts with the whole group or with other families at their table.
- ❑ Validate parent comments and ask for a round of applause for the entire group.
- ❑ Encourage families to try new ideas from this experience when they go home. They can practice the ideas by doing the take-home activity as a family, which will be mentioned before the end of the session.
- ❑ Collect Family Space Journals until the next session.



Say something like:

Thank you for coming today. You can support your child(ren)'s learning at home by trying new ideas you learned from other families, replicating some of the activities we did today or completing the take-home activities. I'll tell you more about those before the session ends.

Preview extension materials (5 minutes)

- ❑ Preview the take-home activity, which is making a paper astronaut helmet.
- ❑ Tell families they can share the results of the take-home activity at the next session. Give parents the option to bring in a video log of their take-home activity or photos of another activity they did together as a result of their experience in the session today.

  Say something like:

  If you decide to work together to make a paper helmet for the astronaut, you can tell us about your building process by recording a video log! Scientists use video logs to share what they were thinking when working on an important project. You can record your video log on a smartphone and, if you like, can share the video in our next session. Your take-home activity sheet lists some questions to answer on your video log. This is not homework, so if your family prefers to continue learning by reading or doing another activity related to today's activities, that works too.

Jet's TIP



Smartphone photos are an alternative way to share family engagement activities at home. You can suggest that families take photos of themselves reading space-themed books or participating in another activity together as a result of their experience in the session today. Open up opportunities for sharing.

If your budget allows, give each family a STEM book to add to their home libraries. Preview the book. Read the title, author's name and a brief description. Flip through a few pages to show families the illustrations. Today's book is *A Big Mooncake for Little Star* by Grace Lin. This book for young readers illustrates the phases of the Moon.



- ❑ Thank parents for coming and invite them to come to next week's session.

  Say something like:

  Next session, we're going to build and launch rockets! We hope you'll join us again to continue this space adventure. While we're having fun, we're also supporting our children's learning about Earth and space.

Session 2: Blast Off!



Introduction from Jet

"Hello, facilitators! Jet Propulsion here. Great job leading families to build a spacesuit to protect an astronaut. Now we are moving on to the exciting, action-packed subject of rockets! Your mission is to support the Flight Commanders to lead their Space Scouts to build and improve rockets. Go forward and develop the next generation of rocket scientists! READY JET GO!"



Today's Big Idea

Today families are blasting off into space! Families will explore the forces and motion involved in launching a balloon rocket and make improvements so the rocket travels farther.

Session Learning Goals

- ❑ Ask questions, observe and discuss ideas about what makes something move and how the movement can be controlled and changed
- ❑ Explore the effects of forces like pushes and pulls by making and testing predictions
- ❑ Use drawings, pictures, movement and 3D materials to represent ideas and make sense of everyday experiences
- ❑ With guidance, plan and conduct an investigation (science and engineering practice)
- ❑ Analyze data to decide if a design solution works (as intended) and improve a design based on information gathered through testing and interpretation of results (Engineering Design Process)

Getting Ready for the Day

Effective facilitators make their work look effortless and natural but prepare in advance to be successful! Make sure to read through this Materials and Preparation table at least a week in advance to allow time to collect or purchase supplies.

Materials and Preparation

Be sure to gather supplies in advance so you have time to organize and prepare the materials as described in the chart below.

ACTIVITY	MATERIALS
Eat Have food and paper goods set out and tables ready with tablecloths for when families arrive. Have materials organized and ready for families to easily pick up upon entering.	❑ name tags ❑ sign-in sheet and pens ❑ table tent for session 2 ❑ tablecloth (reusable, if possible) ❑ paper goods (made from recycled materials when possible): napkins, plates, utensils, cups ❑ aluminum foil ❑ trash bags, trash can
Explore Have a computer and projector set up and ready to show the video to the group. If available, make sure computers are connected to the Internet to play Jet's Rocket Ship creator.	❑ READY JET GO! video clip from episode **Lone Star 2: Rocket Kids!** ❑ computers with Internet access (set up to play Jet's Rocket Ship Creator) ❑ small and large marbles ❑ paper tubes ❑ scissors ❑ balloons ❑ flipchart or whiteboard

ACTIVITY	MATERIALS
Make Arrange chairs in an open space for the balloon rocket experiment.	❑ Family Space Journals ❑ pencils ❑ 2 chairs per group ❑ string ❑ scissors ❑ paper tubes ❑ straws ❑ balloons ❑ measuring tape or rulers ❑ masking tape ❑ preset balloon rocket model (optional) ❑ Rocket Launcher stickers
Share Have take-home materials organized and ready for pickup.	❑ Family Space Journals ❑ pencils ❑ take-home handout ❑ take-home materials (e.g., recommended book)

RECOMMENDED BOOK TO SEND HOME WITH FAMILIES:	OTHER GREAT BOOKS ON TODAY'S THEME:
If You Decide to Go to the Moon by Faith McNulty (Grade level: PreK-3)	❑ *Forces Make Things Move (Let's-Read-and-Find-Out Science 2)* by Kimberly Bradley (Grade level: K-3) ❑ *Katherine Johnson (You Should Meet)* by Thea Feldman (Grade level: 1-3) ❑ *Hidden Figures Young Readers' Edition* by Margot Lee Shetterly (Grade level: 3-7)

Session 2 Rundown

Eat (20 minutes)



Greet (10 minutes)

- ❑ Welcome and greet families to the second session.
- ❑ Ask families to sign in and pick up their Family Space Journals.
- ❑ Invite families to get food and eat.
- ❑ Place a session 2 table tent on each table.

Say something like:

Welcome back. This is the second session of the READY JET GO! Family and Community Learning. Thank you for supporting your child's learning by coming here today.

Please sign in. Then you are welcome to grab a meal and find a place to settle in. I will set up table tents with a new question for each family to consider as we get ready for today's adventures.

Jet's TIP



Consider playing music to create a friendly atmosphere.

Review and Preview (10 minutes)

- ❑ Welcome families back and have new families introduce themselves.
- ❑ Briefly review last week's session in one or two sentences.
- ❑ Ask if families would like to share their paper astronaut helmets from the take-home activity, a video log or any still photos. They can also share reactions to any books they read or other activities they might've done related to space. Encourage parents to share their experience putting what they learned last week into practice.

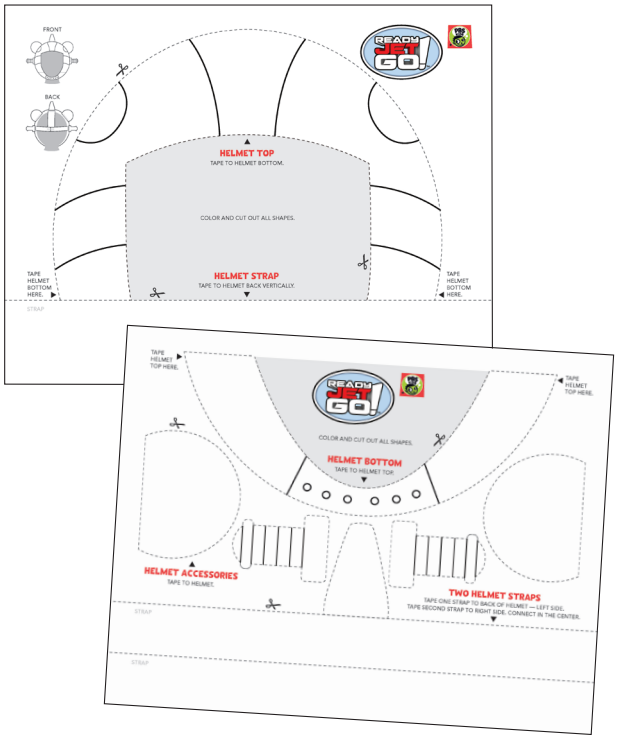
  Say something like:

  Last session we compared Earth and other places in space and built a spacesuit. You took home a guide to making a paper helmet for an astronaut. Did anyone have a chance to work on the astronaut helmet, record a video log or take photos? We have time for one or two Flight Commanders to share what they did at home. Did you use any ideas from our last session?

- ❑ Introduce the daily topic and the day's activities.

  Say something like:

  Today, Flight Commanders and Space Scouts will earn the Rocket Launcher badge by exploring forces and motion and building a rocket.



Mindy's TIP



Encourage families who have not spoken before to share if they are comfortable doing so.

Explore (35 minutes)



Gather (10 minutes)

❑ Gather children and parents on separate sides of the room (or in separate rooms) for this quick introduction activity.

Say something like:

Now we're going to start our first activity! Flight Commanders, we'll move to one side of the room and explore forces and motion with marbles. Space Scouts, you'll move to the other side of the room with Senior Flight Commander_____(other facilitator name) and explore forces and motion with balloons.

Parents:

❑ Remind parents that they can foster science and engineering learning at home by encouraging their child's curiosity. They can ask questions and work with their children to find solutions to everyday problems.

Say something like:

Science and engineering are all about being curious. Science learning is about finding answers to questions. Engineering is about finding solutions to problems. Children are naturally curious and do this already! Encourage their curiosity by asking questions and working with them to figure out solutions to problems you encounter during everyday activities. For example, how can I use this too-small shirt for something new? How much chocolate sauce should we add to milk to make the best chocolate milk?

❑ Ask parents to form pairs or small groups.

❑ Pass out a balloon to each parent. Ask about latex allergies.

Say something like:

In pairs or small groups, you'll practice asking questions and looking for solutions using a simple object: a balloon. First, we will be curious like scientists and ask, "What do I wonder about this balloon?" In your small group, come up with questions you have about the balloon. For example, "If I blow it up and let it go, what will happen?" You can ask questions about all kinds of things you have at home.

❑ Next, help parents see the balloon through the lens of Engineering Design.
Ask, ***"How might this balloon solve the problem of moving an object forward?"*** Ask parents to come up with ideas.

Say something like:

In pairs or small groups, practice brainstorming solutions to problems just like an engineer would do. Brainstorm possible solutions to the problem of moving an object forward using your balloon.

❑ Have parents open the Family Space Journal to the Science Inquiry and Engineering Design graphics (pages 5 and 10). Tell groups that the graphic names the different steps or practices involved in science or engineering. You will go into greater detail with the Engineering Design Process next session.

Say something like:

Take a look at the Science Inquiry Process Graphic in your Family Space Journals. You'll see the strategies that people use to help answer questions about the world. Now, look at the Engineering Design graphic and the Engineering Design practices, the steps to build something that solves a problem. You don't have to use all of the Science Inquiry or Engineering Design practices every time or use them in the exact order they appear here. We'll go into more detail about the Engineering Design Process next session.

❑ Transition to learning about space by watching a video with their kids.

Say something like:

Media and technology are effective tools when families use them to support learning. During these workshops, I'll show you ways to do that. You can replicate these ideas at home with your child(ren).

Children:

- ❑ Divide children into small groups.
- ❑ Blow up a balloon. Ask children to make a prediction in their small groups about what will happen if you let go. Ask groups to share and write their predictions on a flipchart or whiteboard.

  Say something like:

  In a few minutes, I'll let go of the balloon. At your tables, make a prediction about what will happen. A prediction is what you think will happen next. Be sure to explain why you think that.

- ❑ Let go of the balloon!
- ❑ Ask children to compare their predictions to what really happened in their groups.

  Say something like:

  That balloon sure went fast! What do you think made it move?
  When I let go, what do you think happened to the air inside the balloon?
  The force of the air rushing out and pushed the balloon forward!
  A force is a push or pull on an object.

- ❑ Transition to the READY JET GO! episode.

  Say something like:

  Now let's go back to your families to watch a video together and learn more about space!



Courtesy of KET

Watch (10 minutes)



- ❑ Families gather together to prepare for the next activity.
- ❑ Before watching the READY JET GO! video clip from episode **Lone Star 2: Rocket Kids!**, provide some information to orient the group to what they're about to watch. Also provide prompts so families can start thinking about key concepts in the next hands-on activity while they watch.

  Say something like:

  In this episode, Jet and his friends explore how rockets work and learn about the history of rockets in their town. Later we will build our own rockets and explore how to make them go farther. While you watch, listen to the ideas they have about how to build a rocket that moves.

- ❑ Watch the READY JET GO! clip from episode **Lone Star 2: Rocket Kids!** (4:20 - 6:30 mins).
- ❑ After watching, ask families, "What is pushing the foot rocket up? The force (the push or pull of an object) of the moving air is making the foot rocket move."
- ❑ Ask families how the force (pushes and pulls) or motion of their balloons and the rocket from the episode are the same or different.

  Say something like:

  Flight Commanders, talk with your Space Scouts now about your own explorations with balloons. When you blow up a balloon and let it go, what is the force (the push or pull) moving the balloon? Compare this to the force moving the foot rocket.

- ❑ Ask if one or two families would like to volunteer their answers.

Digital Play (15 minutes)

- ❑ Put families into groups.
- ❑ Provide tablets or computers with Internet access.
- ❑ Families take 10 minutes to play the Jet's Rocket Ship Creator game and talk about what the game is teaching their children.

  Say something like:

  Now we're going to play a READY JET GO! online game called Jet's Rocket Ship Creator. In this game, you'll create a rocket ship and explore the forces and motion involved in reaching your destination. Take a few minutes to explore the features and then talk at your table about what you think this game is teaching children. What do you think this game teaches us about forces and motion in space travel?

- ❑ While the parents talk to each other, walk around the room and encourage them to continue sharing.
- ❑ After the families play with the app, take a moment to make the connection between digital media, technology and learning and explain how to put them into practice at home to promote learning skills in children.

  Say something like:

  This game allows us to explore forces and motion. We see that different types of rocket ships travel differently through space. This game is a great example of how we can effectively involve our children in STEM (i.e., science, technology, engineering, math) learning using media and technology.



Courtesy of KET

Make (35 minutes)

❑ Transition to the Make activity

Say something like:

We have explored balloons and talked about how a balloon is similar to a foot rocket. Now, we are going to build a rocket using a balloon and solve a problem: how do we make our balloon rocket go as far as possible? As a family, you will build a rocket along a string. We are going to focus on testing and improving our balloon rockets.

Sean's TIP



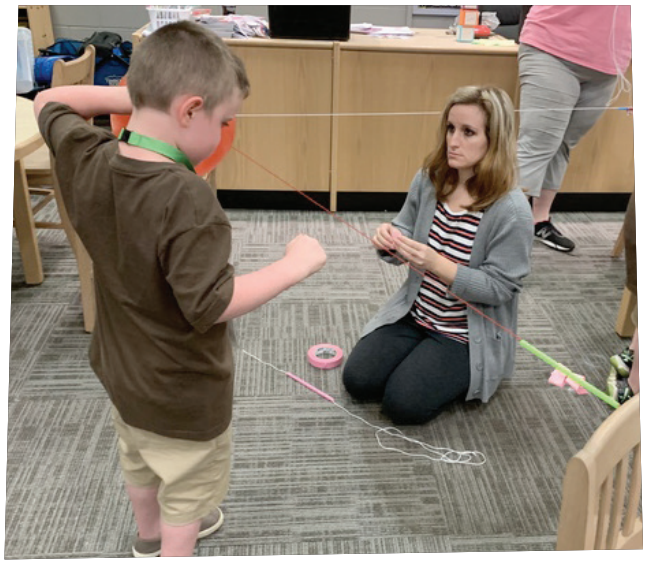
Ask the group if anyone has a latex allergy. If so, have other members of the family handle the balloons.

Activity (35 minutes)

❑ Ask families to look at the diagram in their Family Space Journals to set up the balloon rocket. They will lace string through a paper tube or straw and tie the string between two chairs. They will inflate a balloon, tape it to the bottom of the paper tube or straw, and let it go.

Say something like:

Now, we are going to build balloon rockets! Look at the balloon rocket diagram on page 11 of your Family Space Journal.
A diagram is a picture showing how something works.
Sometimes, engineers start out following a common design but then they make improvements to the design to make it even better.



Courtesy of KET

- ❑ After they build the balloon rocket, ask families to test their designs and use tape to mark the distance it traveled. Address the whole group. Ask families if they noticed any elements they might be able to change to improve their balloon rocket design.

  Say something like:

  Now let's test our rockets and mark how far they traveled with tape. Was there anything you noticed during the launch that might have affected how far the rocket traveled? For example, the looseness of the string, the slant of the string, the weight of the rocket or the amount of air in the balloon? As a family, come up with one thing you would like to change to improve your balloon rocket design. Then test your design again and see if it goes farther.

- ❑ Families return to their rockets, this time investigating how changing elements of the balloon rocket affects how far the rocket travels.
- ❑ Move around the room to support families. Encourage any questions, observations or predictions you hear.
- ❑ End the activity by asking families what observations they made about their balloon rockets and what questions they asked in order to test and improve their balloon rocket.
- ❑ Flight Commanders and Space Scouts earn a **Rocket Launcher badge!**

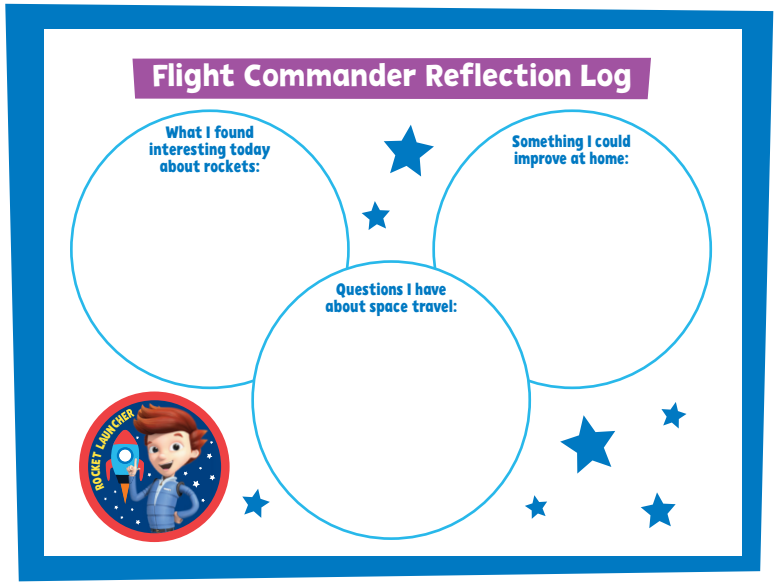


Share (15 minutes)

- ❑ Ask if one or two families will volunteer to share their balloon rocket process.

Family Space Journal (10 minutes)

- ❑ Prompt children and parents to reflect on today's workshop with their own families. Ask families to jot down answers to the questions from their Flight Commander Reflection Log in their Family Space Journals.
- ❑ Walk around the room to ensure that each family understands the instructions and to answer any questions.
  - "What I found interesting today about rockets:"
  - "Questions I have about space travel:"
  - "Something I could improve at home:"
- ❑ Ask family Flight Commanders to share thoughts with the whole group or with other families at their table.
- ❑ Validate parent comments and ask for a round of applause for the entire group.
- ❑ Encourage families to try new ideas from their experience during the session when they go home. They can practice these ideas by doing the take-home activity as a family, which will be mentioned before the end of the session.
- ❑ Collect Family Space Journals until the next session.



Preview extension materials (5 minutes)

- ❑ Preview the take-home activity, which is making paper straw rockets!
- ❑ Tell families they can share their take-home activity at the next session. Give parents the option to bring in a video log of their take-home activity or photos of another activity they did together as a result of their experience in the session today.
- ❑ Thank parents for coming and invite them to come to next week's session.

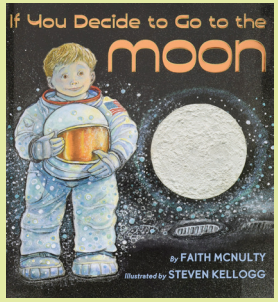
Say something like:

Next session, we're going to design and build a rover! We hope you'll join us again to continue this space adventure. While we're having fun, remember, we're also learning how to support your young children with Earth and space knowledge and exploration.

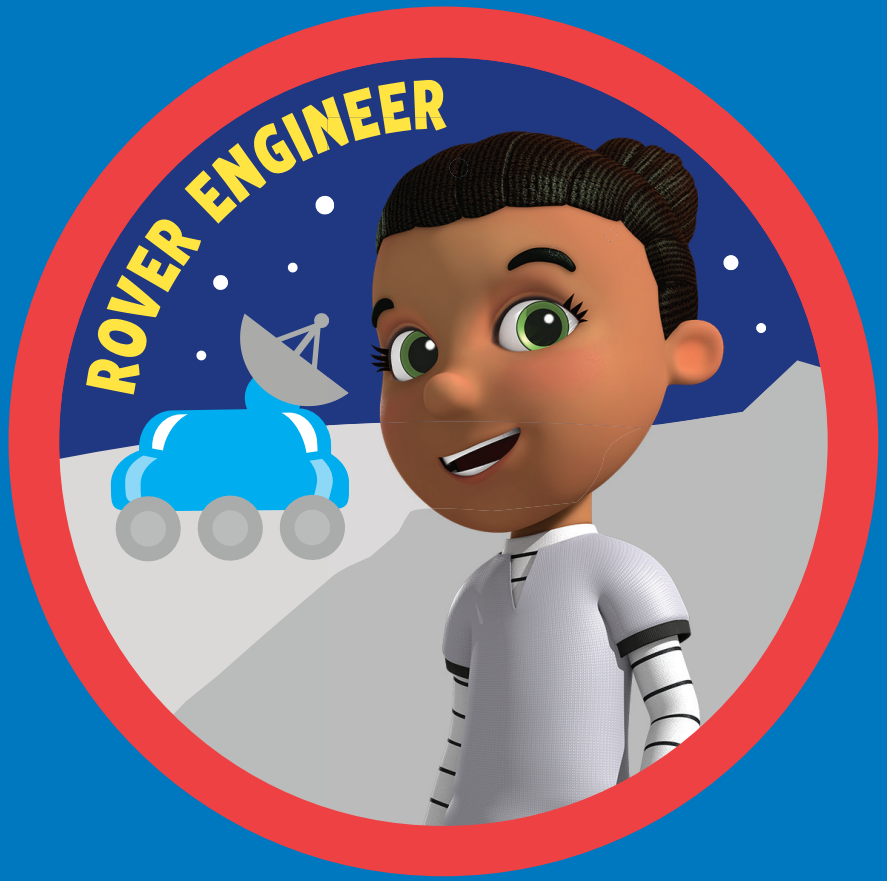


Courtesy of WCTE Central TN PBS

If your budget allows, give families a STEM book to add to their home libraries. Preview the book. Read the title, author's name and a brief description. Flip through a few pages to show families the illustrations. Today's book is *If You Decide to Go to the Moon* by Faith McNulty. This book describes facts about space travel, the journey to the Moon and back to Earth.



Session 3: Engineer a Rover



Introduction from Jet

"Hello, facilitators! It's me, Jet Propulsion, with a new space adventure. Congratulations on completing another great session. Last session you helped families learn about forces and motion by building and improving balloon rockets. Now, it is time to explore Mars with a rover! Families will engineer a rover to move and explore Mars. Engineers designed and built the rovers that are exploring Mars right now. Your mission is to support your Flight Commanders to think, design and build like engineers and support their Space Scouts to develop a rover. READY JET GO!"



Today's Big Idea

Today families will engineer a rover to explore Mars. They will explore how different surfaces are easier to move across than others. Then they will design a rover that can move around on the special terrain of Mars!

Session Learning Goals

- ❑ Explore how objects roll differently across different surfaces
- ❑ Identify a problem that can be solved through the construction of an object (Engineering Design practice)
- ❑ Build a device that provides a solution to a specific problem (Engineering Design practice)

Getting Ready for the Day

Effective facilitators make their work look effortless and natural but prepare in advance to be successful! Make sure to read through this Materials and Preparation table at least a week in advance to allow time to collect or purchase supplies.

Sydney's TIP



Children and adults may find if difficult to cut through cardboard with child scissors. Consider providing softer cardboard for children or precut the cardboard into small pieces yourself. Or have adults or older siblings check out adult scissors from the facilitator and provide clear safety instructions about who can use them.

Materials and Preparation

Be sure to gather supplies in advance so you have time to organize and prepare the materials as described in the chart below.

ACTIVITY	MATERIALS
Eat Have food and paper goods set out and tables ready with tablecloths for when families arrive. Have materials organized and ready for families to easily pick up upon entering.	❑ name tags ❑ sign-in sheet and pens ❑ table tent for session 3 ❑ tablecloth (reusable, if possible) ❑ paper goods (made from recycled materials when possible): napkins, plates, utensils, cups ❑ aluminum foil ❑ trash bags, trash can
Explore Have a computer and projector set up and ready to show the video to the group. If available, make sure tablets have Rover Maker app downloaded.	❑ READY JET GO! video clip from episode **Interstitial: Engineering** ❑ tablets ❑ lots of index cards or construction paper ❑ tape ❑ ramps (cardboard, wooden plank, poster board) ❑ scissors and tape ❑ different ramp surfaces (tin foil, bubble wrap, sandpaper, etc.) ❑ toy cars (e.g., Lego® cars) or things that roll (like paper tubes)

ACTIVITY	MATERIALS
Make Prepare workstations for Engineering Design activity. Arrange ramp and bubble wrap for families to test their rovers.	❑ Family Space Journals ❑ pencils ❑ flipchart or whiteboard ❑ wheels and axles (wooden dowels of different lengths, wheels with the same diameter, straws and plastic lids) ❑ materials for rovers (popsicle sticks, poster board, paper cups, pipe cleaners) ❑ tape, glue (or a fast-drying alternative to glue such as Velcro® glue dots or poster putty) ❑ scissors ❑ ramps (cardboard, wooden plank, poster board) ❑ bubble wrap (for testing rover over rocky terrain) ❑ Rover Engineer stickers ❑ recycled materials: CDs, spools, plastic lids, cardboard, Styrofoam® containers
Share Have take-home materials organized and ready for pickup.	❑ Family Space Journals ❑ pencils ❑ take-home handout ❑ take-home materials (e.g., recommended book)

RECOMMENDED BOOK TO SEND HOME WITH FAMILIES:	OTHER GREAT BOOKS ON TODAY'S THEME:
Be a Maker by Katey Howes (Grade level: PreK-3)	❑ *National Geographic Readers: Mars* by Elizabeth Carney (Grade level: 1-4) ❑ *Pluto's Secret: An Icy World's Tale of Discovery* by Margaret Weitekamp, David DeVorkin, National Air and Space Museum (Grade level: K-4) ❑ *Curiosity: The Story of a Mars Rover* by Markus Motum (Grade level: 3-7)

Session 3 Rundown

Eat (20 minutes)

Greet (10 minutes)

- ❑ Welcome and greet families to the third session.
- ❑ Ask families to sign in and pick up their Family Space Journals.
- ❑ Invite families to get food and eat.
- ❑ Place a session 3 table tent on each table.

Say something like:

Welcome back. This is the third session of the READY JET GO! Family and Community Learning. Thank you for supporting your child's learning by coming here today. Please sign in. Then you are welcome to grab a meal and find a place to settle in. I'll set up table tents with a new question that you can talk about with your family.



Courtesy of KET

Review and Preview (10 minutes)

- ❑ Welcome families back and have new families introduce themselves.
- ❑ Briefly review last week's session in one or two sentences.
- ❑ Ask if families would like to share their straw rockets from the take-home activity, a video log or any still photos. They can also mention any books they read or other activities they might've done related to space. Encourage parents to share their experience putting what they learned last week into practice.

  Say something like:

  Last session we made rockets and investigated how to make a rocket travel farther. You took home a straw rocket activity. Did anyone have the opportunity to work on the straw rocket, record a video log or take photos? We have time for one or two Flight Commanders to share what they did. Did you use any ideas from the last session at home?

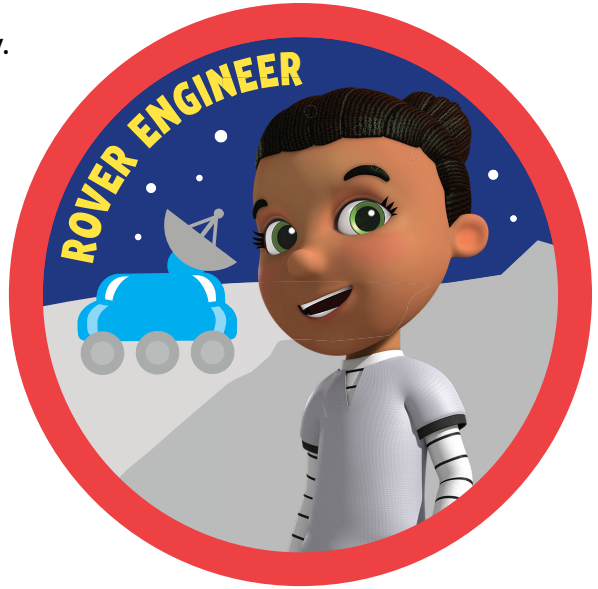


Courtesy of PBS Wisconsin / photo by Mouna Algahaithi

- ❑ Introduce the daily topic and the activities families will take part in today.

  Say something like:

  Today, Flight Commanders and Space Scouts will earn the Rover Engineer badge by building a Mars rover!



Explore (35 minutes)

Gather (10 minutes)

❑ Gather children and parents on separate sides of the room (or in separate rooms) for this quick introduction activity.

Say something like:

Now we're going to start our first activity! Flight Commanders, we're going to move to one side of the room and try out and talk about the Engineering Design Process. Space Scouts, you're going to move to the other side of the room with Senior Flight Commander_____ (another facilitator name) and investigate if some surfaces are more difficult to move across than others.



Courtesy of Alaska Public Media

Parents:

❑ Tell parents that engineering is an important part of everyday life.

Say something like:

Engineers design and build the bridges we use, the buildings where we work and the roller coasters we ride at amusement parks! Engineers also design and build common tools we use at home such as a can opener, blender or a ceiling fan. Next, we're going to engineer towers.

❑ Divide parents into small groups.

❑ Each group has 10 minutes to build a tower that is as tall as possible and stands on its own, using only the materials provided—paper and tape.

Say something like:

In groups, we're going to build a tower that is as tall as possible and stands on its own, using only the materials provided. You can use the materials any way you want, but the structure needs to be able to stand on its own. This means no one can hold it up, and it can't lean against anything. Keep communicating with each other as you work as a team.



Courtesy of Louisiana Public Broadcasting

❑ After 10 minutes, ask the group to choose a representative who will share the tower. Ask the whole group which stages of the Engineering Design Process they used (have them refer to the Engineering Design graphic in their Family Space Journal (page 5).

Engineering Design Process is a series of steps that engineers use to build things:

- **DEFINE A PROBLEM:** The first step in the ED process is to define a simple problem that can be solved through the design of a new or improved tool or technology. **Asking questions, making observations and gathering information are helpful in thinking about problems, and it is important to clearly understand the problem before beginning to design a solution.**
- **IMAGINE AND PLAN:** There is rarely one right answer or one way to solve a problem, which is why it's so important for children to be creative problem solvers. There are many ways to solve a problem!
- **CREATE:** This is the step where you get to put your plan into action. Follow it and build and create a new or improved product or tool.
- **TEST AND IMPROVE:** It's okay if what you made doesn't work the first time. Keep making changes and try again.
- **COMMUNICATE:** Getting feedback from others throughout the process is a great way to get new ideas.

❑ Validate parents' comments about Engineering Design so they can help their children understand and engage better with the process.

Say something like:

Look at the Engineering Design graphic in your Family Space Journal. Which steps of the Engineering Design Process did you use? The steps, as you know, are to define a problem, create, test and improve, and communicate. You can use these same steps when creating things at home. Imagining and planning are important first steps, followed by testing and improving. It's important to repeat these steps before settling on a final product.

❑ Transition to the READY JET GO! episode.

Children:

- ❑ Divide children into small groups.
- ❑ The groups will explore what happens when they roll an object across different surfaces.

  Say something like:

  Today you and your family are building a rover that will need to move across the surface of Mars. First, in our small groups, we will investigate which surfaces are easier or harder to move across than others.

- ❑ Pass out wood or cardboard ramps, tape and scissors to each group. Set up a variety of surface materials like sandpaper, tinfoil and bubble wrap for groups to choose from. Encourage groups to pick different materials rather than all choosing the same material to create flat and inclined surfaces.

  Say something like:

  Decide in your group which surface you will explore. If another group picked a material you wanted, consider choosing a different one. Later, you'll get to test all of the other surfaces, and we want to test as many different surfaces as possible. Use scissors and tape to attach the material to create different surfaces and ramps.

- ❑ To set up the test, tell children to lay out different surface materials. They can also prop up one end to create a ramp using a small box, a stack of books or even a knee.



Courtesy of WFSU Public Media

- ❑ Pass out toy cars or other things that roll (like paper tubes) so groups can test surface materials on flat surfaces and ramps.

  Say something like:

  Set one end of the ramp on a raised surface and let your object roll down the ramp. What happened? Did it roll quickly? Did it get stuck? Now, each group will move to the next group's ramp. We'll continue rotating the groups until each group has tested all of the surfaces.

- ❑ Ask children to share what they learned.

  Say something like:

  What did you learn about how the toy cars move? Pair up with someone who wasn't in your group and share what you learned.

- ❑ Transition to the READY JET GO! episode.



Courtesy of KET

Watch (10 minutes)



- ❑ Families gather together.
- ❑ Before watching the READY JET GO! episode **Try and Try Again** (5:00 - 10:00 mins.), give some information to orient the group on what they are about to watch. Also provide prompts so families can start thinking about key concepts in the next hands-on activity while they watch.

  Say something like:

  Jet and his friends want to send their robot to Mars! Pay attention to how they solve the problem of making a rover move around on Mars, which is rocky and hilly.

- ❑ After the video, ask families to reflect on how Jet and his friends solved the problem.

  You can ask questions like:

  Jet and his friends tried a lot of different things to make Jet 2 move around on the Mars yard. Did they solve the problem like engineers? How? Did they ask questions? Did they make observations and gather information? Use the Engineering Design Process graphic in your Family Space Journal for ideas.

Digital Play (15 minutes)



Courtesy of KET

- ❑ Put families into groups.

  Say something like:

  We'll continue to share and reflect in groups of two or more families. As you share with other families, you'll be building a parent engagement community for you and continuing to learn from one another.

- ❑ Provide tablets with the Space Scouts app already downloaded.
- ❑ Families take 10 minutes to play Rover Maker game and talk in their family group about what the game is teaching their children. What does this game tell us about engineering?

  Say something like:

  Now we are going to play a READY JET GO! game called Rover Maker. In this app, you will modify a rover with different parts to move through different challenging environments. You'll solve problems and design like an engineer does.

- ❑ While the parents talk to each other, walk around the room and encourage them to continue sharing.
- ❑ After the families play with the app, take a moment to make the connection between digital media, technology and learning and explain how using them at home as a family promotes learning skills in children.

  You can say something like:

  We just used digital technology to learn about engineering. When paired with hands-on projects, digital games can help make learning about STEM concepts (i.e., science, technology, engineering, math) even more engaging.

Make (45 minutes)

❑ Transition to the Make activity

Say something like:

Now that we've learned more about different surfaces and the Engineering Design Process, let's design and build a rover!

Sydney's TIP



Show the READY JET GO! "Engineering Design Song" for a fun way to remember the Engineering Design Process. You can find this song in the READY JET GO! **Lone Star 2: Rocket Kids!** episode.

Blast off (5 minutes)

❑ Have families open the Family Space Journals to the picture of the Mars rover. Ask parents to talk with their children about what the surface of Mars is like (based on the picture) and what challenges the rover might have there.

Say something like:

Look at the picture of the Mars rover. What do you notice about the surface of Mars? What problems or obstacles might rovers have when exploring Mars?

❑ Ask families to share their answers to the questions and record answers on a flipchart or whiteboard.

Activity (40 minutes)

❑ Tell families that they are going to be thinking like engineers. Ask them to use the Engineering Design Process page to keep track of the steps they use. Families will be able to share how they used the Engineering Design Process at the end of the activity.

Say something like:

Engineers design, plan, create, test and improve everything from bridges and roads to airplanes and cars! Today, you're going to put on your engineering hats and use the Engineering Design Process to build a rover.

- ❑ Refer back to the answers you recorded to the earlier question about what problems or obstacles could a rover have while on Mars? Now families will design and build a rover that solves one or more of these problems.

  Say something like:

  Now each family will build a rover that solves one or more of the problems rovers face on Mars. For example, if the most important thing a rover must do is move across the rocky ground on Mars, then that's the problem the rover must solve. Think about what to include in your rover's design and how you would test to discover if your rover can solve the specific problem of driving across rocky terrain. You can pick this problem or use another one you came up with a few minutes ago.

- ❑ Have families select the materials they wish to use.

  Say something like:

  Examine the materials at your tables and imagine how you can use them to solve one of the problems we wrote down. Then start designing your own unique rover by imagining and drawing a plan in your Family Space Journals.

- ❑ Give families ample time, at least 40 minutes, to build, test and improve their designs.
- ❑ Families can test if their rover solves their selected problem. For example, families may want to push the rovers down a ramp or push it over bubble wrap to test if it can drive over hilly or rocky terrain.
- ❑ As families work on their projects, walk around the room and provide suggestions or help if needed.

  Say something like:

  Just like in real-life NASA projects, we can collaborate and ask each other for help if we have a question or challenge. Collaboration and communication are important parts of the Engineering Design Process.

- ❑ End the activity by asking which Engineering Design steps families used.
- ❑ Flight Commanders and Space Scouts receive a **Rover Engineer badge!**

Sean's TIP



What happens if the rover doesn't move? This is an engineering problem you or your families may encounter. First, make sure the wheels are touching the ground and the body of the rover is lifted (if not, you may need to move your wheels and axles lower). Next, check to see that the wheel and axle are not stuck or taped directly to the body of the vehicle and can rotate freely.

Mindy's TIP

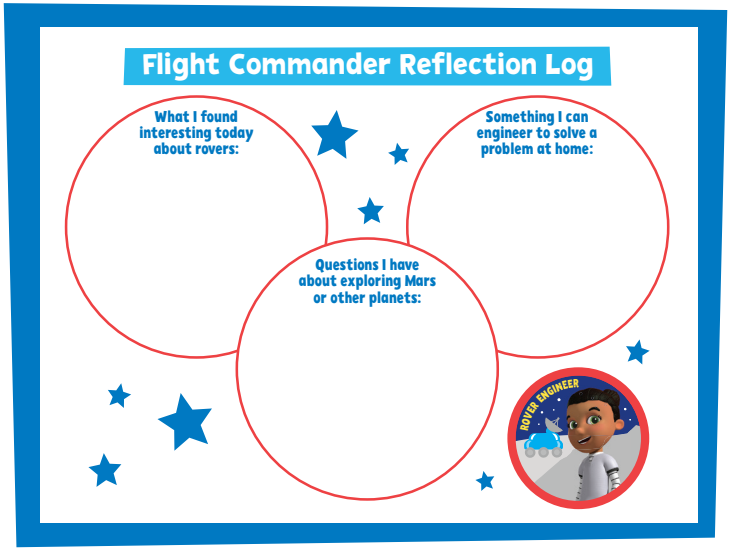


Some families may want to test their rovers on a ramp. Other families may want to test their rovers on a bumpy surface like bubble wrap or over gravel. Provide as many options as possible and encourage creativity as families come up with different methods for testing their rovers.

Share (15 minutes)

- ❑ Ask families to share their rovers and their Engineering Design Process with the whole group.

Family Space Journal (10 minutes)



- ❑ Prompt children and parents to reflect on today's workshop with their own families. Ask families to jot down answers to the questions from their Flight Commander Reflection Log in their Space Journals.
- ❑ Walk around the room to ensure that each family understands the instructions and to answer any questions.
  - "What I found interesting today about rovers:"
  - "Questions I have about exploring Mars or other planets:"
  - "Something I can engineer to solve a problem at home:"
- ❑ Ask family Flight Commanders to share thoughts with the whole group or with other families at their table.
- ❑ Validate parent comments and ask for a round of applause for the entire group.
- ❑ Encourage families to try new ideas from their experience during the session when they go home. They can practice these ideas by doing the take-home activity as a family, which will be mentioned before the end of the session.
- ❑ Reinforce the importance of parent's direct participation in their children's Science Inquiry and Engineering Design Process learning.

❑ Collect Family Space Journals until the next session.

Say something like:

Outside of school, we want children to engage in various activities and environments that spark their interest in STEM. For example, consider planting and tending a garden (maybe a community garden!), playing with blocks and Legos® and reading STEM-related books and magazines like the ones we'll recommend before the session ends. What are other ways your family might engage in STEM activities at home and in the community?



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Preview extension materials (5 minutes)

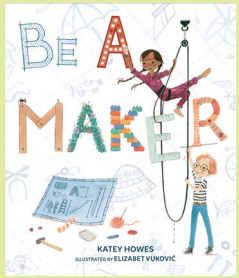

Courtesy of WCTE Central TN PBS

- ❑ Preview the take-home activity, which is creating a map.
- ❑ Tell families they can share their take-home activity next session. Give parents the option to bring in a video log of their take-home activity or photos of another activity they did together as a result of their experience in the session today.
- ❑ Preview the next session.

  Say something like:

  Next session, we're going to build a birdhouse out of recycled materials! We hope you'll join us again to continue our STEM adventures. Even though we're having fun, remember, we're also learning how to support your young children with Earth and space knowledge and exploration. Also, next week is your graduation where we'll celebrate your commitment to attending these workshops. We'll award certificates to everyone at the end of the session. If you'd like to invite more family to attend this short graduation ceremony, feel free to do so.

If your budget allows, give families a STEM book to add to their home libraries. Preview the book. Read the title, author's name and a brief description. Flip through a few pages to show families the illustrations. Today's book is *Be a Maker* by Katey Howes. This book engages young readers with rhyme and repetition and asks questions about the many things we make and how they can make a difference.

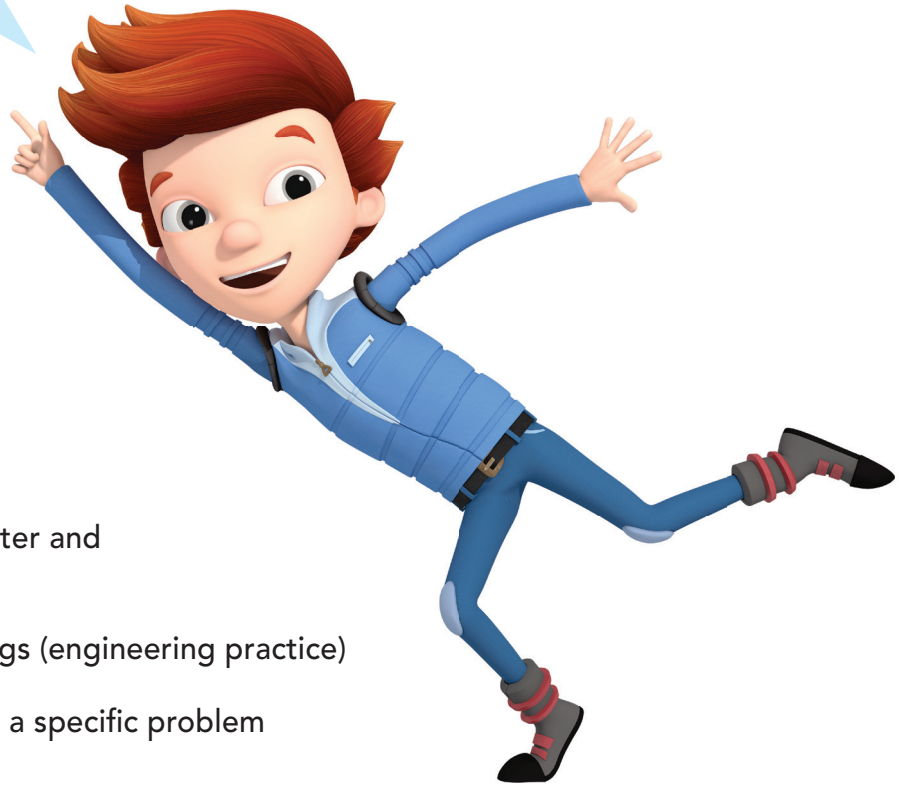


Session 4: Protect the Earth



Introduction from Jet

"Hello, facilitators! Jet Propulsion here. Congratulations! You have made it to the last day of this Earth and space adventure! And what better way to end our space exploration than to celebrate my favorite planet, the one you know and love, planet Earth! Although it might just seem like home, Earth is a part of our solar system and a part of space. Today, we'll talk about its amazing natural resources and why it is such a unique planet. READY JET GO!"



Today's Big Idea

Families will explore and gain a deeper understanding of how people can affect the world around them via an Engineering Design project using recycled materials.

Session Learning Goals

- ❑ Design a solution to reduce the impact of humans on the land, air, water and other living things in the local environment
- ❑ Share design ideas with others in oral and written forms using drawings (engineering practice)
- ❑ Use materials to design and build a device that provides a solution to a specific problem (engineering practice)

Getting Ready for the Day

Effective facilitators make their work look effortless and natural but prepare in advance to be successful! Make sure to read through this Materials and Preparation table at least a week in advance to allow time to collect or purchase supplies.

Sydney's TIP



Children and adults may find if difficult to cut through cardboard with child scissors. Consider providing softer cardboard for children or precut the cardboard into small pieces yourself. Or have adults or older siblings check out adult scissors from the facilitator and provide clear safety instructions about who can use them.

Materials and Preparation

Be sure to gather supplies in advance so you have time to organize and prepare the materials as described in the chart below.

ACTIVITY	MATERIALS
Eat Have food and paper goods set out and tables ready with tablecloths for when families arrive. Have materials organized and ready for families to easily pick up upon entering.	❑ name tags ❑ sign-in sheet and pens ❑ table tent for session 4 ❑ tablecloth (reusable, if possible) ❑ paper goods (made from recycled materials when possible): napkins, plates, utensils, cups ❑ aluminum foil ❑ trash bags, trash can
Explore Have computer and projector set up and ready to show the video to the group. If available, make sure computers are connected to the Internet to play Mission Earth.	❑ READY JET GO! video clip from episode **Who Messed Up the Tree House?** ❑ computers with Internet access (set up to play Mission Earth) ❑ washed and dried recycled containers (the same ones that families will use in the Make activity)

ACTIVITY	MATERIALS
Make Prepare workstations for Engineering Design activity.	❑ Family Space Journal ❑ pencils ❑ glue (or fast-drying alternative to glue such as Velcro® glue dots or poster putty), tape, scissors ❑ decorations ❑ Planet Earth Protector stickers ❑ recycled materials: plastic containers (e.g., yogurt containers, frozen meal dishes, water bottles), paper cartons, plastic utensils, paper rolls, etc.
Share Have take-home materials organized and ready for pickup.	❑ Family Space Journal ❑ pencils and pens ❑ certificates ❑ take-home handout ❑ take-home materials (e.g., recommended book)

RECOMMENDED BOOK TO SEND HOME WITH FAMILIES:	OTHER GREAT BOOKS ON TODAY'S THEME:
One Plastic Bag: Isatou Ceesay and the Recycling Women of the Gambia by Miranda Paul (Grade level: K-3)	❑ *Round Like a Ball* by Lisa Campbell Ernst (Grade level: PreK-3) ❑ *What A Waste: Trash, Recycling and Protecting our Planet* by Jess French (Grade level: 1-4)

Session 4 Rundown

Eat (20 minutes)

Greet (10 minutes)

- ❑ Welcome and greet families to the fourth and final session.
- ❑ Ask families to sign in and pick up their Family Space Journals.
- ❑ Invite families to get food and eat.
- ❑ Place a session 4 table tent on each table.



Courtesy of Louisiana Public Broadcasting

Say something like:

Welcome back. Today is the last session of the READY JET GO! Family and Community Learning. At the end of the session, we'll have a graduation ceremony where you'll receive a special certificate! Please sign in. Then you are welcome to grab a meal and find a place to settle in. I'll also set up the last table tents with a question that you can talk about with your family.

Review and Preview (10 minutes)

- ❑ Welcome families back and have new families introduce themselves.
- ❑ Briefly review last week's session in one or two sentences.
- ❑ Ask if families would like to share their map take-home activity, a video log or any still photos. They can also talk about any books they read or other activities they might've done related to space. Encourage parents to share their experience putting what they learned last week into practice.

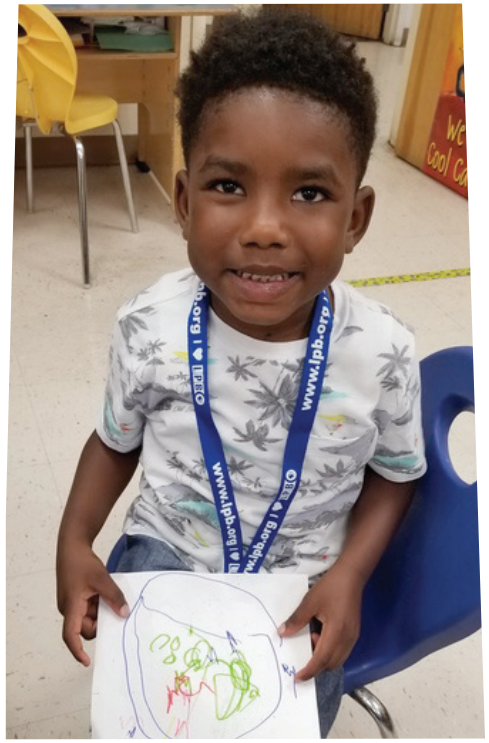
  Say something like:

  In the last session, we designed and built a Mars rover. Families took home a mapping activity. Was anyone able to work on the map, record a video log or take photos? We have time for one or two Flight Commanders to share what they did at home. Did you borrow any ideas from the last session?

- ❑ Introduce the daily topic and the activities families will take part in today.

  Say something like:

  Today, Flight Commanders and Space Scouts will earn the Planet Earth Protector badge. In today's session, we'll continue to learn more about space by exploring our wonderful home planet, Earth! We'll talk about what makes Earth special and explore how to protect its natural resources by reusing materials to make new things.



Courtesy of Louisiana Public Broadcasting



Explore (25 minutes)

Facilitator Note: Families are staying together today. There are no separate "Gather" activities for children and parents.

Sean's TIP



To add an extra challenge to today's activity, ask families to incorporate this material into the birdfeeder they will be building!

Blast off (5 minutes)

- ❑ Pass out assorted recyclable or reusable materials to each table.
- ❑ Ask families to choose one material, describe it and discuss how it could be reused for another purpose.

  Say something like:

  In front of you are many different kinds of materials. As a family, choose one material and describe the shape and what it looks like. Then talk at your tables about how you might reuse this material for another purpose.

Watch (10 minutes)



- ❑ Before watching the video clip of READY JET GO! episode **Who Messed Up the Tree House?**, give some information to orient the group on what they are about to watch. Also provide prompts so families can start thinking about key concepts in the next hands-on activity while they watch.

  Say something like:

  In this episode, Jet and his friends make a big mess in the tree house, but no one thinks that it's their mess. Has this ever happened to you? While you are watching, think about what making lots of trash does to the Earth.

- ❑ Watch the READY JET GO! episode **Who Messed Up the Tree House?** (8:50 - 11:00 mins.)
- ❑ Ask families to reflect on what harm making lots of trash has on the environment. For example, how does trash in the ocean or litter on the highway affect plant and animal life?

Digital Play (10 minutes)



Courtesy of Louisiana Public Broadcasting

- ❑ If time allows, families can take 10 minutes to play Mission Earth game and talk in their family groups about what the game is teaching their children.

  Say something like:

  Now we're going to play a READY JET GO! online game called Mission Earth. In this game, you'll help Mindy and Sunspot take some great photos of features that make Earth extra special. Take a few minutes to explore the features of the game and then talk at your table about what you think this game is teaching children. What does this game tell us about the Earth and Earth science?

- ❑ While the parents talk to each other, walk around the room and encourage them to continue to share.

- ❑ After the families play with the game, make the connection between technology and education and explain how to put them into practice at home to promote learning skills in children.

  Say something like:

  You mentioned in your group discussions how this game teaches us about Earth science. It's a great tool for you and your child to explore more about these topics, and it may even inspire you to observe, talk about and take photographs of nature in your own neighborhood!

Make (40 minutes)



Courtesy of WCTE Central TN PBS

Blast off (5 minutes)

- ❑ Ask families to examine the materials at their tables and imagine how they can use them to build a birdfeeder.

  Say something like:

  Look at the materials at your tables. Everyone, pick up one object and explain how you might use it as part of your design to build a birdfeeder. If you're having trouble, ask others if they have any ideas!

Activity (35 minutes)

- ❑ Ask families to draw a design for their birdfeeder in their Family Space Journals.
- ❑ Read and talk about the "Things to keep in mind" questions in the journal.

  Say something like:

  Now we're going to draw a design for our family birdfeeders. Before you get started, I want to point out the list of helpful questions in your Family Space Journal. You don't have to discuss all of them, only the ones that you think are important for your project. I'm going to read the questions now.

  Questions to get you started:

  - *What do I already know about birds that will help me design my feeder?* For example, the size of the birds I see outside.
  - *What problems might a birdfeeder have?* For example, other animals might try to eat the food.
- ❑ Time to build! This stage will take most of the activity's allotted time.
- ❑ End the activity by asking which Engineering Design steps families used.
- ❑ Flight Commanders and Space Scouts receive a **Planet Earth Protector badge!**



Share and Graduation (30 minutes)

- ❑ Ask families to share their birdfeeders with the whole group. If time allows, ask families to share one key difference between their original design and their final project. Why did they decide to make that change?

Reflection (10 minutes)

- ❑ Ask parents to reflect on their experience in the READY JET GO! Family and Community Learning workshop by responding to three questions. Parents can share their answers on post-it notes that they place on chart paper (write the questions on the chart paper) or can share their answers out loud.
- ❑ Validate parent comments and ask for a round of applause for the entire group.
- ❑ Encourage families to try new ideas from their experience during the session when they go home. They can practice these ideas anytime, anywhere!
- ❑ Reinforce the importance of parents' direct participation in their children's Science Inquiry and Engineering Design Process learning.

  Say something like:

  Outside of school, children should have the opportunity to choose to engage in various activities and environments that spark an interest in Earth science. You can help support this learning at home by replicating the activities we just did today with your family at home or by encouraging the following:

  - ***Discuss with your child different kinds of weather.***
  - ***Talk about things in the sky.***
  - ***Discuss fog, sun and rain with your child.***



Courtesy of Louisiana Public Broadcasting

If your budget allows, give families a STEM book to add to their home libraries. Preview the book. Read the title, author's name and a brief description. Flip through a few pages to show families the illustrations. Today's book is *One Plastic Bag: Isatou Ceesay and the Recycling Women of the Gambia* by Miranda Paul. This book tells the story of how one woman made a big difference in Njau, Gambia, by recycling plastic bags.





Courtesy of WFSU Public Media

Graduation (20 minutes)

- ❑ Transition to graduation.

  Say something like:

  We're wrapping up our space adventure as part of the READY JET GO! FCL in a graduation ceremony, but your family is just starting your space adventures together!

Sydney's TIP



Reflect on the journey families have embarked on together by showing a slideshow of photos taken during the various sessions and/or invite families to mention their favorite projects during the program.

Ceremony

- ❑ Wrap up the session with a celebration!

  Say something like:

  I'm proud of all your great work. Each session you explored space, practiced new science and engineering skills and worked as teams. I'm happy you all joined this program and invite you to continue having space adventures after today.

Mindy's TIP



Feel free to add your own special message to thank parents and families.

- ❑ Call up one family at a time and present them with family certificates.
- ❑ If you choose to use this approach, say something like:

  These past weeks have been about collaborating with each other, learning from each other and supporting each other. Because of this, I'd like you to present each other with the certificate of completion. If you want to say something else to the family, please feel free to do so, although it's not necessary.

Wrap-up

- ❑ Reflect on the work that families took part in over the four sessions.
- ❑ Families leave the final session with a handout that provides suggestions for both digital and non-digital ways to continue their family-focused creative learning efforts in the future.
- ❑ Encourage families to continue to engage at home as a family with all the information and resources they gained throughout these four sessions. They can also continue to meet with other families outside these sessions.



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